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

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BOGOR
2026

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Bogor, August 2026

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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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Thesis
Submitted in partial fulfillment of the requirements for a
Master's Degree
in
Animal Biosciences Major Graduate School

STUDY PROGRAM ANIMAL BIOSCIENCE
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
IPB UNIVERSITY
BOGOR
2026

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Exam date:
5 August 2026

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FOREWORDS

Praise and gratitude are offered to Allah SWT for His blessings, mercy, and guidance, which have enabled the author to complete this thesis. This work, entitled "Growth Patterns and Factors Associated with Early Childhood Growth in Sumbawa, Indonesia", Insert was prepared as one of the requirements to obtain the degree of Master of Science in Animal Biosciences at the Graduate School, IPB University.

The author would like to express sincere gratitude to the author parents, Mr. Henri, S.E. and Mrs. Sofy, for their endless prayers, love, sacrifices, encouragement, and unwavering support throughout the author's academic journey. Their constant support and motivation have become the greatest source of strength for the author in completing this study. The author also extends heartfelt appreciation to the author siblings, Asyifa Rinfi Sekar Dewi, S.Ak., Ak. and Muhammad Arkan Sanusi for their kindness, care, and continuous encouragement during the completion of this thesis.

The author would like to express the deepest appreciation to the supervisors, Dr. Kanthi Arum Widayati, S.Si., M.Si. and Dr. Eneng Nunuz Rohmatullayaly S.Si., M.Si., for their invaluable guidance, knowledge, patience, constructive suggestions, and dedication throughout the research process and thesis preparation. Their support has greatly contributed to the completion of this work.

During the research and writing process of this thesis, the author received valuable assistance, support, and encouragement from many individuals and institutions. Therefore, the author would like to sincerely thank the following:

1. Prof. Dr. Drs. Tri Atmowidi, M.Si., as the Head of the Animal Biosciences Study Program, for the support, motivation, and encouragement provided throughout the author's study period.
2. All lecturers of the Animal Biosciences Study Program for sharing their knowledge, expertise, and valuable insights throughout the author's academic journey.
3. The author would like to express special gratitude to the entire family of Ninda Luqya Nakadira in Sumbawa, who provided invaluable assistance, hospitality, guidance, and support during the data collection process for this thesis. Their kindness and willingness to help greatly contributed to the successful completion of the fieldwork.
4. The author would like to sincerely thank Bibi Sundari for her assistance and guidance in facilitating data collection activities in Sili Hamlet, Mata Village, Sumbawa Regency. Her support and local knowledge were greatly appreciated during the fieldwork process.
5. The author expresses sincere appreciation to all respondents and participants involved in this study. Although their names cannot be mentioned individually, their willingness, time, and cooperation in providing the necessary information and data were essential for the completion of this research.
6. The author would like to thank all colleagues and friends from the Animal Biosciences Study Program, especially the M. Iqra Reza, Hanifa Rahma, Ninda L. Nakadira, Chairunnisa Anwar, Rizki R.

Hayati, Astihawa I. Setiani, Marsha Hapsarini, Nur Azizah M. Rahma, Winda E. Putri, Nur Anisa, Muhammad Ridwan, Firnandez N. V. Sadana, Gaetania F. Adhara, Nurul W. Assaumi, Septiany A. Kadang, Tazkiana N.F. Sofandi, Rahmat A. Munggaran, Tazkiah Auliaputri, Amat Ribut, Azimah W. Ishlah, Ahsani Taqwim, Fauzia N.F Tantu, Intan R. Pratiwi, Nabilah Khairunnisa, for their friendship, support, valuable discussions, and memorable experiences throughout the academic journey.

7. The author sincerely thanks to Vienza Gita Hapsari, S.Si., Dyan Puspita Hanung Pratiwi, S.Si., and Syafia Mufida, S.TP. from the author's undergraduate friends for always being a place to share stories, worries, struggles, and emotions throughout this academic journey. Their willingness to listen to the author's concerns, moments of anxiety, and difficulties, as well as their continuous encouragement, prayers, and support, have been invaluable and deeply appreciated.
8. The author would like to express heartfelt gratitude to Jessica Ayumi Tri Putri Aurelie, S.Psi., Lisza Alifia, S.E., Ns. Aprechilia Ardhya Aulia, S.Kep. and Rifka Nurmaya, A.Md.Kep. from the author's high school friends for their continuous support, encouragement, and companionship throughout this journey. Their presence, cheerful moments, and efforts to bring happiness and balance during challenging times have helped the author reduce stress and maintain motivation throughout the completion of this thesis.
9. The author would like to express special appreciation to Mohammad Iqra Reza for the support, assistance, and encouragement provided throughout the completion of this thesis. The author appreciates the help and companionship during the writing process.
10. Finally, the author would like to extend sincere gratitude to all individuals and parties who have contributed directly or indirectly to this research and thesis completion. Every form of support, kindness, and assistance provided throughout this journey is deeply appreciated.

The author realizes that this thesis is still far from perfect. Therefore, constructive suggestions and feedback are highly appreciated for future improvements. Hopefully, this thesis may provide valuable contributions to the field of human biology and child growth research.

Bogor, August 2026

Aviani Rinfi Shafira

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