

Original Article

Information exposure and growth monitoring favour child nutrition in rural Indonesia

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Background and Objectives: Malnutrition is a health problem among under-five children in Indonesia. The mothers' knowledge on nutrition and health in addition to growth monitoring program are essential components that may influence nutritional status of children under-five. The objective was to observe the importance of maternal information exposure along with growth monitoring program to the nutritional status of children in rural areas. **Methods and Study Design:** A cross sectional study of 233 randomly selected mothers of under-five children from different geographical rural settings in Indonesia were interviewed and observed as to their exposure to nutrition and health information, growth monitoring program and nutritional status of the children. **Results:** The prevalence of underweight, stunting, and wasting was 50.5%, 18.0%, and 28.4%, respectively. The mean of height-for-age z score was similar across villages, however, the mean of weight-for-age ($p=0.039$) and weight-for-height ($p=0.047$) were significantly lower in Kenduren compared with Karangrejo village. The possession of a growth monitoring card in Kenduren was significantly lower compared with Karangrejo ($p<0.001$) or Buko villages ($p<0.001$). The prevalence of underweight ($p=0.001$) or stunting ($p=0.021$) was higher among children who did not possess a growth monitoring card. The prevalence of stunting was higher among children who did not routinely go to *Posyandu* (Integrated Health Post) in the last 3 months ($p=0.018$). **Conclusion:** Maternal exposure to nutrition and health information, along with growth monitoring programs, contribute to the prevalence of underweight and stunting among rural children who are under-five years old.

Key Words: nutritional status, nutritional information exposure, growth monitoring, under-five children, Indonesia

INTRODUCTION

The World Health Organization estimates approximately 150 million children under-five in developing countries are underweight and more than 200 million children are stunted. More than 60% of the 10.9 million deaths (annual death) among children under-five are directly and indirectly caused by malnutrition. Over two-thirds of these deaths occur during the first year of life, and are associated with inappropriate feeding practices.¹⁻³ Previous studies have indicated that child malnutrition is the first determinant of the "burden of disease" among the general population.⁴

Malnutrition is a health problem in Indonesia, especially for rural areas with infants and children under-five as the most vulnerable groups. Low rates of exclusive breastfeeding (EBF), too early or too late complementary feeding, unsafe and nutritionally inadequate food, and low coverage of growth monitoring program are common. According to the conceptual framework on the causes of malnutrition from UNICEF, nutrient intake and presence or absence of disease are the direct determinants of child survival, growth and development.² Dietary intake and incidence of illness are, in turn, influenced by the underlying factors of household food security, availability of health services, and child care practices.³ Child care practices are themselves determined in part by caregivers'

knowledge on health and nutrition.⁵ Exposing mothers or caregivers to nutritional and health information along with improved health services, will greatly influence the nutritional status of under-five children, especially in rural area where accessibility is one of the primary concerns.

MATERIALS AND METHODS

The study was conducted in Demak district, Central Java Province, (from April to May 2007). The subjects of the study were under-five children and their mothers or caregivers from 4 villages, namely Karangrejo, Kaliyantar, Buko, and Kenduren. A total of 233 under-five children were randomly selected from the *Posyandu* (Integrated Health Post) list.

Data collection was conducted by interview, observation, and anthropometric measurement. Nutritional status

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was assessed by measuring weight and height. The z score of less than -2SD for weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ) were categorized as underweight, stunting, and wasting, respectively.⁴ Interviews by using a structured questionnaire was done to assess demographic data and exposure on nutritional and health information. Coverage of growth monitoring program was assessed by interview and observation on the possession of a growth monitoring card, and a record of routine visits to *Posyandu* in the last 3 months. In-depth interviews with the nutrition staff at *Puskesmas* (Primary Health Centre) in each sub-district, the head of nutrition division of Demak District Health Office, and the *Posyandu* cadres in each village were conducted to collect information on *Posyandu* activities and community participation. Ethical approval was obtained from Ethical Committees of the Faculty of Medicine, Universitas Indonesia.

