

Wasting in Children Under Five in the Haruku–Sameth Community Health Centre Catchment Area, Maluku Province

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Abstract:

Objective: Wasting, defined as *low weight for height*, remains a major nutritional problem in Indonesia, with a relatively high prevalence in Maluku Province, including on Haruku Island, driven by limited healthcare access, geographic constraints, and socioeconomic vulnerability. This study examined household, maternal, and child factors associated with wasting among children under five living in the catchment area of the Haruku–Sameth Community Health Centre in Central Maluku District.

Material and Methods: Using a total sampling method, a cross-sectional survey was conducted in July 2025 across five villages (Haruku, Sameth, Oma, Wassu, and Aboru). Information was collected from 194 mothers of children under five. Structured questionnaires were used to obtain data on sociodemographic, maternal, and child health characteristics, along with children's anthropometric measurements. Logistic regression analysis was employed to identify factors associated with wasting.

Results: We found that the prevalence of wasting among children under five in the study area was 20.0% (95 % confidence interval (CI): 14.0–26.0%). Children in Wassu Village had significantly higher odds of wasting than those from Sameth Village (aOR=7.87; p-value=0.003). In addition, children born preterm were more likely to experience wasting than those born at term (aOR=4.34; p-value=0.008). We also found children from households without national health

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insurance had an increased likelihood of being wasted (aOR=3.61; p-value=0.006).

Conclusion: These findings indicate that wasting in Haruku remains relatively high and is shaped by geographic, biological, and socioeconomic factors, underscoring the need for targeted nutritional interventions and social protections tailored to small-island communities.

Keywords: gestational age, location, Maluku, subsidy, wasting

Introduction

Wasting is defined as a condition in which a child has a low weight-for-height or weight-for-length, indicating that the child's body weight is significantly below the expected weight for their height or length^{1,2}. This condition generally reflects rapid and severe weight loss, although it can also occur over a longer period². A child is diagnosed with wasting if the weight-for-length (WFL) index or weight-for-height (WFH) index is below -2 standard deviations (S.D.) from the median of the growth reference established by the World Health Organisation (WHO)¹.

Wasting is commonly caused by inadequate food intake in terms of quality and quantity, and could be aggravated by recurrent or prolonged illness². Studies have shown that wasting is a serious health problem that could affect growth, increase the risk of infection, and hinder cognitive development in children. If not addressed early, wasting might lead to long-term impacts, such as low work productivity and poor health conditions in adulthood³.

Early childhood, particularly the first five years of life, represents a critical period of rapid physical growth, brain development, and immune system maturation⁴. Wasting during this period reflects acute undernutrition and is associated with increased risks of morbidity, mortality, impaired cognitive development, and reduced productivity in later life⁵. The WHO recognizes wasting in children under five as a life-threatening condition that requires urgent prevention and management¹.

In children, wasting was reported to be closely associated with an increased risk of death when not treated appropriately². Previous studies have shown that several risk factors contributed to the occurrence of wasting in children under five, including a history of infectious diseases⁶, poor environmental sanitation⁶, not receiving exclusive breastfeeding⁷, low maternal employment status and socioeconomic status⁸, insufficient intake of macronutrients (energy, protein, and fat)⁹, and inadequate intake of micronutrients (zinc and iron)¹⁰.

Based on the WHO data, the global prevalence of wasting in children under five in 2024 was 42.8 million (6.8%)¹¹. According to the 2024 Indonesia Nutrition Status Survey, the prevalence of wasting in Indonesia in children under five was 6.2%¹². This figure remains above the target set by the World Health Assembly (WHA), which aimed to reduce the prevalence of wasting to below 5.0% by 2025¹³.

