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Association between Six Key Messages Behaviour and Incidence of Stunting in Under-Two-Year-Old Children in Central Java Province

Hubungan antara Perilaku Enam Pesan Kunci dengan Kejadian Stunting pada Anak dibawah Dua Tahun di Provinsi Jawa Tengah

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Stunting, Iron folate tablet, Exclusive breastfeeding, Handwashing, Under-two children

ABSTRACT

Background: The stunting prevalence in Central Java Province remains high. Six key messages, i.e. iron tablet supplementation, healthy latrines, exclusive breastfeeding, Integrated Health Care Post (Posyandu) visit, hand washing, and Antenatal Care visit are the efforts to reduce the prevalence of stunting.
Objectives: This study aimed to analyse the relationship between the behaviour of the six key messages and the stunting prevalence in four districts of Central Java Province.
Methods: This cross-sectional study was conducted in Brebes Regency, Tegal Regency, Banyumas Regency, and Semarang City with 424 mothers who have under two-year-old children randomly selected as sample. Data were collected by interview using a structured questionnaire with the results grouped into attitude and practices categories. The body's weight and length were measured by a digital scale and infantometer. Data were analysed using the chi-square test.
Results: The findings indicated that 21.5% of children under two had stunting. Besides, behaviour regarding six key messages were mostly good. There was no association between mothers' iron tablet consumption behaviour and the nutritional status of under-two children. There was an association between maternal attitudes about exclusive breastfeeding and knowledge about hand washing with length for age index (p=0.004). There was also an association between antenatal care and Posyandu visits practice with weight for age index (p=0.004 and 0.018). There was a relationship between attitude regarding the use of latrines and the weight for length index (p=0.001).
Conclusions: Only the key messages of exclusive breastfeeding attitude, antenatal care visit practice, Posyandu visit practice, and hand washing attitude were associated with the nutritional status of under-two children.

INTRODUCTION

Stunting is a chronic nutritional problem that remains a global issue. Stunting refers to a condition where a child's height is below average due to long-term malnutrition, which can cause delays in brain development and growth[1]. Based on the Joint Child Malnutrition Estimates (JME) Report for 2023 by the United Nations Children's Fund (UNICEF), World Health Organization (WHO), and the World Bank, the prevalence of stunted toddlers in Indonesia is the second highest in the Southeast Asian region behind Timor Leste[2]. The results of the Indonesian Nutrition Status Survey (SSGI) show a downward trend, namely 27.7% in 2019, 24.4% in 2021, and 21.6% in 2022[3–5]. The prevalence is still relatively high because it exceeds the WHO target of 20%. Indonesia's National Medium-Term Development Plan (RPJMN) targets a reduction in stunting prevalence to 14% by 2024[6]. SSGI data in 2022 in Central Java Province recorded 20.8% of toddlers experiencing stunting[5]. Although this figure is lower than that of the national figure, it still exceeds the WHO target of 20%.

Stunting in Indonesia is associated with a complex combination of factors, including inadequate maternal nutrition, hygiene habits, low maternal and paternal education, and parenting practices characterised by poor dietary diversity and suboptimal feeding practices[7]. The Indonesian government has launched a campaign to promote several key behaviours to educate the public about stunting. These key behaviour consist of taking iron tablet supplementation, attending classes for pregnant women, exclusive breastfeeding until six months of age,

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regularly attending Posyandu, washing hands with soap, and using healthy latrines[8].

Improving maternal nutrition during pregnancy is a public health priority for stunting prevention in Indonesia. Antenatal care is strongly associated with improving maternal and child health. Several studies have shown that stunting is caused by a chronic process that lasts from pregnancy to early infant life. Therefore, improving antenatal care can play an important role in reducing stunting[9]. A system-strengthening approach during antenatal care was shown to improve maternal nutrition and reduce child stunting in West Bengal, India. In Ethiopia, higher levels of maternal education, better maternal autonomy, average or higher maternal height and weight, at least four antenatal care (ANC) visits, and delivery in a health facility were significantly associated with lower levels of stunting. Improved antenatal care, including nutrition and maternal health, can play an important role in reducing child stunting[10].

Iron-folic acid (IFA) supplementation during pregnancy has been shown to have a positive impact on child development, including reducing the risk of stunting in children under two years of age. A study conducted in South Asia found that iron and folic acid supplementation in the antenatal period increased linear growth and reduced the risk of stunting or *severe* stunting in children less than two years old[11]. Adherence to iron tablet supplementation during pregnancy is critical in reducing the risk of stunting in children. A systematic review found that iron tablet supplementation adherence in adolescent girls is influenced by various factors, including knowledge, attitudes and beliefs about anaemia and Iron tablet supplementation, side effects of iron tablets, and social support[12]. Overall, although the search results did not provide specific information on iron tablet supplementation adherence and stunting, it is clear that iron-folic acid supplementation during pregnancy can have a positive impact on child development, including reducing the risk of stunting in children from 2 years of age[11]. Therefore, it is critical to promote adherence to iron tablet supplementation during pregnancy to maximise its benefits. Factors affecting adherence should be identified and addressed to improve adherence to iron tablet supplementation.

Exclusive breastfeeding is associated with a reduced risk of stunting in children aged 12-23 months. A study conducted in Banjar Margo Sub-district found that exclusively breastfed children had a lower risk of stunting compared to those who were not exclusively breastfed[13]. Another study from Eastern Indonesia also found that exclusive breastfeeding protects children from stunting in low-income populations[14]. However, a study from Jatinangor Sub-District, Sumedang, Indonesia, found no significant difference in the proportion of stunting between exclusively breastfed and non-breastfed children[15]. The association between exclusive breastfeeding and stunting may vary depend on the context and the presence of effect modifiers such as socioeconomic status and access to health services.

Regular visits to Posyandu are essential for monitoring child growth and preventing stunting[16]. Posyandu, a community-based health effort, plays an important role in providing health and nutrition services for pregnant women and children, including monitoring growth through activities such as weighing, height measurement, and counselling[17]. Regular attendance at Posyandu enables timely interventions, referrals and education on nutrition and child growth to effectively reduce stunting.

