

INTRODUCTION

Pregnancy is a crucial period in a woman's life where good nutritional intake is an important factor in influencing the health of the mother and fetus. During pregnancy, the body's nutritional requirements will increase. This is because the fetus grows by taking in the nutrients from the mother's body. Therefore, pregnant women need to pay attention to their nutritional intake with a complete and balanced menu. Healthy and balanced nutritional intake during pregnancy has a good impact on the mother's health and the development of the fetus (Kementarian Kesehatan RI, 2014).

Lack of nutritional intake during pregnancy can cause serious health problems that endanger the mother and the development of the fetus. One of the effects of nutritional deficiencies during pregnancy is anemia. Anemia in pregnant women can cause bleeding, shock, low birth weight, miscarriage, prolonged labor, uterine atony, and premature birth (Ernawatsi, 2017). Apart from that, excessive nutritional intake during pregnancy also has negative impacts, such as weight gain. Excessive weight gain during pregnancy can increase gestational diabetes, preeclampsia, high birth weight, cesarean section, postpartum weight retention, and increased risk of preterm birth (de Seymour et al., 2019).

Considering this issue, we need a food menu recommender system that can help recommend daily menus that suit the needs of pregnant women. One common recommendation technique is an ontology-based recommender system. Ontology-based recommendation is a knowledge-based recommender system that utilizes ontology to represent knowledge (Yang, 2010). Ontology-based recommender systems have similarities with expert systems, both utilize domain knowledge for inference and decision-making. They also rely on rules and logic to provide relevant results. The difference is that ontology-based recommender systems provide item recommendations based on user preferences, while expert systems mimic the decision-making abilities of specialists in a specific domain to provide solutions or answers to specific problems (Mekruksavanich, 2016).

In previous research regarding ontology-based food recommender systems, Ali et al developed an ontology-based health service recommendation system to monitor patients' bodies and recommend certain foods and medicines with an average accuracy value of 83% (Ali et al., 2018). Sambola et al developed an ontology-based nutritional recommender system using SWRL rules that can identify levels of excess weight in users and offer appropriate dietary plans with an average accuracy of 87% (Mckensy-Sambola et al., 2021). Adila et al developed a food menu recommender system for individuals with coronary heart sufferers, utilizing ontology and SWRL. This study uses a Telegram bot to assist users in determining suitable food and water requirements for coronary heart sufferers with an F1-score accuracy of 93% (Adila & Baizal, 2023). Ontologies play an important role in the development of recommender systems. Previous research has shown that incorporating ontology knowledge into the recommendation process can increase the accuracy and help to overcome limitations in the recommender system, like cold-start /ramp-up and data sparsity problems (Tarus et al., 2018).

The previously mentioned research was able to develop an ontology-based recommender system that can recommend food menus to users, but there has been no research that specifically considers the needs of pregnant women. Because the nutritional needs of pregnant women are different from those of non-pregnant women. Therefore, in this research, we developed an ontology-based food menu recommender system for pregnant women using SWRL rules. This recommender system uses a Telegram chatbot to help pregnant women choose a food menu that suits their needs. This recommender system also provides menu recommendations by considering user allergies and diseases such as anemia and gestational diabetes, so that it can provide food menu recommendations that are more suitable for users. In this study, ontology is used to represent knowledge of food and its nutritional content, and SWRL rules are used to carry out reasoning on the ontology to determine the appropriate food menu for pregnant women.