In 2023, the prevalence of wasting in Maluku Province, one of the largest archipelagic provinces of Indonesia, reached 14.4%¹⁴. This placed Maluku Province first out of 38 provinces with the highest rate of wasting in Indonesia. One of the districts in Maluku with a high prevalence of wasting in 2024 was the Central Maluku District, which reached 13.1%¹². Central Maluku consists of 43 scattered islands that are still difficult to access, including Haruku Island. The catchment area of Haruku-Sameth Community Health Centre is one of the areas on Haruku Island requiring attention due to limited access to healthcare

services, geographical conditions that hinder mobility, and high vulnerability to poverty and food insecurity, which obstruct efforts to improve the nutritional status of children under five¹⁵. Data from the Central Maluku District Health Office in 2024 showed that the prevalence of wasting on Haruku Island was 6.7%¹⁶.

Despite the high wasting burden in Maluku and its small islands' unique geographic and socioeconomic challenges, no prior study has specifically examined the determinants of wasting among children under five on Haruku Island. Evidence from this setting remains scarce, limiting understanding of how island-specific factors, such as limited access to health services, food availability, and local caregiving practices, contribute to wasting. To address this gap, a household health survey was conducted in 2025 to assess the nutritional status and its associated factors among children under five living in the catchment area of the Haruku–Sameth Community Health Centres. Using data from this survey, this study identified factors associated with wasting among children in the catchment area of the Haruku–Sameth Community Health Centre, Central Maluku District of Maluku Province.

Material and Methods

Data source and study design

Data were collected in July 2025 by the Faculty of Medicine, Universitas Pattimura, using a cross-sectional study design. A total sampling technique was applied, and the study respondents comprised mothers of children under five years of age living in these villages.

Study sites

The study was conducted on Haruku Island, within the catchment area of the Haruku–Sameth Community Health Centre, located in Central Maluku District, which covers the villages of Haruku, Sameth, Oma, Wassu, and Aboru (Figure 1). The island lies approximately 157

kilometres from Masohi City, the district's capital. The health centre serves an area of about 54.2 square kilometres, home to 5,921 residents. Most community members work as farmers, fishermen, or civil servants¹⁷. Transportation across the island is available by both land and sea; however, access remains challenging due to narrow footpaths and disconnected roads, particularly in Wassu and Aboru Villages. Residents often need to use speedboats or carry their motorcycles across rivers to reach the health centre.

Population and sample

The final number of respondents in this study was 194 children under five who met the inclusion criteria: 1) Children aged 0–59 months residing in the catchment area of the Haruku–Sameth Community Health Centre, 2) Were available at their respective homes during the data collection period, and 3) Agreed to participate in the study with written informed consent provided and signed by the mothers.

This study employed a total sampling approach, enrolling all eligible children aged 0–59 months residing in the five villages during the data collection period. To ensure statistical adequacy, we evaluated whether the achieved sample size was sufficient for estimating the prevalence of wasting with acceptable precision. Based on a single-proportion formula with a 95% confidence level, an expected wasting prevalence of 14.4%, and a 5% absolute precision, the minimum required sample size was 190. The final sample of 194 children therefore provided adequate precision for prevalence estimation and supported the use of a parsimonious multivariable logistic regression model with a limited number of predictors. Minor discrepancies between the target population and the final sample could have occurred due to the temporary absence of eligible children during home visits or refusal to participate (3%). However, the overall coverage of the target population remained high (97%).

Research instruments

Face-to-face interviews were conducted to collect information on sociodemographic characteristics, maternal factors, and the health history of children under five, using a structured questionnaire, which adopted the questionnaire used in the 2023 Indonesia Health Survey¹⁸. Interviewers accessed the questionnaire using the CommCare Android-based questionnaire data collection application¹⁹. The tools for anthropometric measurement (length/height and weight) of children under five and mothers included a digital weighing scale and baby scale for measuring body weight, as well as an infantometer and stadiometer for measuring length and height. All equipment was calibrated prior to data collection to ensure measurement accuracy. Stool pots were used to collect the faeces of children under five to identify helminth infections.