Handwashing with soap is significantly associated with stunting in children. Research shows that there is a strong correlation between handwashing with soap in running water and stunting in children under five. Mothers with good handwashing habits have a lower risk of stunting in children compared to those with poor handwashing habits[18]. Proper handwashing with soap can prevent diarrhoea, which is a risk factor for stunting. Therefore, regular handwashing with soap is essential to prevent stunting in children.

Poor sanitation is closely associated with the transmission of diseases such as diarrhoea and environmental enteric dysfunction (EED), which leads to decreased nutrient absorption and consequent stunting[19,20]. Furthermore, infectious diseases can lead to low nutrient intake, absorption and utilisation, resulting in stunting[21–23]. A study conducted in Indonesia found that children who did not dispose of faeces in latrines were more likely to be stunted[24]. Another study in Indonesia found that the availability of healthy latrines was associated with a lower prevalence of stunting[25]. Maternal behaviour that follows the six key messages can be an effort to prevent stunting. Several studies on the six key messages which include exclusive breastfeeding such as a study conducted in Nigeria[26], iron tablet supplementation[27], posyandu visits[28], have been conducted. However, very few studies have explored these six key messages combined with the nutritional status of children under two years old. This study aimed to analyse the association of 6 key messages behaviour with the incidence of stunting in children aged 6-23 months in the Central Java region.

METHODS

This study was an analytical observational study with a cross-sectional approach with the subject of mothers who have children aged 6 - 23 months and are willing to become respondents totalling 424 mothers. This study was conducted in four regencies in Central Java, namely Brebes Regency (Negla Village, Kluwut Village, Losari Kidul Village), Tegal Regency (Tuwel Village and Kalisapu Village), Banyumas Regency (Cilongok Village and Gandatapa Village), and Semarang City (Bandarharjo Village and Mijen Village). The sampling technique used the following steps, which included purposively selecting four regencies. Two villages were chosen for each district based on the number of stunting cases. After obtaining the selected villages, respondents were selected through simple random sampling. The independent variables in this study were mothers' knowledge, attitudes, and practices on six key stunting messages (blood addition tablet, healthy latrine, exclusive breastfeeding, child check-up at posyandu, handwashing, and ANC). The dependent variable was the incidence of stunting. Data on knowledge, attitudes, and practices were obtained by interview using a structured questionnaire adapted from previous research that was

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conducted in different locations and has been validated and tested for reliability. The incidence of stunting in children under two years old was obtained by measuring body length using an infantometer. Under-two-year-old children were categorised as stunted if the z score on the body length index according to their age was < -2SD. This study has received ethical approval from the Health Ethics Commission, Faculty of Public Health, Diponegoro University with number 365/EA/KEPK/2022.

RESULTS AND DISCUSSIONS

Table 1 shows that most of the respondents (47.4%) were less than 31 years old. Most of the subjects (58%) had a basic education level (elementary or junior high school graduates), while 9.2% had a higher education level. Most of the subjects were housewives (79.2%). Respondents with medium and low family expenditure were almost equal at 50.6% and 41.1%. Respondents came from Brebes Regency (35.1%), Banyumas Regency (21.2%), Tegal Regency (22.4%), and Semarang City (21.2%).

Table 1. Characteristics of mothers of under-two-year-old children (6-23 months) in Brebes Regency, Tegal Regency, Banyumas Regency, and Semarang City

Characteristics of respondents	Frequency (n=424)	%
Age		
< 31 years old	201	47.4
31-35 years old	127	29.8
>35 years	96	22.7
Education Level		
Not completed primary school level	14	3.3
Primary education level	246	58
Secondary education level	125	29.5
Higher education level	39	9.2
Employment Status		
Working	88	20.8
Unemployed	336	79.2
Family expenses		
Low	174	41.1
Intermediate	215	50.6
High	35	8.3
Region		
Brebes Regency	149	35.1
Banyumas Regency	90	21.2
Tegal Regency	95	22.4
Semarang City	90	21.2

Figure 1 shows that 14.4% of the children were underweight according to the weight for age indicator, 21.5% were stunted, and 11.8% were malnourished. Table 2 shows that more than 50% of mothers' knowledge, attitudes, and practices related to taking iron tablet supplementation, exclusive breastfeeding, ANC visits, visit to Posyandu, and handwashing were in the good and recommended categories. For key immunisation messages, there was a gap between knowledge and practice results. Almost all mothers had good knowledge while the practice was only 41.5% as recommended, the rest were not as recommended (58.5%). The opposite results were seen in the healthy latrine key message, where the percentage of mothers who did not know it was more than half (51.7%), while the percentage of mothers' attitudes and practices were good and as recommended >50% (92.5% and 66.3%).

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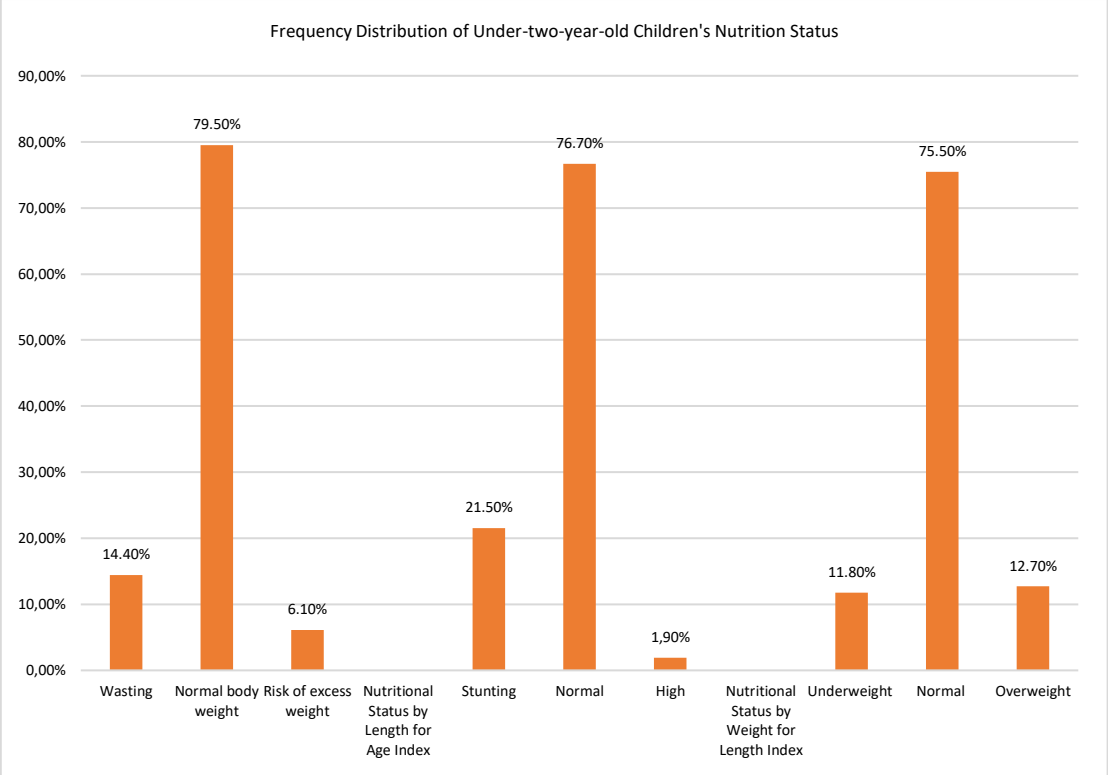

