## ABSTRACT

Malnutrition remains a persistent public health issue in Indonesia even after decades of attempts to solve the problem. Current national and regional policies for malnutrition prevention tend to adopt a uniform approach, overlooking the diverse nutritional profiles across different regions. This study aims to cluster cities and regencies in Java Island, a region with the largest population in Indonesia, into several groups based on their nutritional statuses. These nutritional statuses include the status of undernutrition (stunting, wasting, and underweight) and the status of overnutrition (overweight). Data were collected from the 2023 report of the Indonesian Health Survey conducted by the Indonesian Ministry of Health. A Gaussian Mixture Model (GMM) with Expectation-Maximization (EM) algorithm and initialization using Model-Based Agglomerative Hierarchical Clustering (MBAHC) was employed to identify latent clusters among the cities and regencies. This probabilistic clustering approach was chosen for its flexibility in modelling complex, overlapping distributions in nutritional data. The analysis revealed a two-cluster model, with mixing coefficients of 0.1246 and 0.8754. One cluster consists of cities and regencies likely experiencing a double burden of malnutrition, while the other predominantly faces moderate to high levels of undernutrition. These findings highlight the need for region-specific nutritional interventions and suggest that data-driven clustering can serve as a valuable tool for designing more effective, targeted public health policies.



**Keywords:** Nutritional Status, GMM, EM-algorithm, MBAHC, Malnutrition