Field work personnel

Data collection personnel were twelve newly graduated general practitioners. They conducted interviews, anthropometric measurements, and stool collection. All field personnel participated in training activities before fieldwork at the Faculty of Medicine of Universitas Pattimura in Ambon and a field trial at the surrounding integrated health posts to practice all research components, including interview techniques and anthropometric measurements.

Data collection procedures

During the preparatory phase, the research team conducted a field visit to Haruku Island to obtain an overall understanding of the study area and to collect preliminary information on the number of children under five residing in the location. Home visits were then carried out for each eligible child. Prior to the interview, prospective



Figure 1 Map of Indonesia, Haruku Island, and the villages in the catchment area of Haruku-Sameth Community Health Centre

respondents (mothers of children under five) received an explanation regarding the study objectives, potential benefits, procedures, and overall flow of the research. Written informed consent was obtained from all participants before data collection commenced.

In addition to the structured interview, anthropometric measurements were also conducted to assess the nutritional status of children. For children under two years of age, body weight and length were measured using a weighing scale and an infantometer, respectively. For children aged two years and above, a weighing scale and a stadiometer were used to measure weight and height. Stool containers were distributed and collected according to a predetermined schedule, and the stool samples were analysed in collaboration with the local hospital and the Regional Health Laboratory of Maluku Province to identify helminth infections.

Variables

The dependent variable in this study was wasting, defined as a condition in which a child is too thin for their length or height^{20,21}. Wasting was identified when a child's WFL or WFH index < -2 S.D. from the median of the WHO Child Growth Standards²². A Z-score between -2 S.D. and -3 S.D. indicated moderate wasting, while a Z-score below -3 S.D. was classified as severe wasting¹.

The independent variables analysed in this study are grouped into four categories, namely: (1) Environmental factors (village), (2) Household factors (family income, ownership of the National Health Insurance, sanitation, food security, number of children under five, and number of children), (3) Maternal factors (age, last education, occupation, maternal anemia, antenatal care (ANC) visits, maternal age at pregnancy, gestational age, history of illness during pregnancy, history of anaemia during pregnancy, consumption of iron-folic acid (IFA) tablets, and the total number of IFA tablets consumed), and (4) Child factors (sex,

age, birth weight, birth length, history of acute respiratory infection (ARI), history of diarrhoea, history of seeking treatment at a health facility when ill, neonatal immunisation, measles immunisation, complete immunisation, history of postnatal care (PNC), breastfeeding and complementary feeding practices, and anaemia in the child). Breastfeeding and complementary feeding were defined as whether the child had ever received breastfeeding or complementary foods at any time, and did not represent adherence to recommended feeding practices.

Family income was categorized at the household level using the Regional Minimum Wage as the cut-off, i.e., IDR 3,141,700¹⁵. Households with income below the Regional Minimum Wage were classified as low-income, while those with income equal to or above it were classified as higher-income. Sanitation was defined based on household access to toilet facilities and categorized as adequate if the household had a private latrine and inadequate if no latrine was available. Food insecurity was defined as a household condition in which access to adequate, safe, and nutritious food was limited or uncertain due to economic or physical constraints²³. Household food security was assessed using the six-item United States Household Food Security/Hunger Survey Module²⁴, which evaluates household food conditions over the preceding year. The items capture experiences such as running out of food without money to buy more, inability to afford a balanced diet, reduced portion sizes, episodes of hunger due to financial constraints, and skipping meals because of insufficient funds. Based on the number and frequency of affirmative responses, households were classified as food secure or food insecure (with and without hunger, following established scoring guidelines^{24,25}).

Antenatal care visits included information on whether the mother attended ANC services during her pregnancy with the index child and, if so, the total number of visits made. The number of ANC visits was categorized according

to the WHO recommendation²⁶, stating that women with uncomplicated pregnancies should attend at least eight ANC visits during pregnancy.

Maternal age during pregnancy was categorized into three groups: <25 years, 25–35 years, and >35 years. These data were analysed in relation to the child's nutritional status, as maternal age during pregnancy might influence biological readiness, nutritional reserves, and caregiving experience, all of which can affect the child's nutritional outcomes²⁷.