Figure 1. Frequency distribution of under-two-year-old children's nutrition status

Table 2. Frequency distribution of knowledge, attitude and practices of mothers of under-two-year-old children related to six key messages in Brebes Regency, Tegal Regency, Banyumas Regency, and Semarang City

Variables	Frequency (n=424)	%
Iron tablet supplementation		
Mother's knowledge		
Lack of knowledge	136	32.1
Good knowledge	288	67.9
Mother's attitude		
Poor attitude	15	3.5
Good attitude	409	96.5
Mother's practice		
Not as recommended	142	33.5
As recommended	282	66.5
Exclusive breastfeeding		
Mother's knowledge		
Lack of knowledge	125	29.5
Good knowledge	299	70.5
Mother's attitude		
Poor attitude	63	14.9
Good attitude	361	85.1
Mother's practice		
Not as recommended	160	37.7
As recommended	264	62.3
ANC visits		
Mother's knowledge		
Lack of knowledge	78	18.4
Good knowledge	346	81.6
Mother's attitude		
Poor attitude	43	10.1
Good attitude	381	89.8
Mother's practice		
Not as recommended	39	9.2

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Variables	Frequency (n=424)	%
As recommended	385	90.8
Visit to Posyandu		
Mother's knowledge		
Lack of knowledge	180	42.5
Good knowledge	244	57.5
Mother's attitude		
Poor attitude	17	4.0
Good attitude	407	96.0
Mother's practice		
Not as recommended	51	12.0
As recommended	373	88.0
Immunisation		
Mother's knowledge		
Lack of knowledge	2	0.5
Good knowledge	422	99.5
Mother's practice		
Not as recommended	246	58.5
As recommended	176	41.5
Handwashing		
Mother's knowledge		
Lack of knowledge	124	29.2
Good knowledge	300	70.8
Mother's attitude		
Poor attitude	4	0.9
Good attitude	420	99.1
Mother's practice		
Not as recommended	143	33.7
As recommended	281	66.3
Healthy Latrine		
Mother's knowledge		
Lack of knowledge	219	51.7
Good knowledge	205	48.3
Mother's attitude		
Poor attitude	32	7.5
Good attitude	392	92.5
Mother's practice		
Not as recommended	143	33.7
As recommended	281	66.3

Association between Knowledge, Attitude, and Practice of Six Key Messages on Nutritional Status of Under-two-year-old Children

Table 3 shows that mothers with poor knowledge and attitudes tend to have iron tablet supplementation drinking practices that are not as recommended (50.7% and 93.3%). The results of statistical tests showed a relationship between iron tablet supplementation drinking knowledge and attitude towards iron tablet supplementation drinking practices. Mothers who have good knowledge and attitudes also have good iron tablet supplementation drinking practices. The results of statistical analysis (table 3) showed a significant association between mothers' knowledge and attitudes about iron tablet supplementation and the practice of taking iron tablet supplementation. Similar studies conducted in Kenya found that knowledge and attitude towards iron tablet supplementation were associated with iron supplement consumption among pregnant women[29]. Knowledge about the importance of iron and folate supplementation and women's attitudes can contribute to overall practice. This is important not only in improving the health status of infants but also mothers[30].

This could also be seen from the results of knowledge and attitudes regarding exclusive breastfeeding which indicated that mothers who had poor knowledge and attitudes regarding exclusive breastfeeding, almost equally had exclusive breastfeeding practices that were not as recommended (76.8% and 73%). The statistical test results showed that there were associations between knowledge and attitude regarding iron tablet supplementation and iron tablet supplementation drinking practice, as well as a relationship between knowledge and attitude regarding exclusive breastfeeding and exclusive breastfeeding practices. Meanwhile, maternal attitudes about exclusive breastfeeding were associated with exclusive breastfeeding practices (Table 3). According to a 2022 National Center for Biotechnology Information (NCBI) study, mothers who had higher knowledge about exclusive breastfeeding and positive attitudes towards it were more likely to exclusively breastfeed[33]. The study also found that mothers who received breastfeeding information had a 73% higher chance of doing exclusive

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breastfeeding[34]. Another study found that mothers who had higher knowledge about exclusive breastfeeding were 5.9 times more likely to exclusively breastfeed compared to mothers who had high knowledge and positive attitudes showing a 74% higher chance of doing exclusive breastfeeding[35].

There was a significant relationship between ANC knowledge and ANC practice (p<0.05). Mothers who had good knowledge tended to have recommended ANC practices (92.5%). Maternal attitude towards ANC was not significantly associated with ANC practice. Both mothers with good and poor attitudes were equally likely to have recommended ANC practices. Mothers' attitudes regarding Posyandu visits had a significant association with Integrated Health Care Post (Posyandu) visits practices. Among the 407 mothers who had good attitudes related to Integrated Health Care Post (Posyandu) visits, 89.2% had high practices of recommended posyandu visits. In contrast, the results of maternal knowledge related to Posyandu visits were not significantly associated with the practice of Posyandu visits. Both mothers with good and poor knowledge had almost the same percentage of recommended Posyandu visits.

