

GROWTH PATTERNS AND FACTORS ASSOCIATED WITH EARLY CHILDHOOD GROWTH IN SUMBAWA, INDONESIA

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**STUDY PROGRAM ANIMAL BIOSCIENCE
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
IPB UNIVERSITY
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SUMMARY

AVIANI RINFI SHAFIRA. Growth Patterns and Factors Associated with Early Childhood Growth in Sumbawa, Indonesia. Supervised by KANTHI ARUM WIDAYATI and ENENG NUNUZ ROHMATULLAYALY.

Population-specific growth references have been established in several populations, but evidence from Indonesian children remains limited. This study characterized growth patterns among children from Sumbawa, compared them with national growth references, evaluated differences in nutritional status classification, and examined factors associated with child growth. A cross-sectional study was conducted among 207 children aged 0–5 years from two villages in Sumbawa, Indonesia. Anthropometric and sociodemographic data were collected using standardized procedures and structured questionnaires. Growth curves were modeled using GAMLSS and compared with the Indonesian national growth reference. Nutritional status was assessed using population-specific, Indonesian, and WHO growth references. Factors associated with height-for-age (HAZ), weight-for-age (WAZ), and BMI-for-age (BMIZ) z-scores were examined using generalized linear models. Body height and weight increased progressively with age, whereas BMI gradually declined throughout early childhood. Compared with the INSGC (Indonesia Synthetic Growth Chart), the median (P50) height, weight, and BMI values of Sumbawa children were lower across most ages. Nutritional status classifications differed substantially across growth references, with the WHO Child Growth Standards and Permenkes classifying higher proportions of children as stunted, underweight, and wasted/overweight than the population-specific reference. Maternal age at childbirth and household sanitation score were positively associated with HAZ, whereas the number of older siblings was negatively associated with BMIZ. Children from Sumbawa exhibited population-specific growth pattern that differed from the Indonesian national reference, highlighting the importance of considering population-specific growth references when interpreting child growth and nutritional status.

Keywords: child growth, developmental plasticity, GAMLSS, growth pattern, population-specific growth.

RINGKASAN

AVIANI RINFI SHAFIRA. Pola Pertumbuhan dan Faktor-Faktor yang Berkaitan dengan Pertumbuhan Pada Masa Anak Usia Dini di Sumbawa. Dibimbing oleh KANTHI ARUM WIDAYATI dan ENENG NUNUZ ROHMATULLAYALY.

Referensi pertumbuhan spesifik populasi telah dikembangkan untuk beberapa populasi, tetapi bukti mengenai anak-anak di Indonesia masih terbatas. Penelitian ini bertujuan untuk mengkarakterisasi pola pertumbuhan anak di Sumbawa, membandingkannya dengan referensi pertumbuhan nasional, mengevaluasi perbedaan klasifikasi status gizi, serta mengidentifikasi faktor-faktor yang berhubungan dengan pertumbuhan anak. Penelitian potong lintang (cross-sectional) dilakukan pada 207 anak usia 0–5 tahun dari dua desa di Kabupaten Sumbawa, Indonesia. Data antropometri dan sosiodemografi dikumpulkan menggunakan prosedur terstandar dan kuesioner terstruktur. Kurva pertumbuhan dimodelkan menggunakan *Generalized Additive Models for Location, Scale, and Shape* (GAMLSS) dan dibandingkan dengan Kurva Pertumbuhan Sintetik Indonesia (*Indonesia Synthetic Growth Chart/INSGC*). Status gizi dinilai menggunakan referensi spesifik populasi, referensi Indonesia, serta standar WHO. Faktor-faktor yang berhubungan dengan *z-score* tinggi badan menurut umur (HAZ), berat badan menurut umur (WAZ), dan indeks massa tubuh menurut umur (BMIZ) dianalisis menggunakan model linier umum (*generalized linear models*). Tinggi badan dan berat badan meningkat secara progresif seiring bertambahnya usia, sedangkan indeks massa tubuh menurun secara bertahap selama masa kanak-kanak awal. Dibandingkan dengan INSGC, anak-anak di Sumbawa menunjukkan median (p50) tinggi badan, berat badan, dan indeks massa tubuh yang lebih rendah pada sebagian besar kelompok usia. Klasifikasi status gizi berbeda antara referensi pertumbuhan dan Standar Pertumbuhan Anak WHO serta Permenkes, yang mengklasifikasikan proporsi anak stunting, berat badan kurang, serta wasting/overweight lebih tinggi dibandingkan dengan referensi spesifik populasi. Usia ibu saat melahirkan dan skor sanitasi rumah tangga berhubungan positif dengan HAZ, sedangkan jumlah saudara kandung yang lebih tua berhubungan negatif dengan BMIZ. Anak-anak di Sumbawa menunjukkan pola pertumbuhan yang berbeda dari referensi pertumbuhan nasional Indonesia, sehingga temuan ini menegaskan pentingnya mempertimbangkan kurva referensi pertumbuhan yang spesifik untuk populasi dalam interpretasi pertumbuhan dan status gizi anak.

Kata kunci: GAMLSS, pertumbuhan spesifik populasi, pertumbuhan anak, pola pertumbuhan, plastisitas perkembangan.



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GROWTH PATTERNS AND FACTORS ASSOCIATED WITH EARLY CHILDHOOD GROWTH IN SUMBAWA, INDONESIA

AVIANI RINFI SHAFIRA

Thesis
Submitted in partial fulfillment of the requirements for a
Master's Degree
in
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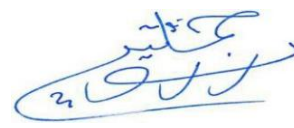
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Bogor, August 2026

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