Regarding child factors, low birth weight was defined as a birth weight of less than 2,500 grams, while a birth weight of 2,500 grams or more was classified as normal, in accordance with the WHO criteria²⁸. Ideal birth length was defined as a birth length of 47 cm or more, whereas birth length below 47 cm was classified as non-ideal, based on national and international child growth references²⁹. The PNC was defined as receipt of at least one health check by a trained worker within 40 days of delivery and recorded as a binary variable (yes/no).

Data analysis

The data analysis process started with descriptive analysis to describe the frequency distribution of each variable. In the second stage, bivariate logistic regression was employed to identify factors associated with the dependent variable without considering other covariates. Subsequently, in the third stage, multivariate logistic regression with the backward method was applied to determine factors significantly associated with the dependent variable after adjusting for other covariates. Variables that obtained a p -value<0.25 in the bivariate analysis were included in the multivariate model. A backward elimination method was then applied, in which non-significant variables were removed stepwise. The final model retained only variables that remained significantly associated with wasting after adjustment for potential confounders. The statistical

significance threshold was set at p -value<0.05 for all analytical tests. All data were analysed using IBM SPSS Statistics for Windows version 29.0.

Ethics clearance

This study obtained ethical approval from the Faculty of Medicine Ethics Committee, Universitas Pattimura, Ambon, Indonesia, Number: 076/FK-KOM.ETIK/V/2025. Before data collection, the research team explained the study's objectives and procedures to the prospective respondents. After that, written informed consent was obtained as a form of approval. During the process, parents were free to determine their child's participation. The identity of respondents was fully protected and used only for research purposes.

Results

Of the 194 children under five measured in this study, 20.0% were classified as wasted (95% CI: 14.0–26.0%). The highest proportion of wasting was observed in Wassu Village (32.0%), followed by Aboru Village (24.3%), Haruku Village (23.4%), Sameth Village (10.5%), and the lowest in Oma Village (10.2%).

Table 1 shows the characteristics of the children under five and the respondents involved in this study. The highest percentage of mothers of children under five was in the age group of 23–35 years (45.9%), with 21.3% of their children wasted. Based on the national health insurance ownership, most mothers did not have any insurance (41.8%), and of this group, 28.4% of children were wasted. Based on gestational age, most children under five were born premature or preterm (32.0%), and 29.0% of them experienced wasting. The largest proportion of children under five was found in the age group 0–11 months (28.4%), with a wasting prevalence of 23.6%.

The results of the multivariate analysis examining factors associated with wasting among children under five

are presented in Table 2. One of the significant predictors identified in this study was the village of residence. Children living in Wassu Village had higher odds of being wasted (aOR=7.87; 95% CI: 2.04–30.39; p-value=0.003). We also found a significant association between gestational age and wasting. Children born preterm were more likely

to experience wasting compared to those born at term (aOR=4.34; 95% CI: 1.47–12.77; p-value=0.008). In addition, our findings showed that children from households without national health insurance also had an increased likelihood of being wasted (aOR=3.61; 95% CI: 1.45–8.99; p-value=0.006).

Table 1 The frequency distribution of respondents of wasting at Haruku–Sameth Community Health Centre