Handwashing knowledge was associated with handwashing practices. Mothers who had good handwashing knowledge practiced handwashing as recommended and vice versa. This result was not in line with handwashing attitudes that showed no relationship. The table shows that mothers who had a poor attitude toward all practice hand washing as recommended (100%). The table also shows there was no significant relationship between knowledge and attitude about healthy latrines with healthy latrine practices. Mothers who had poor knowledge and attitudes about healthy latrines were almost equally likely to have healthy latrine practices that were not recommended.

Table 3. Association between knowledge and attitude on maternal practice of six key messages in Brebes Regency, Tegal Regency, Banyumas Regency, and Semarang City

Variables	Practice				p-value
	Not as recommended		As recommended		
	n	%	n	%	
Iron tablet supplementation drinking					
Knowledge					
Lack of knowledge	69	50.7	67	49.3	0.000*
Good knowledge	73	25.3	215	74.7	
Attitude					
Low attitude	14	93.3	1	6.7	0.000*
Good attitude	128	31.3	281	68.7	
Exclusive breastfeeding					
Knowledge					
Lack of knowledge	96	76.8	29	23.2	0.000*
Good knowledge	64	21.4	235	78.6	
Attitude					
Poor attitude	46	73.0	17	27.0	0.000*
Good attitude	114	31.6	247	68.4	
Antenatal Care					
Knowledge					
Lack of knowledge	13	16.7	65	83.3	0.021*
Good knowledge	26	7.5	320	92.5	
Attitude					
Poor attitude	3	7.0	40	93.0	0.784
Good attitude	36	9.4	345	90.6	
Posyandu Visit					
Knowledge					
Lack of knowledge	26	14.4	154	85.6	0.245
Good knowledge	25	10.2	219	89.8	
Attitude					
Poor attitude	7	41.2	10	58.8	0.001*
Good attitude	44	10.8	363	89.2	
Handwashing					
Knowledge					
Lack of knowledge	98	79.0	26	21.0	0.000*
Good knowledge	45	15.0	255	85.0	
Attitude					
Poor attitude	0	0.0	4	100.0	0.305
Good attitude	143	34.0	277	66.0	
Healthy latrine					
Knowledge					
Lack of knowledge	78	35.6	141	64.4	0.454

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Variables	Practice				p-value
	Not as recommended		As recommended		
	n	%	n	%	
Good knowledge	65	31.7	140	68.3	
Attitude					
Poor attitude	0	0.0	4	100.0	0.783
Good attitude	143	34.0	277	66.0	

*Significantly associated with the chi-square test, p-value <0.05

Table 4 shows that the attitude and practice of iron tablet supplementation drinking did not show a significant relationship with nutritional status according to weight for age, length for age, and weight for length. Mothers who had good attitude and practice of taking iron tablet supplementation tended to have children with normal weight for age index, length for age index, and weight for length index. On the other hand, a high number of mothers who had a poor attitude also had stunted children, which was 40%. Both mothers who had good and appropriate attitudes and practices and those who did not, were equally likely to have well-nourished infants (>70%), but there was a tendency that mothers who had poor attitudes and practices tended to have infants with poor nutritional status.

Good maternal knowledge about iron tablet supplementation can lead to good iron tablet supplementation drinking practices and may reduce the risk of anaemia during pregnancy. Anaemia during pregnancy can impact various aspects, including maternal health, fetal growth, and birth[31]. A case-control study in Purbalingga showed that maternal factors also had a significant effect on child factors. This means that all maternal factors can affect child factors, namely low birth weight, prematurity, lack of exclusive breastfeeding and formula milk, and children with infectious diseases. Among these factors are low education, gestational age (too young or too old), low socioeconomic conditions, unwanted pregnancy, closely spaced pregnancy, anaemia during pregnancy, poor nutritional status, low weight gain, infection during pregnancy, and hyperemesis gravidarum[32].

There was no association between the attitude and practice of exclusive breastfeeding and the nutritional status of weight for age, length for age, and weigh for length. The results of the analysis also showed that mothers with good and appropriate attitudes and practices of exclusive breastfeeding and those without good and appropriate attitudes and practices of exclusive breastfeeding were likely to have equally normal-weight infants. The exclusive breastfeeding attitude variable is significantly associated with length for age index, which means that mothers who had good exclusive breastfeeding attitudes tended to have under-two with the normal length for age index. On the other hand, the results of the analysis showed that mothers who had a poor attitude towards exclusive breastfeeding had more stunted children than mothers who had a good attitude (28.5% and 20.2%, respectively). Both good and poor attitudes and practices of exclusive breastfeeding among mothers showed a tendency to have infants with normal al status. The statistical test results showed that there was no relationship between knowledge, attitude, and exclusive breastfeeding practices with nutritional status according to the weight for length indicator.

Mothers with recommended ANC practices tended to have normal-weight infants (81.6%). The results of statistical analyses showed that there was a significant relationship between ANC practices and the nutritional status of under-five children according to the weight for age indicator. Different results were seen in the ANC attitude variable. Mothers who had good and bad ANC attitudes both had normal-weight infants. Mothers who had good and appropriate ANC attitudes and practices or those who did not, were likely to have infants with equally normal length for age index. The results of statistical analysis showed that there was no significant relationship between mothers' knowledge, attitudes, and practices related to ANC and nutritional status according to the length for age index(p>0.05). The results of the analysis showed that the attitudes and ANC practices of mothers who were poor and inappropriate as well as those who were good and appropriate, both had a high percentage of infants with normal al status (>70%). The results of statistical analysis showed that there was no relationship between mothers' knowledge, attitudes, and ANC practices with nutritional status according to the weight for length indicator.

ANC practices had a significant association with the nutritional status of weight for age index (table 4). Among the 385 mothers who had recommended ANC practices, 81.6% of them had normal-weight infants. A study cinducted by Juneja *et al*. in Uttar Pradesh state in India found that low birth weight was associated with a low number of ANC visits and use of iron supplements for less than 100 days[38]. Other analyses also showed that ANC knowledge was significantly associated with weight for length index. Adequate knowledge and positive attitudes are a must for implementing good practices on ANC.

Mothers' knowledge of ANC also influenced ANC practices (table 2). More than three-quarters of the mothers were aware of ANC visits. In the study of Bashir, *et al,* the overall level of knowledge had a significant positive correlation with practices towards ANC[36]. Whereas previous studies conducted by Patel, *et al,* showed 58%, 100%, and 69.3% had adequate knowledge, good attitude, and good practice towards ANC and Ibrahim et al. [37] showed 86%, 96.0%, and 76.3% of pregnant women had a high level of knowledge, positive attitude and good practice score regarding ANC.

