

ABSTRAK

Penelitian ini berjudul "Pengelompokan Karakteristik Stunting Pada Balita di Indonesia Berdasarkan Faktor Penyebab dengan Metode *Agglomerative Hierarchy Clustering*", bertujuan untuk mengelompokkan provinsi-provinsi di Indonesia berdasarkan kesamaan karakteristik faktor penyebab stunting pada balita menggunakan metode AHC dengan *Ward's Linkage*. Data yang digunakan bersumber dari Survei Status Gizi Indonesia (SSGI) Tahun 2024 yang mencakup 36 provinsi dengan 8 variabel indikator, meliputi cakupan ANC K6, ASI eksklusif, *Minimum Acceptable Diet* (MAD), konsumsi protein hewani, pemantauan pertumbuhan, imunisasi dasar lengkap, akses air minum layak, dan sanitasi layak. Proses analisis diawali dengan praproses data meliputi pemeriksaan nilai hilang, penanganan *outlier* menggunakan metode IQR dengan *Winsorizing*, dan normalisasi *Z-Score*, dilanjutkan dengan perhitungan matriks jarak Euclidean sebagai dasar klusterisasi. Penentuan jumlah kluster optimal menggunakan analisis dendrogram, *Silhouette Coefficient*, dan *Calinski-Harabasz Index* yang ketiganya secara konsisten merekomendasikan $k = 2$ dengan nilai *Silhouette* sebesar 0,2844 dan *Calinski-Harabasz* sebesar 13,3111. Hasil penelitian menunjukkan terbentuknya 2 kluster, di mana Kluster 1 terdiri dari 8 provinsi di kawasan Jawa, Bali, NTB, dan Kalimantan Timur dengan cakupan layanan kesehatan yang relatif baik, sedangkan Kluster 2 terdiri dari 28 provinsi lainnya yang dicirikan oleh rendahnya cakupan imunisasi dasar lengkap (42,15%), ANC K6 (21,12%), dan MAD (23,68%). Variabel imunisasi dasar lengkap menjadi faktor pembeda terkuat antarkluster dengan selisih 29,10 poin persentase, membuktikan bahwa metode AHC *Ward's Linkage* efektif untuk mengelompokkan karakteristik stunting berdasarkan faktor penyebab dan dapat menjadi landasan ilmiah bagi perumusan strategi intervensi yang lebih tepat sasaran.

Kata kunci: *Agglomerative Hierarchical Clustering*, stunting, balita, faktor penyebab stunting, *Ward's Linkage*

ABSTRACT

This study, titled "Grouping of Stunting Characteristics in Toddlers in Indonesia Based on Causative Factors Using the Agglomerative Hierarchical Clustering Method", aims to cluster Indonesian provinces based on the similarity of stunting causative factor characteristics in children under five using the AHC method with Ward's Linkage. Data were obtained from the 2024 Indonesian Nutritional Status Survey (SSGI) covering 36 provinces with 8 indicator variables, including ANC K6 coverage, exclusive breastfeeding, Minimum Acceptable Diet (MAD), animal protein consumption, growth monitoring, complete basic immunization, access to clean water, and proper sanitation. The analytical process began with data preprocessing comprising missing value examination, outlier treatment using the IQR method with Winsorizing, and Z-Score normalization, followed by Euclidean distance matrix calculation as the basis for Clustering. The optimal number of clusters was determined using dendrogram analysis, Silhouette Coefficient, and Calinski-Harabasz Index, all of which consistently recommended $k = 2$ with a Silhouette score of 0.2844 and Calinski-Harabasz Index of 13.3111. The results revealed two clusters, where Cluster 1 comprised 8 provinces in Java, Bali, NTB, and East Kalimantan characterized by relatively good health service coverage, while Cluster 2 comprised 28 other provinces characterized by low coverage of complete basic immunization (42.15%), ANC K6 (21.12%), and MAD (23.68%). Complete basic immunization emerged as the strongest differentiating variable between clusters with a gap of 29.10 percentage points, demonstrating that the AHC Ward's Linkage method is effective for Clustering stunting characteristics based on causative factors and provides a scientific foundation for formulating more targeted stunting intervention strategies.

Keywords: Agglomerative Hierarchical Clustering, stunting, toddlers, stunting causative factors, Ward's Linkage