Variables	n	%	Wasting	
			n	%
Respondent Characteristics				
Location				
Oma	49	25.3	5	10.2
Sameth	19	9.8	2	10.5
Haruku	64	33.0	15	23.4
Aboru	37	19.1	9	24.3
Wassu	25	12.9	8	32.0
Age of respondent (years)				
>35	58	29.9	9	15.5
25–35	89	45.9	19	21.3
<25	47	24.2	11	23.4
Education				
Senior high school/Diploma/Bachelor’s degree	181	93.3	36	19.9
No schooling/Elementary/Junior high school	13	6.7	3	23.1
Mother’s occupation				
Housewife	166	85.6	32	19.3
Working outside the home	28	14.4	7	25.0
Income				
Rp>3,141,700	30	15.5	6	20.0
Rp<3,141,700	164	84.5	33	20.1
Ownership of National Health Insurance				
Subsidised	78	40.2	9	11.5
No Subsidised	35	18.0	7	20.0
No health insurance ownership	81	41.8	23	28.4
Number of under-five children in the family				
1–2 children	188	96.9	36	19.1
>2 children	6	3.1	3	50.0
Number of children in the family				
1–2 children	128	66.0	24	18.8
>2 children	66	34.0	15	22.7
Food security				
Food secure	173	89.2	32	18.5
Food insecure with/without hunger	21	10.8	7	33.3
Toilet facility				
No latrine	15	7.7	2	13.3
Private latrine	179	92.3	37	20.7

Table 1 (continued)

Variables	n	%	Wasting	
			n	%
Maternal characteristics				
High-risk pregnancy: history of disease during pregnancy				
Non-metabolic/none	166	85.6	33	19.9
Metabolic disease	28	14.4	6	21.4
Ever attended antenatal care				
No	27	13.9	4	14.8
Yes	167	86.1	35	21.0
History of anaemia during pregnancy				
Yes	55	28.4	8	14.5
No	139	71.6	31	22.3
Consumption of iron/folic acid supplements				
Yes	171	88.1	33	19.3
No	23	11.9	6	26.1
Amount of iron-folic acid tablets				
≥90 tablets	38	19.6	4	10.5
<90 tablets	135	69.6	29	21.5
Unknown	21	10.8	6	28.6
Gestational age				
Term	132	68.0	21	15.9
Preterm	62	32.0	18	29.0
Child characteristics				
Birth weight				
Normal birth weight	156	80.4	26	16.7
Low birth weight	18	9.3	5	27.8
Unknown	20	10.3	8	40.0
Birth length				
Non-ideal birth length	30	15.5	6	10.0
Ideal birth length	51	26.3	7	13.7
Unknown	113	58.2	26	23.0
Sex of child				
Male	85	43.8	16	18.8
Female	109	56.2	23	21.1
Age of the child (months)				
36-47	36	18.6	4	11.1
48-59	23	11.9	5	21.7
24-35	31	16.0	6	19.4
12-23	49	25.3	11	22.4
0-11	55	28.4	13	23.6
History of acute respiratory infection				
Yes	22	11.3	4	18.2
No	172	88.7	35	20.3
Helminth infection				
No	184	94.8	35	19.0
Yes	10	5.2	4	40.0
Healthcare-seeking behaviour				
Neonatal immunization				
No	17	8.8	3	17.6
Yes	177	91.2	36	20.3

Table 1 (continued)

Variables	n	%	Wasting	
			n	%
Measles immunization				
Yes	128	66.0	25	19.5
No	66	34.0	14	21.2
Complete immunization				
Yes	132	68.6	26	19.7
No	61	31.4	12	21.0
History of visiting a health facility when sick				
Yes	133	68.6	25	18.8
No	61	31.4	14	23.0
Feeding practices				
Breastfeeding				
No	31	16.0	6	19.4
Yes	163	84.0	33	20.2
Complementary feeding				
No	31	16.0	6	19.4
Yes	163	84.0	33	20.2

Table 2 Factors associated with wasting in Haruku–Sameth Community Health Centre

Variables	Bivariate			Multivariate		
	OR	CI	p-value	aOR	CI	p-value
Respondent characteristics						
Location						
Oma	1.00			1.00		
Sameth	1.04	0.18–5.86	0.969	0.58	0.08–3.87	0.578
Haruku	2.69	0.91–8.62	0.075	3.58	1.12–11.45	0.031
Aboru	2.83	0.86–9.31	0.087	1.01	0.24–4.23	0.989
Wassu	4.00	1.19–14.45	0.026	7.87	2.04–30.39	0.003
Age of respondent (years)						
>35	1.00					
25–35	1.48	0.62–3.54	0.381			
<25	1.66	0.62–4.43	0.309			
Education						
Senior high school/Diploma/Bachelor's degree	1.00					
No schooling/Elementary/Junior high school	1.21	0.32–4.62	0.782			
Mother's occupation						
Housewife	1.00					
Working outside the home	1.40	0.55–3.57	0.486			
Income						
Rp>3,141,700	1.00					
Rp<3,141,700	1.01	0.38–2.67	0.988			
Ownership of National Health Insurance						
Subsidised	1.00			1.00		