The attitude variable of Posyandu visits was significantly associated with visit to Posyandu practices (Table 3). Among the 407 mothers who had a good attitude, 89.7% of them had recommended child examination practices. Posyandu visits included utilisation of health services and regular visits to the

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Posyandu. A positive attitude leads to good and appropriate practices.

Handwashing knowledge variables were significantly associated with handwashing practices and length for age index (Table 3). Adequate knowledge is a necessity to implement good practices on handwashing. In Table 3, among the 300 mothers who had good knowledge, 79% of them had infants with normal height. Another study also mentioned that children whose mothers did not wash their hands with water and soap before feeding their children had a 1.7 times higher chance of being stunted[24]. Similarly, the results of the maternal handwashing attitude variable were significantly associated with the weight for length index (Table 22). Among 420 mothers who had a good handwashing attitude, 76% of them had normal status. A Positive attitude is a must for implementing good practices about handwashing. The results showed that there was no direct relationship between handwashing habits and nutritional status[40]. However, handwashing with soap is an important factor in achieving and maintain normal status[41]. Handwashing plays an important role in preventing various infections, including those that can affect nutritional status. Research conducted on the relationship between handwashing and basic household sanitation on the nutritional status of under-fives in Bojonegoro Regency found that there was no significant relationship between handwashing and nutritional status[40]. However, this does not mean that handwashing is not important for nutritional status.

Posyandu visits attitudes were also associated with weight for age index (Table 4). Among the 373 mothers who had recommended child examination practices, 81.3% had underweight children. Good child examination practices mean that mothers also routinely bring their children to Posyandu. The Posyandu aims to provide basic health services such as family planning, maternal and child health, nutrition (growth monitoring, supplementary feeding, vitamin and mineral supplementation and nutrition education), immunisation, and disease control (diarrhoea prevention)[39].

The results of the analysis showed that mothers with recommended Posyandu visiting practices had more normal-weight infants compared to those who were not recommended. Statistical analysis showed that there was a significant relationship between the practice of Posyandu visits and nutritional status according to the weight for age indicator. Different results were shown in the attitude variable, which showed that both good and bad attitudes had normal-weight infants. Statistical analysis showed that there was no significant relationship between knowledge and attitude of Posyandu visits with nutritional status according to the weight for age indicator. Mothers who had good and appropriate attitudes and practices regarding Posyandu visits and those who did not, were equally likely to have infants with normal length for age index. The results of statistical analysis showed that there was no significant relationship between mothers' attitudes and practices related to Posyandu visits and nutritional status according to the length for age index (p>0.05). Mothers who had good attitudes and practices related to Posyandu visits and those who did not, are equally likely to have well-nourished children. The results of statistical analysis showed that there was no significant relationship between mothers' attitudes and practices related to Posyandu visits and nutritional status according to the weight for length index (p>0.05).

Mothers who had good and appropriate attitudes and handwashing practices and those who did not, had almost the same percentage of normal-weight infants. The results of statistical analysis showed that there was no significant relationship between mothers' attitudes and practices related to child examination and nutritional status according to the weight for age index (p>0.05). The variables of attitude and handwashing practice both showed no association with length for age index (p>0.05). The results of the analysis stated that both mothers who had good attitudes and hand washing practices had children with normal length for age index. The percentage of stunted and normal children was the same among mothers who had poor handwashing attitudes. Mothers who had good handwashing attitudes had more well-nourished infants than mothers with poor attitudes. The statistical test results showed that there was an association between handwashing attitude and the nutritional status of under-five children according to the weight for age and length for age index(P<0.05).

Different results were shown in the practice variable. Mothers who had good and appropriate handwashing practices and those who did not, had almost the same percentage of well-nourished infants. The results of statistical analysis showed that there was no significant relationship between mothers' practices related to hand washing and nutritional status according to the weight for length index(p>0.05). Mothers who had good and appropriate attitudes and practices of healthy latrines and those who do not, have almost the same percentage of normal weight infants The results of statistical analysis show that there is no significant relationship between maternal attitudes and practices related to healthy latrines and nutritional status according to the weight for age index (p>0.05). Mothers who have good and appropriate attitudes and practices of healthy latrines and those who did not, had almost the same percentage of infants with normal length for age index and weight for length index. The results of statistical analysis show that there was no significant relationship between mothers' attitudes and practices related to healthy latrines and nutritional status according to length for age and weight for length index (p>0.05).

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Table 4. Associations between attitudes and practices of six key messages on the nutrition status of under-two-year-old children in Brebes Regency, Tegal Regency, Banyumas Regency, and Semarang City

