I. INTRODUCTION

Malnutrition or nutritional deficiency refers to a condition where an individual does not receive sufficient nutrients or only obtains an intake below the standard [1]. Based on data from the WHO, there are four common forms of malnutrition, namely wasting, stunting, underweight, and vitamin and mineral deficiencies[1] [2]. Children suffering from malnutrition are more susceptible to infections, growth disturbances, and delays in cognitive development [3] [4]. In 2022, WHO estimated that worldwide, around 149 million children under five years old experienced stunting due to inadequate height for their age, while 45 million suffered from wasting as a result of being underweight for their height, and 37 million were affected by overweight or obesity. Malnutrition is linked to nearly half of all deaths among children under five[1].

By 2025, SDG Target 2.2 aims to eliminate malnutrition, including reducing stunting and wasting in children under five. It also highlights the importance of adequate nutrition for adolescent girls, as well as for pregnant women, breastfeeding mothers, and the elderly. Adequate nutrition supports maternal and child health, strengthens immunity, promotes healthy pregnancies, reduces non-communicable diseases, and extends life expectancy[2].

Several previous studies have applied machine learning methods for disease and nutritional status classification. Research on heart disease classification revealed that among the methods tested, the SVM approach utilizing a Radial Basis Function (RBF) kernel achieved the highest accuracy of 92%, surpassing Na¨ıve Bayes classification and K-Nearest Neighbor (KNN) method [5]. Another study on predicting the spread of malnutrition in Magelang City using Na¨ıve Bayes showed an accuracy of 75% [6]. Moreover, a study on stroke prediction found that among the algorithms tested, Na¨ıve Bayes classification achieved the highest performance, reaching an accuracy of 82% [7].

This study applies Na¨ıve Bayes and SVM to classify the nutritional status of toddler using real-world, imbalanced anthropometric data. In contrast to earlier research that concentrated on broader health concerns, this research specifically addresses the impact of data imbalance on classification performance in child nutrition [8]. The findings offer insights into algorithm effectiveness under such conditions and contribute to early malnutrition detection.

The aim of this study is to classify the nutritional status of children under five based on anthropometric data and to compare the performance of Na¨ıve Bayes Classifier and SVM in handling imbalanced datasets [9]. This research is conducted in Kalijambe, with data from approximately 3,000 children, given the widespread challenges of malnutrition and undernutrition in the area. The results are expected to provide recommendations for a more optimal method for classifying the nutritional status of toddler and to support child health programs in the early detection of malnutrition risks [10].

[1] https://www.who.int/news-room/fact-sheets/detail/malnutrition

[2] https://www.who.int/data/gho/data/themes/topics/sdg-target-2_2-malnutrition?