RESULTS

Almost all socio-demographic characteristics were similar between villages and sub-districts. The age of children was normally distributed across villages with the mean of 25.5±15.6 months. The prevalence of underweight, stunting, and wasting was 50.5%, 18.0%, and 28.4%, respectively. The highest prevalence of underweight or stunting was in Kenduren village, while the highest wasting was in Buko as shown in Table 1, both villages being located in Wedung sub-district.

Table 2 shows the proportion of mothers exposed to each type of nutritional and health information. Kenduren village had the lowest proportion of mothers exposed to

almost all types of information except on immunization. The proportion of mothers exposed to topics of breastfeeding, healthy food for children, child illnesses, immunization, and vitamin A supplementation, were significantly lower in Kenduren compared with Karangrejo village. Kenduren village had significantly lower proportion of mothers exposed to topics of breastfeeding and child illnesses compared to Buko, although they were located in the same sub-district.

Table 3 shows the coverage and utilization of the growth monitoring program. The possession of a growth monitoring card and the proportion of children who routinely went to *Posyandu* in the last 3 months was significantly lower in Kenduren compared with Karangrejo ($p<0.001$) or Buko ($p<0.001$), but similar to that in Kalityan village ($p=0.521$). Kenduren village had the lowest coverage and utilization of the growth monitoring program.

Table 4 shows the prevalence of underweight ($p=0.001$) or stunting ($p=0.021$) was higher among children who did not possess a growth monitoring card. The prevalence of stunting was higher among children who did not routinely go to *Posyandu* in the last 3 months ($p=0.018$). Mean weight-for-age z scores and weight-for-height z scores were significantly lower in Kenduren village, compared with the other three villages but similar for height-for-age z scores as shown in Table 5.

DISCUSSION

This study shows the condition of acute malnutrition rather than chronic.⁶ Maternal exposure to nutrition and health information are lacking, especially for the topics of

Table 1. The prevalence of underweight, stunting and wasting among under-five children

	Karangrejo	Kalityan	Kenduren	Buko
Underweight (%)	40.0	38.9	60.5	39.4
Stunting (%)	11.1	13.9	26.7	13.6
Wasting (%)	22.2	27.8	30.2	30.3

Table 2. The proportion of mothers exposed to nutritional and health information

	Karangrejo	Kalityan	Kenduren	Buko
Growth and development (%)	28.9	19.4	10.5 [†]	19.7
Breastfeeding and EBF (%)	42.2	22.2	14.0 [‡]	24.2
Healthy food for children (%)	31.1	19.4	10.5 [§]	16.7
Hygiene and sanitation (%)	24.4	22.2	11.6 [¶]	18.2
Child illnesses (%)	42.2	13.9	12.8 ^{††}	25.8
Immunization (%)	82.2	44.4	52.3 ^{**}	62.1
Vitamin A supplementation (%)	71.1	47.2	43.0 ^{§§}	51.5

[†] $p=0.051$, between Kenduren and Karangrejo; $p=0.121$, between Kenduren and Kalityan; $p=0.104$, between Kenduren and Buko; chi-square.

[‡] $p<0.001$, between Kenduren and Karangrejo; $p=0.052$, between Kenduren and Kalityan; $p=0.047$, between Kenduren and Buko; chi-square.

[§] $p=0.008$, between Kenduren and Karangrejo; $p=0.136$, between Kenduren and Kalityan; $p=0.147$, between Kenduren and Buko; chi-square.

[¶] $p=0.208$, between Kenduren and Karangrejo; $p=0.326$, between Kenduren and Kalityan; $p=0.434$, between Kenduren and Buko; chi-square.

^{††} $p<0.001$, between Kenduren and Karangrejo; $p=0.318$, between Kenduren and Kalityan; $p=0.037$, between Kenduren and Buko; chi-square.

^{**} $p=0.047$, between Kenduren and Karangrejo; $p=0.363$, between Kenduren and Kalityan; $p=0.103$, between Kenduren and Buko; chi-square.

^{§§} $p=0.018$, between Kenduren and Karangrejo; $p=0.568$, between Kenduren and Kalityan; $p=0.283$, between Kenduren and Buko; chi-square.