Variables	Weight for Age index			p-value	Length for age index			p-value	Weight for length index			p-value
	Wasting	Normal	Risk of Overweight		Stunting	Normal	High		Underweight	Normal	Overweight	
	n (%)	n (%)	n (%)		n (%)	n (%)	n (%)		n (%)	n (%)	n (%)	
Maternal Iron Tablet Supplementation Drinking												
Attitude												
Poor	4 (26.7%)	10 (66.6%)	1 (6.7%)	0.376	6 (40%)	8 (53.3%)	1 (6.7%	0.065	1 (6.7%)	12 (80%)	2 (13.3%)	0.822
Good	57 (13.9%)	327 (80%)	25 (6,1%)		85 (20.8%)	317 (77.5%)	7 (1.7%)		10 (2.7%)	308 (83.2%)	52 (14.05%)	
Practice												
Not as recommended	23 (16,2%)	121 (75.6%)	11 (6.9%)	0.416	37 (26.1%)	121 (75.6%)	11 (6.9%)	0.243	18 (12.7%)	111 (78.2%)	13 (9.1%	0.287
As recommended	38 (13.3%)	216 (81.8%)	15 (5.7%)		54 (19.2%)	216 (81.8%)	15 (5.7%)		32 (11.5%)	209 (75.1%)	37 (13.3%)	
Exclusive breastfeeding												
Attitude												
Poor	13 (20.6%)	48 (76.2%)	2 (3.2%)	0.206	18 (28.5%)	41 (65.1%)	4 (6.3%)	0.004*	13 (20.6%)	42 (66.7%)	8 (12.7%)	0.059
Good	48 (13.3%)	289 (80.1%)	24 (6.6%)		73 (20.2%)	284 (78.7%)	4 (1.1%)		31 (10.2%)	278 (77%)	46 (12.7%)	
Practice												
Not as recommended	28 (17.5%)	121 (75.6%)	11 (6.9%)	0.206	18 (28.5%)	41 (65.1%)	4 (6.3%)	0.004*	13 (20.6%)	42 (66.7%)	8 (12.7%)	0.059
As recommended	33 (12.5%)	216 (81.8%)	15 (5.7%)		73 (20.2%)	284 (78.7%)	4 (1.1%)		31 (10.2%)	278 (77%)	46 (12.7%)	
Antenatal Care (ANC)												
Attitude												
Poor	8 (18.6%)	33 (76.6%)	2 (4.7%)	0.668	10 (23.35%)	33 (76.7%)	0 (0%)	0.614	6 (14%)	32 (74.4%)	5 (11.6%)	0.886
Good	53 (13.9%)	304 (79.8%)	24 (6.3%)		81 (21.3%)	292 (76.6%)	8 (2.1%)		44 (11.5%)	288 (75.6%)	49 (22.8%)	
Practice												
Not as recommended	11 (28.2%)	23 (59%)	5 (12.8%)	0.004*	12 (30.8%)	26 (66.7%)	1 (2.6%)	0.302	6 (15.4%)	27 (69.2%)	6 (15.4%)	0.629
As recommended	50 (13%)	314 (81.6%)	21 (5.5%)		79 (20.55)	299 (77.7%)	7 (1.8%)		44 (10.8%)	293 (76.1%)	48 (12.5%)	
Integrated Health Care Post (Posyandu) Visits												
Attitude												
Poor	5 (30.4%)	11 (64.7%)	1 (5.9%)	0.195	5 (29.4%)	12 (70.5%)	0 (0%)	0.625	4 (23.5%)	10 (58.8%)	3 (17.7%)	0.217
Good	56	326 (80.1%)	25 (6.1%)		86 (21.1%)	313 (76.9%)	8 (2%)		46 (11.3%)	310 (76.2%)	51 (12.5%)	
Practice												

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Not as recommended	14 (27.4%)	34 (66.7%)	3 (5.9%)	0.018*	14 (27.4%)	35 (68.6%)	2 (3.9%)	0.256	11 (21.5%)	33 (64.7%)	7 (13.7%)	0.060
As recommended	47 (12.6%)	303 (81.2%)	23 (6.2%)		77 (20.65)	290 (77.7%)	6 (1.6%)		39 (10.4%)	287 (76.9%)	21 (5.6%)	
Handwashing												
Attitude												
Poor	1 (25%)	2 (50%)	1 (25%)	0.212	2 (50%)	2 (50%)	0 (0%)	0.371	0 (0%)	1 (25%)	3 (75%)	0.001*
Good	60 (14.3%)	335 (79.8%)	25 (6%)		89 (21.2%)	323 (76.9%)	8 (1.9%)		50 (11.9%)	319 (76%)	51 (12.1%)	
Practice												
Not as recommended	15 (10.5%)	118 (82.5%)	10 (7%)	0.418	32 (22.4%)	107 (74.8%)	4 (2.8%)	0.570	14 (9.8%)	109 (76.2%)	20 (14%)	0.602
As recommended	46 (16.3%)	219 (77.9%)	16 (5.7%)		59 (21%)	218 (77.6%)	4 (1.4%)		36 (12.8%)	211 (75.1%)	34 (12.1%)	
Healthy Latrine												
Attitude												
Poor	4 (12.6%)	26 (81.3%)	2 (6.3%)	0.951	10 (31.3%)	21 (65.6%)	1 (2.1%)	0.305	4 (12.5%)	22 (68.8%)	6 (6.3%)	0.547
Good	57 (14.5%)	311 (79.3%)	24 (6.1%)		81 (20.6%)	304 (77.6%)	7 (1.8%)		46 (11.7%)	298 (76%)	22 (5.6%)	
Practice												
Not as recommended	21 (14.7%)	111 (77.6%)	11 (7.7%)	0.618	33 (23.1%)	108 (75.5%)	2 (1.4%)	0.752	22 (15.4%)	98 (68.5%)	23 (16.1%)	0.060
As recommended	40 (14.2%)	226 (80.4%)	15 (5.3%)		58 (20.6%)	217 (77.2%)	6 (2.1%)		28 (10%)	222 (79%)	32 (11%)	

*Significantly associated with the chi square test, p-value <0.05

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Knowledge about healthy latrines was associated with weight for length index (Table 4). Among the 205 mothers who had good knowledge about healthy latrines, 79% of them had under-fives with normal status. Improved access to latrines and water sources can lead to better nutritional outcomes. This is because increased access to latrines can reduce the transmission of enteric pathogens[42]. According to one study, children living in homes with better latrine hygiene were less likely to be malnourished[43]. The limitation of this study was due to the unrepresentative sample that represents the entire population in the selected regencies/cities. The recommendation for the next research is to conduct a longitudinal study in which the six key messages are given intensively for several months and the impact is observed.

Multivariate Analysis Results

Multivariate analysis is conducted if the results of the bivariate test between the independent variable and the dependent variable have a p-value <0.25. These results show that the practice of Integrated Health Care Post (Posyandu) visits is associated with nutritional status based on body weight with an OR value of 2.285, which means that mothers of under-two-year-old children who practice Posyandu visits as recommended have a likelihood of their children having normal body weight 2.285 times greater than mothers whose Posyandu visit practices are not as recommended. However, different results were seen in the attitude of washing hands, which had an OR value of -3,04 which means that, a good handwashing attitude in mothers had a three times smaller chance of having a normal nutritional status of under-two-year-old children according to the indicator weight for length.

