

UNIVERSITI TEKNOLOGI MARA (UiTM)

**THE EFFECT OF EXERCISE AND NUTRITION
INTERVENTION ON BODY COMPOSITION AND METABOLIC
PARAMETERS IN WEIGHT MANAGEMENT PROGRAM
AMONG OVERWEIGHT AND OBESE ADULTS: SYSTEMATIC
REVIEW**

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JULY 2024

ACKNOWLEDGMENT

First and foremost, I would like to thank the almighty for giving me ease and strength in completing my thesis for the Final Year Project titled “The Effect Of Exercise And Nutrition Intervention On Body Composition And Metabolic Parameters In Weight Management Program Among Overweight and Obese Adult: Systematic Review”.

I would like to express my deepest appreciation to my supervisor **Associate Professor Dr. Norazmir Bin Md. Nor** for his valuable guidance, support, and encouragement throughout the research process. His expertise and insights have been instrumental in shaping the direction of this project. I am profoundly grateful for the opportunities you have provided me to learn and grow academically and personally. Your patience, understanding, and willingness to always be available for consultation have made this challenging journey an enlightening and fulfilling experience.

I extend my appreciation to my Final Year Project partners for their valuable feedback and constructive criticism, which significantly enhanced the quality of my work. Furthermore, I am truly grateful to Erma and Amiza for participating as a reviewer for my Systematic review. They are willing to share their time and cooperation for this study. Their involvement has been crucial in gathering meaningful data and insights.

ABSTRACT

Background: The rising prevalence of obesity among adults has become a significant global health concern, with predictions indicating that the number of obese individuals worldwide will reach 1.12 billion by 2030. In Malaysia, the prevalence of overweight and obesity is alarmingly high, contributing to increased morbidity and mortality due to chronic diseases such as heart disease, diabetes, and cancer. This study systematically reviews and compares the effects of nutrition-only, exercise-only, and combined nutrition and exercise interventions on body composition and metabolic parameters in overweight and obese adults. **Methods:** This systematic review follows a rigorous protocol registered with the International Prospective Register of Systematic Reviews (PROSPERO), identification CRD42024517550. A comprehensive literature search was conducted across electronic databases including PubMed, Scopus, Web of Science, and Google Scholar to identify relevant studies published between January 2015 and June 2024. The inclusion criteria specified that studies must involve adult participants aged 18-65 diagnosed with overweight or obesity, and studies assessing the impact of exercise and dietary interventions on body composition and metabolic parameters. Extracted data included study characteristics, participant characteristics, intervention details, and reported outcomes. Two independent reviewers performed the data extraction to ensure accuracy and consistency. **Result:** A total of 6508 articles were identified, with 48 studies meeting the inclusion criteria and included in the systematic review. The review found that the most significant reduction in body weight was achieved through energy restriction combined with exercise or high-protein intake and personalized nutrition interventions significantly improved BMI, body fat percentage, and waist circumference, along with blood biomarkers such as triglycerides, total cholesterol, LDL cholesterol, and blood glucose level. High-protein meal replacements demonstrated substantial weight loss, improved body composition, and enhanced metabolic health markers. **Conclusion:** Personalized combined nutrition and exercise interventions are more effective than standard intervention guidelines in promoting weight loss and improving metabolic health in overweight and obese individuals. The findings highlight the importance of considering individual differences in dietary interventions to maximize their efficacy.

Keywords: Obesity, Overweight, Exercise Intervention, Nutrition intervention, Body composition, Metabolic Parameter, Weight Loss, Systematic review.

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CHAPTER 1: INTRODUCTION

1.1 Research Background

In recent years, the rising prevalence of obesity among adults has become a significant global health concern. Overweight and obesity have become more prevalent in several countries in recent years. If predictions become facts, the number of obese persons in the globe is anticipated to reach 1.12 billion by 2030 (Zeng et al., 2020). According to The National Health Morbidity Survey (NHMS) 2019, the prevalence of overweight and obesity in Malaysia was 32.3% and 33.7%, respectively.

Obesity is a disease due to its detrimental impact on life expectancy, and disruption of bodily functions, it has distinct signs and symptoms, increases morbidity, and can be caused by genetic factors (Clinical Practice Guidelines, 2023). The excess accumulation of adipose tissue in the body, especially visceral adipose tissue, is related to an elevated risk of metabolic diseases (Dettlaff et al., 2022). It is responsible for more deaths as they are usually associated with various chronic diseases, such as heart disease, stroke, diabetes, and cancers. According to the Ministry of Health in Malaysia and the World Health Organization (WHO) in 2019, Malaysia holds the highest obesity and overweight rates among Asian countries, with 64% of males and 65% of females categorized as obese or overweight. Consequently, the percentage of adults aged 18 and above with diabetes surged from 11.6% to 17.5% between 2006 and 2015. Additionally, the prevalence of hypertension remained high at approximately 30%, with over 50% of diabetes and hypertension cases going undiagnosed.

Obesity is commonly assessed through body mass index (BMI), but it is a more complex condition than a mere measure of weight. It arises from an imbalance between energy intake and energy expenditure, which is influenced by a combination