Table 2 (continued)

Variables	Bivariate			Multivariate		
	OR	CI	p-value	aOR	CI	p-value
No Subsidised	1.92	0.65–5.65	0.238	2.48	0.78–7.92	0.125
No health insurance ownership	3.04	1.31–7.09	0.010	3.61	1.45–8.99	0.006
Number of under-five children in the family						
1–2 children	1.00					
>2 children	4.22	0.82–21.79	0.085			
Number of children in the family						
1–2 children	1.00					
>2 children	1.28	0.62–2.63	0.513			
Food security						
Food secure	1.00					
Food insecure with/without hunger	2.20	0.82–5.90	0.116			
Toilet facility						
No latrine	1.00					
Private latrine	1.69	0.37–7.84	0.500			
Maternal characteristics						
High-risk pregnancy: history of disease during pregnancy						
Non-metabolic/none	1.00					
Metabolic disease	1.10	0.41–2.93	0.850			
Ever attended antenatal care						
No	1.00					
Yes	1.53	0.50–4.70	0.463			
History of anaemia during pregnancy						
Yes	1.00					
No	1.69	0.72–3.94	0.228			
Consumption of iron/folic acid supplements						
Yes	1.00					
No	1.48	0.54–4.03	0.448			
Amount of iron-folic acid tablets						
≥90 tablets	1.00					
<90 tablets	2.33	0.76–7.09	0.138			
Unknown	3.40	0.84–13.84	0.087			
Gestational age						
Term	1.00			1.00		
Preterm	2.16	1.05–4.44	0.036	4.34	1.47–12.77	0.008
Child characteristics						
Birth weight						
Normal birth weight	1.00					
Low birth weight	1.92	0.63–5.86	0.250			
Unknown	3.33	1.24–8.96	0.017			
Birth length						
Non-ideal birth length	1.00					
Ideal birth length	0.64	0.19–2.11	0.460			
Unknown	1.20	0.44–3.24	0.725			
Sex of child						
Male	1.00					
Female	1.15	0.57–2.35	0.695			
Age of the child (months)						
36–47	1.00					

OR=odds ratio, CI=confidence interval, aOR=adjusted odd ratio

Table 2 (continued)

Variables	Bivariate			Multivariate		
	OR	CI	p-value	aOR	CI	p-value
48–59	1.92	0.49–7.55	0.350			
24–35	2.22	0.53–9.34	0.276			
12–23	2.32	0.67–7.98	0.183			
0–11	2.48	0.74–8.32	0.142			
History of acute respiratory infection						
No	1.00					
Yes	1.15	0.37–3.61	0.811			
Helminth infection						
No	1.00					
Yes	2.84	0.76–10.60	0.121			
Healthcare-seeking behaviour						
Neonatal immunization						
No	1.00					
Yes	1.19	0.33–4.37	0.792			
Measles immunization						
Yes	1.00					
No	1.10	0.53–2.31	0.782			
Complete immunization						
Yes	1.00					
No	1.08	0.51–2.28	0.837			
History of visiting a health facility when sick						
Yes	1.00					
No	1.29	0.61–2.69	0.503			
Feeding practices						
Breastfeeding						
No	1.00					
Yes	1.06	0.40–2.79	0.910			
Complementary feeding						
No	1.00					
Yes	1.06	0.40–2.79	0.910			

