

***Hypertension Risk Prediction Using the C4.5 Decision Tree Method at Jember
Kidul Public Health Center***

Andri Permana Wicaksono, S.ST., M.T. (Supervisor)

Yulisa Cahyani Putri

*Health Information Management Study Program
Department of Health*

ABSTRACT

Hypertension is one of the non-communicable diseases that has the potential to cause various serious complications. At the Jember Kidul Health Center, hypertension is included in the top 10 diseases during the 2023–2025 period. In addition, the achievement of early detection of hypertension through the Non-Communicable Disease Prevention and Control Program (P2PTM) in the 2023–2025 period has not reached the set target. This condition shows the need for supportive efforts to help identify the risk of hypertension early. This study aims to develop a hypertension risk prediction system using the Decision Tree C4.5 algorithm based on P2PTM screening data at the Jember Kidul Health Center. Data analysis was carried out using the Decision Tree C4.5 algorithm with the help of RapidMiner software, while system development used the Waterfall method. The dataset used amounted to 5,166 data from the P2PTM screening in 2025 with a 70:30 distribution of training and testing data using stratified sampling techniques. The model evaluation using the Confusion Matrix showed an accuracy value of 99.55%, precision of 99.36%, and recall of 99.74%. The resulting model is then implemented into the hypertension risk prediction system. The results showed that excessive salt consumption was the most influential risk factor because it had the highest gain ratio. Based on these results, the Decision Tree C4.5 algorithm is able to provide good classification performance in predicting the risk of hypertension. Further research is suggested to add more specific risk factor variables so that the resulting classification rules are more detailed and accurate in describing the patient's condition.

Keywords: *Hypertension, Decision Tree C4.5, Data Mining, Risk Prediction, Knowledge Discovery in Database*