Table 5. Multivariate analysis between attitudes and practices on nutritional status by weight-for-age and weight for length on mother of under-two-year-old children in Brebes Regency, Tegal Regency, Banyumas Regency, and Semarang City

Variable	Coeff B	p-value	OR
Weight-for-age			
Posyandu visit practice	0.151	0.023*	2.285
Weight for length			
Hand washing attitude	-0.746	0.003*	-3.040

*Significantly associated with the multivariate linear regression, p-value <0.05

CONCLUSIONS

Among all six key message behaviour, only the key messages of exclusive breastfeeding attitude, antenatal care visit practice, Posyandu visit practice, and hand washing attitude were associated with the nutritional status of children under two years old. Variables that were not associated were due to good and poor attitudes, as well as the recommended and not recommended practices had children with almost the same percentage of nutritional status according to the weight for age index, length for age index, and weight for length index. The delivery of the six key messages needs to be continued by considering strategies and interpersonal approaches to support the acceleration of stunting reduction.

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CONFLICT OF INTEREST AND FUNDING DISCLOSURE

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AUTHOR CONTRIBUTIONS

MIK: Conceptualizing, determining methodology, writing review, and supervising; AFA: Writing-original draft, supervising, editing; HMD: Supervising, investigating; DZN: Supervising, conducting data curation, doing formal analysis, validating, doing visualization; LTD: Doing formal analysis, validating.

REFERENCES

1. World Health Organization. Malnutrition. https://www.who.int/health-topics/malnutrition#tab=tab_1.
2. The Joint Child Malnutrition Estimates (JME). Levels and trends in child malnutrition: UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates: Key Findings of the 2023 Edition. *UNICEF, World Heal. Organ. World Bank Gr.* **24**, 32 (2023).
3. Sudikno *et al.* Laporan Akhir Penelitian Status Gizi Balita Tahun 2019. *Kemenkes RI* 1–150 (2019).
4. SSGI. *Buku saku hasil studi status gizi indonesia (SSGI) tingkat nasional, provinsi, dan kabupaten/kota tahun 2021*. *Kementerian Kesehatan Republik Indonesia* (2021).
5. Kemenkes. Buku Saku Hasil Survey Status Gizi Indonesia (SSGI) Tahun 2022. *Kemenkes* 1–7 (2022).
6. Widasari, L. & Kurniawan, R. Executive Report Accelerating the Reduction of Stunting Year 2022. (2023).
7. Laksono, A. D., Wulandari, R. D., Amaliah, N. & Wisnuwardani, R. W. Stunting among children under two years in Indonesia: Does maternal education matter? *PLoS One* **17**, 1–11 (2022).
8. SUKOHARJO REGENT PROVINCE OF CENTRAL JAVA. *REGULATION OF THE REGENT OF SUKOHARJO NUMBER 90 YEAR 2021 ABOUT BEHAVIOR CHANGE COMMUNICATION*

How to cite: *Kartasurya, M. I., Asna, A. F., Denny, H. M., Nuridzin, D. Z., & Dharmawan, L. T. (2024). Association between Six Key Messages Behaviour and Incidence of Stunting in Under-Two-Year-Old Children in Central Java Province: Hubungan antara Perilaku Enam Pesan Kunci dengan Kejadian Stunting pada Anak dibawah Dua Tahun di Provinsi Jawa Tengah. Amerta Nutrition, 8(1SP), 83–95.*