OR=odds ratio, CI=confidence interval, aOR=adjusted odd ratio

Discussion

Main findings

Overall, this study found that one in five children under five on Haruku Island were affected by wasting, indicating a considerable burden of acute malnutrition in this island setting. The prevalence varied substantially across villages. The highest proportion was found in Wassu Village. The multivariate analysis confirmed that the village of residence was a significant predictor of wasting. In addition to geographic variation, perinatal factors and ownership

of national insurance were also important. Children born preterm were more than three times as likely to experience wasting compared to those born at term, and children of mothers without health insurance had a threefold higher risk of wasting than those whose mothers were insured. These findings highlight both contextual and biological determinants of wasting in small-island communities, emphasizing the need for targeted interventions that address local environmental conditions and maternal–child health during the perinatal period.

Factors associated with wasting

Our study found that the place of residence was significantly associated with the occurrence of wasting among children under five. Children living in Wassu Village were at a higher likelihood of wasting than those from other areas. This might reflect less supportive living conditions, including limited access to health services, poor sanitation, inadequate availability of nutritious food, and socioeconomic vulnerability in the village. Previous studies have shown that low nutritional status and a higher risk of wasting are linked to mothers' limited knowledge of childcare and nutrition, compounded by restricted health access, weak family support, and limited engagement with community health cadres^{30,31}. Regional disparities in infrastructure and service access could also contribute to variations in child nutritional status, with remote areas tending to have a higher prevalence of wasting. Therefore, geographic location reflects not only administrative boundaries but also inequalities in access to essential health resources.

We also found that a history of preterm birth was significantly associated with the occurrence of wasting among children under five. Children born before 37 weeks of gestation had a higher likelihood of experiencing wasting compared to those born at term. This finding is consistent with a previous study reporting that children with a history of preterm birth were more likely to experience wasting than those born at term³². This association could be explained by the physiological limitations of premature infants, including low energy reserves, immature organ function, and an underdeveloped immune system, which make them more susceptible to infections and growth disturbances.

Furthermore, children from households without national health insurance had an increased likelihood of being wasted than those insured. This association can be explained by various factors. Households without health insurance tend to have limited access to preventive and

curative health services, including routine growth monitoring, nutritional counselling, and early treatment of illness. This was also found in previous literature showing that mothers and children who did not use health services were found to have a 1.2 times greater likelihood of experiencing wasting³³. The lack of insurance also increases out-of-pocket costs, which might discourage families from seeking timely medical care. Therefore, intensive socialization and education should be conducted for the community in the working area of the Haruku–Sameth Community Health Center regarding the benefits of national health insurance, especially for nutrition and child growth monitoring.

Several established determinants of child undernutrition, such as breastfeeding practices, small-for-gestational-age birth, food insecurity, or low socioeconomic status, were not statistically significant in this analysis. This should be interpreted cautiously. The modest sample size might have limited power to detect associations, and the geographically and socially homogeneous island setting likely reduced variability in socioeconomic and caregiving conditions. In addition, some variables, such as breastfeeding and complementary feeding, that were measured as binary indicators could potentially obscure associations with wasting. Household-level measures of food insecurity and socioeconomic status may also have missed short-term fluctuations or individual dietary intake. This indicates the need for larger, longitudinal studies with more detailed assessments of infant feeding and household conditions to clarify the role of these factors, particularly in small-island contexts.

Policy implications

Our findings indicate that efforts to reduce wasting among children under five should adopt an area-based village approach. Villages with a higher vulnerability, such as Wassu Village, should be prioritised. Localised

interventions to address disparities in access to health services, sanitation, and nutritious food availability across island communities are required. Additionally, efforts to strengthen community-based health programs should also be considered. Local health cadres could be encouraged to play an active role in community-based education by promoting optimal infant and young child feeding practices and improving the knowledge of mothers and other family members about locally available nutritious foods. Cadres could use different contact opportunities with the families to conduct nutrition education sessions. Additionally, closer coordination between health centres and village authorities could enhance early detection and the management of undernutrition. Such tailored approaches will help to ensure that interventions reach the most at-risk populations and effectively reduce the burden of wasting in small-island settings.