Table 3. The coverage and utilization of growth monitoring program

	Karangrejo	Kalianyar	Kenduren	Buko
Possession of Growth Monitoring Card (%)	53.3	33.3	30.2*	63.6
Routine visits to <i>Posyandu</i> in the last 3 months (%)	77.8	58.3	52.3**	86.4

* $p < 0.001$, between Kenduren and Karangrejo; $p = 0.521$, between Kenduren and Kalianyar; $p < 0.001$, between Kenduren and Buko; chi-square.

** $p < 0.001$, between Kenduren and Karangrejo; $p = 0.343$, between Kenduren and Kalianyar; $p < 0.001$, between Kenduren and Buko; chi-square.

Table 4. Association between nutritional status of under-five children and coverage of growth monitoring program

	WAZ [†]		HAZ [‡]		WHZ [§]	
	<-2 SD	≥-2 SD	<-2 SD	≥-2 SD	<-2 SD	≥-2 SD
Possession of Growth Monitoring Card (%)						
Yes	35.6*	64.4	11.5**	88.5	25.0	75.0
No	56.6*	43.4	23.3**	76.7	31.0	69.0
Routine visits to <i>Posyandu</i> in the last 3 months (%)						
Yes	45.6	54.4	13.9***	86.1	28.5	71.5
No	50.7	49.3	26.7***	73.3	28.0	72.0

WAZ: weight-for-age z score; HAZ: height-for-age z score; WHZ: weight-for-height z score.

* $p = 0.001$, between children who possess growth monitoring card and who did not; chi-square.

** $p = 0.021$, between children who possess growth monitoring card and who did not; chi-square.

*** $p = 0.018$, between children who routinely go to *Posyandu* in the last 3 months and who did not; chi-square.

Table 5. The comparison of nutritional status indices between villages

Mean±SD	Karangrejo	Kalianyar	Kenduren	Buko
Weight-for-age z score	-1.60±1.09	-1.61±1.20	-2.11±1.19*	-1.69±1.10
Height-for-age z score	-1.09±1.02	-1.10±0.91	-1.41±1.12**	-1.12±1.09
Weight-for-height z score	-1.11±1.09	-0.92±1.21	-1.51±1.09***	-1.31±1.10

* $p = 0.039$, between Kenduren and Karangrejo; $p = 0.041$, between Kenduren and Kalianyar; $p = 0.047$, between Kenduren and Buko; Bonferroni post hoc test.

** $p = 0.087$, between Kenduren and Karangrejo; $p = 0.093$, between Kenduren and Kalianyar; $p = 0.108$, between Kenduren and Buko; Bonferroni post hoc test.

*** $p = 0.047$, between Kenduren and Karangrejo; $p = 0.038$, between Kenduren and Kalianyar; $p = 0.049$, between Kenduren and Buko; Bonferroni post hoc test.

growth and development, breastfeeding, healthy food for children, hygiene, sanitation, and child illnesses. The lack of exposure might directly contribute to mother's knowledge in nutrition, and could indirectly contribute to the nutritional status of under-five children.^{7,9}

A growth monitoring program may prevent under-five children from becoming underweight or stunted by early detection of growth faltering.^{8,9} The growth monitoring chart functions as a reference for sufficient growth of under-five children;^{9,10} therefore, it must be utilized optimally. Encouragement to routinely attend *Posyandu* and an effective referral system for severe acute malnutrition (SAM) are essential, especially in rural areas where accessibility is one of the barriers.¹¹

The in-depth interviews revealed that health and nutrition programs (including *Posyandu*) were not effectively implemented due to financial constraints and considered of lower priority by the local government. The prevalence of underweight and wasting remains high although several programs to overcome nutritional problems have been implemented.^{9,11} The cadres sometimes have to spend their own money to keep the *Posyandu* running every month, even with insufficient reward and support from the local government. The gap observed between follow-up and supervision appeared mainly to be related to a

shortage of resources, similar with challenges of growth monitoring program in a low income country.^{9,11,12}

Conclusion

The level of maternal exposure to nutrition and health information, with low coverage of growth monitoring programs in rural areas, contribute to the prevalence of underweight and stunting among under-five children.

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AUTHOR DISCLOSURES

The authors declare no conflict of interest. The funding agency has no influence on the study design, data collection, results interpretation, decision to publish and preparation of the manuscript.

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