STRATEGY IN STUNTING PREVENTION. (2021).
9. Permatasari, T. A. E., Rizqiya, F., Kusumaningati, W., Suryaalamsah, I. I. & Hermiwahyoeni, Z. The effect of nutrition and reproductive health education of pregnant women in Indonesia using quasi experimental study. *BMC Pregnancy Childbirth* **21**, 1–15 (2021).
10. Camelia, V. Hubungan Antara Kualitas & Kuantitas Riwayat Kunjungan Antenatal Care (ANC) Dengan Stunting Pada Balita Usia 24-59 Bulan Di Kecamatan Pujon Kabupaten Malang. *J. Issues Midwifery* **4**, 100–111 (2020).
11. Nisar, Y. Bin, Aguayo, V. M., Billah, S. M. & Dibley, M. J. Antenatal iron-folic acid supplementation is associated with improved linear growth and reduced risk of stunting or severe stunting in south asian children less than two years of age: A pooled analysis from seven countries. *Nutrients* **12**, 1–19 (2020).
12. Feriyanti, A., Deviatin, N. S., Nurmala, I., Widati, S. & Atmaka, D. R. Determinant of Adherence to iron supplementation in Adolescent Girl In Spesific Intervention For Stunting Prevention: Systematic Review. *Media Gizi Indones.* **17**, 90–96 (2022).
13. Sari, N., Manjorang, M. Y., Zakiyah & Randell, M. Exclusive breastfeeding history risk factor associated with stunting of children aged 12–23 months. *Kesmas* **16**, 28–32 (2021).
14. Hadi, H. *et al.* Exclusive breastfeeding protects young children from stunting in a low-income population: A study from eastern indonesia. *Nutrients* **13**, 1–14 (2021).
15. Rusmil VK, Prahastuti TO, Luftimas DE & Hafsah T. Exclusive and Non-Exclusive Breastfeeding among Stunted and Normal 6-9 Month-Old-Children in Jatinangor Subdistrict, Indonesia. *Althea Med. J.* **6**, 35–41 (2019).
16. Sekarani, N. A., Herawati, D. M. D. & Rinawan, F. R. Monitoring Obstacles of Toddlers Growth in Public Health Center Margahayu Raya Bandung City during the COVID-19 Pandemic: From Cadre Perspective. *Althea Med. J.* **10**, 8–13 (2023).
17. K. P. P. N. & (BAPPENAS), B. P. P. N. The Importance of Posyandu in Preventing Stunting. https://cegahstunting.id/en/news/the-importance-of-posyandu-in-preventing-stunting/?amp=1 (2020).
18. Ovika Maulida Artharini, Candra Bumi & Adistha Eka Noveyani. Correlation Between Wash and Stunting in Toddlers in Jember Regency. *J. Ilmu Kesehat. Masy.* **13**, 278–291 (2022).
19. Waller, A., Lakhanpaul, M., Godfrey, S. & Parikh, P. Multiple and complex links between babyWASH and stunting: An evidence synthesis. *J. Water Sanit. Hyg. Dev.* **10**, 786–805 (2020).
20. Bhutta, Z. A. *et al.* Evidence-based interventions for improvement of maternal and child nutrition: What can be done and at what cost? *Lancet* **382**, 452–477 (2013).
21. Geberselassie, S. B., Abebe, S. M., Melsew, Y. A., Mutuku, S. M. & Wassie, M. M. Prevalence of stunting and its associated factors among children 6-59 months of age in Libo-Kemekem district, Northwest Ethiopia; A community based cross sectional study. *PLoS One* **13**, 1–11 (2018).
22. Olo, A., Mediani, H. S. & Rakhmawati, W. Hubungan Faktor Air dan Sanitasi dengan Kejadian Stunting pada Balita di Indonesia. *J. Obs. J. Pendidik. Anak Usia Dini* **5**, 1113–1126 (2021).
23. Bank, U. W. *et al.* Child Malnutrition.
24. Woldesenbet, B., Tolcha, A. & Tsegaye, B. Water, hygiene and sanitation practices are associated with stunting among children of age 24-59 months in Lemo district, South Ethiopia, in 2021: community based cross sectional study. *BMC Nutr.* **9**, 1–9 (2023).
25. Syahruddin, A. N., Irmawati, I. & Sari, N. P. Water Sanitation and Hygiene (WASH) and feeding patterns: Linkages with stunting among children aged 6-23 months. *AcTion Aceh Nutr. J.* **8**, 466 (2023).
26. Sabo, A. *et al.* Knowledge, attitude, and practice of exclusive breastfeeding among mothers of childbearing age. *Front. Public Heal.* **11**, 1–9 (2023).
27. Agustina, R. *et al.* Associations of Knowledge, Attitude, and Practices toward Anemia with Anemia Prevalence and Height-for-Age Z-Score among Indonesian Adolescent Girls. *Food Nutr. Bull.* **42**, S92–S108 (2021).
28. Prasticha, A. D., Sampurna, M. T. A. & Dewanti, L. Correlations between Maternal Knowledge, Attitude, and Posyandu Utilization on Nutritional Status in Children Under Five. *J. Matern. Child Heal.* **8**, 188–202 (2023).
29. Tsegai, M. B. *et al.* Knowledge, Attitude, and Practice Regarding Supplemental Iron and Folic Acid Amongst Women Delivering in Edaga-Hamus Community Hospital: A Cross-Sectional Study in Asmara, Eritrea. *Int. J. Womens. Health* **15**, 1593–1609 (2023).
30. Wald, N. J., Law, M. R., Morris, J. K. & Wald, D. S. Quantifying the effect of folic acid. *Lancet* **358**, 2069–2073 (2001).
31. Balcha, W. F., Eteffa, T., Arega Tesfu, A. & Abeje Alemayehu, B. Maternal Knowledge of Anemia and Adherence to its Prevention Strategies: A Health Facility-Based Cross-Sectional Study Design. *Inq. (United States)* **60**, (2023).
32. Santosa, A., Arif, E. N. & Ghoni, D. A. Effect of maternal and child factors on stunting: partial least squares structural equation modeling. *Clin. Exp. Pediatr.* **65**, 90–97 (2022).
33. Sultana, M. *et al.* Knowledge, attitudes, and predictors of exclusive breastfeeding practice among lactating mothers in Noakhali, Bangladesh. *Heliyon* **8**, (2022).
34. Gebretsadik, G. G., Tadesse, Z., Mamo, L., Adhanu, A. K. & Mulugeta, A. Knowledge, attitude, and determinants of exclusive breastfeeding during COVID-19 pandemic among lactating mothers in Mekelle, Tigrai: a cross sectional study. *BMC Pregnancy Childbirth* **22**, 1–10 (2022).

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35. Dukuzumuremyi J P C, Acheampong K, A. J. et al. Knowledge , attitude , and practice of exclusive breastfeeding among mothers in East Africa : a systematic review, https://doi.org/10.1186/s13006-020-00313-9. *Int. Breastfeed.* **9**, 1–17 (2020).
36. Kaur, R., Taneja, P. & Nandal, I. A study on knowledge, attitude and practices regarding antenatal care among pregnant women attending antenatal clinic at a tertiary care hospital. *Int. J. Reprod. Contraception, Obstet. Gynecol.* **10**, 1621 (2021).
37. Ibrahim, H. K., El Borgy, M. D. & Mohammed, H. O. Knowledge, attitude, and practices of pregnant women towards antenatal care in primary healthcare centers in Benghazi, Libya. *J. Egypt. Public Health Assoc.* **89**, 119–126 (2014).
38. Juneja, K., Khalique, N., Ansari, A., Ahmad, A. & Khan, H. Effect of utilization of antenatal services on pregnancy outcome in Aligarh - A community based study. *Indian J. Community Heal.* **28**, 40–44 (2016).
39. Kementerian Kesehatan RI. *Panduan Orientasi Kader Posyandu*. *Direktorat Promosi Kesehatan dan Pemberdayaan Masyarakat Kementrerian Kesehatan RI* (2019).
40. Haibah, A. I. Correlation of Handwashing and Basic Household Sanitation Towards Nutritional Status of Toddler (Under 2 Years Old/ Baduta) in Bojonegoro District. *J. Public Heal. Res. Community Heal. Dev.* **5**, 62 (2022).
41. Why Handwashing. https://globalhandwashing.org/about-handwashing/why-handwashing/nutrition/.
42. Humphrey, J. H. *et al.* Independent and combined effects of improved water, sanitation, and hygiene, and improved complementary feeding, on child stunting and anaemia in rural Zimbabwe: a cluster-randomised trial. *Lancet Glob. Heal.* **7**, e132–e147 (2019).
43. Shrestha, A., Six, J., Dahal, D., Marks, S. & Meierhofer, R. Association of nutrition, water, sanitation and hygiene practices with children's nutritional status, intestinal parasitic infections and diarrhoea in rural Nepal: A cross-sectional study. *BMC Public Health* **20**, 1–21 (2020).

How to cite: *Kartasurya, M. I., Asna, A. F., Denny, H. M., Nuridzin, D. Z., & Dharmawan, L. T. (2024). Association between Six Key Messages Behaviour and Incidence of Stunting in Under-Two-Year-Old Children in Central Java Province: Hubungan antara Perilaku Enam Pesan Kunci dengan Kejadian Stunting pada Anak dibawah Dua Tahun di Provinsi Jawa Tengah. Amerta Nutrition, 8(1SP), 83–95.*