For preterm infants, specific interventions are required to prevent early growth failure and subsequent wasting. Health workers should be able to promote exclusive breastfeeding and provide lactation support for mothers of preterm babies. This will help to ensure adequate intake and reduce infection risk. In areas with limited resources, close postnatal follow-up through home visits by midwives or health cadres is essential to monitor growth, detect feeding difficulties, and provide timely referrals. Nutritional supplementation for mothers and preterm infants, combined with regular growth monitoring through community health posts, could further help identify at-risk children early. Strengthening collaboration between primary health centres, village midwives, and local authorities will ensure that these interventions are implemented effectively. Such integrated, context-specific actions are critical to improving the nutritional status of both term and preterm children in small-island settings.

National health insurance ownership plays a crucial role in reducing wasting among children under five on

Haruku Island. Therefore, interventions should focus on increasing the utilization of health services and ensuring equitable access for all families to these services. This can be achieved by conducting intensive community education within the Haruku-Sameth Community Health Centre area on the benefits and use of national health insurance, particularly in nutrition services and child growth monitoring. Furthermore, identifying and enrolling low-income or vulnerable families without national health insurance coverage through cross-sectoral collaboration is essential to optimizing the program's implementation in underdeveloped regions.

Beyond child-focused interventions, strengthening maternal health and nutrition is also essential. Improving maternal nutritional status before and during pregnancy will support optimal fetal growth and lower the risk of preterm birth and low birth weight, both of which heighten vulnerability to wasting. Enhanced antenatal care is also critical for early detection and management of high-risk pregnancies. Community-based programs led by midwives and health cadres could further raise maternal awareness of adequate nutrition and timely healthcare use. Integrating maternal and child nutrition strategies will offer a sustainable approach to reducing childhood wasting in small-island settings.

Strengths and limitations

This study has several strengths that enhance the validity and applicability of its findings. The use of multivariate analysis allowed the identification of factors associated with wasting while minimizing confounding effects. Conducting the research within small-island communities using a total sampling method ensures that the findings represent the local condition. This might serve as an evidence base for planning area-based nutritional interventions. In this survey, nutritional status was assessed using the WHO growth standards, ensuring consistent and comparable

classification of wasting across studies. However, several limitations should be noted. As in other cross-sectional studies, the design limits causal interpretation between risk factors and wasting. Data collection also relied on self-reported information, and this might have introduced recall bias. Moreover, this study did not include detailed and standardized dietary intake data; therefore, the association between dietary quantity and quality and wasting could not be examined. Future longitudinal studies with larger samples and comprehensive dietary assessments are needed to confirm these associations and inform targeted interventions in island settings.

Conclusion

In summary, this study showed that the prevalence of wasting among children under five in the Haruku-Sameth Community Health Centre area remained high. Place of residence was one of the significant predictors, as children from Wassu Village had an increased likelihood of wasting. This reflects disparities in access to health services, food, and sanitation across villages. Our study also showed that children born preterm were more likely to experience wasting. This indicates that nutritional vulnerability could start early in life. In addition, children under five from a family without health insurance had a higher risk of wasting than those insured. Therefore, efforts to prevent and manage wasting should adopt an integrated, area-based approach involving collaboration across sectors. Strengthening food security, improving equitable access to health services, and ensuring health insurance coverage for low-income families should be considered. Health workers and community health workers should be encouraged to focus on early detection, growth monitoring, and targeted support for preterm and other high-risk children. Health promotion efforts should also target parents and other family members to apply optimal feeding and caregiving practices. Ultimately, reducing the burden of wasting in island communities requires tailored,

context-sensitive strategies that recognise their unique geographic, cultural, and resource-related challenges.

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Conflict of interest

The authors declare that no personal relationships inappropriately influenced the writing of this article.

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