

# Effectiveness of a mobile-based personalized exercise application in enhancing physical activity and health metrics among middle-aged adults: A 12-week intervention study

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## ABSTRACT

**Introduction:** With sedentary lifestyles becoming increasingly prevalent among middle-aged individuals, there is a pressing need for interventions that promote physical activity. This study aimed to evaluate the effectiveness of a mobile-based personalized exercise application (PEA) in this population. **Materials and Methods:** 21 participants aged  $47.71 \pm 5.24$  years old, engaged in a 12-week exercise regimen, receiving individualized exercise prescriptions through the PEA. Key health metrics including body composition, glucose and lipid profiles, echocardiography, and fitness level using 6-minute walk test (6WMT) were measured before and after the intervention. **Results:** The overall results revealed significant improvements in fitness level ( $18.00 \pm 38.79$ ,  $p < 0.05$ ) and high-density lipoprotein (HDL) levels ( $0.15 \pm 0.24$ ). However, subgroup analysis showed that in women, there were significant improvements in waist-to-hip ratio (WHR) with a mean reduction of  $0.03 \pm 0.05$  ( $p = 0.05$ ), an increase in HDL levels by  $0.17 \pm 0.25$  mg/dL ( $p = 0.01$ ), and an improvement in fitness level ( $23.50 \pm 13.25$ ,  $p < 0.001$ ). In men, the only significant improvement observed was an increase in left ventricular ejection fraction by  $2.80 \pm 2.28\%$  ( $p < 0.05$ ). No significant changes were found in other blood markers or echocardiographic parameters. Meanwhile, the Exercise Self-Efficacy Scale (ESES) results indicated that the PEA intervention effectively enhanced participants' self-assurance in their ability to stick to regular exercise routines, exercise under various challenging conditions (such as feeling down, lacking support, having other interests, or not being in the mood for exercise), and sustain interest in performing exercise anywhere ( $p < 0.05$ ). **Conclusion:** The study demonstrated that PEA has the potential to be an effective tool for promoting physical activity among middle-aged adults, leading to significant improvements in certain health metrics and exercise self-efficacy. Future research could explore larger sample sizes, longer intervention periods, or the combination of PEA with additional lifestyle modifications, such as dietary changes.