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Evaluating the Effects of Circuit Training and Motivation on Gender-Specific Waist Reduction in Overweight Populations

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Abstract

Background. Overweight is a global health problem that is closely associated with an increased risk of cardiovascular and metabolic diseases. Waist circumference, as an indicator of visceral fat, serves as an important parameter for assessing the effectiveness of weight loss interventions. Motivation and exercise type, including circuit training, are believed to play significant roles in the success of weight management programs.

Objectives. This study aimed to analyze the influence of motivation, gender, and circuit training methods (isometric and isokinetic) on waist circumference reduction in overweight individuals.

Materials and methods. The study employed a 2×2×2 factorial design with a quasi-experimental approach. Forty participants from a fitness center were divided into eight groups based on the combinations of motivation (high and low), gender, and training method (isometric and isokinetic). Waist circumference data were measured before and after the treatment over 16 training sessions, with data analysis performed using three-way ANOVA.

Results. Isokinetic training showed higher effectiveness in reducing waist circumference compared to isometric training, with high motivation being a factor that enhanced results. Conversely, gender did not have a substantial effect on waist circumference reduction. Motivation and exercise type had significant main effects ($p < 0.001$), while a marked interaction was found between motivation and exercise type ($p < 0.01$), highlighting the importance of combining these two factors.

Conclusions. Motivation and circuit training methods are key factors in the success of waist circumference reduction, with isokinetic training recommended as the primary choice for optimal results. These findings provide practical guidelines for designing more effective and inclusive physical activity-based overweight management programs.

Keywords: overweight, waist circumference, circuit training, motivation.

Introduction

Overweight constitutes one of the most pressing public health challenges globally. This is due to the global increase in childhood overweight, especially its impact on long-term health (Muyulema et al., 2024). This condition can also be described as an excessive buildup of adipose tissue, which adversely impacts health (Fauziyah & Rohmawati, 2019). Being overweight increases the risk of non-communicable diseases (NCDs), such as cardiovascular disease, diabetes, cancer, and respiratory disease (Alsla et al., 2024). The World Health Organization (WHO) has indicated that Overweight has escalated to a global epidemic, impacting millions worldwide (WHO, 2019). Furthermore, Overweight is directly correlated with several chronic diseases, including type 2 diabetes, hypertension, cardiovascular disease, and osteoarthritis, all of which contribute to increased global morbidity and mortality (Amad Syarifudin & Nurmala, 2015; Al-Mhanna et al., 2024). In addition, major risk factors for various non-communicable diseases and mortality are caused by obesity and low cardiorespiratory fitness (Rago & Mohr, 2023).

Overweight is a disease that adversely affects quality of life, mortality and morbidity, and is associated with a

sedentary lifestyle (John et al., 2023). Childhood overweight remained a significant health issue that necessitated customized treatment approaches. The findings indicated that short-term lifestyle interventions were more effective in decreasing BMI z-scores and cardiovascular risk factors in pubertal boys compared to girls. Further research was required to explore these gender differences in greater depth to inform the development of tailored interventions (Gilardini et al., 2024). The prevalence of Overweight had risen across all age groups, including children and adolescents. Research indicated that approximately 50% of children and 80% of adolescents who were overweight were likely to maintain this condition into adulthood, thus heightening the risk of chronic health complications in later life (Al-Haifi, 2023). Conversely, Overweight in the elderly was often aggravated by sarcopenia, a decline in muscle mass associated with aging, which further elevated the risk of metabolic and cardiovascular disorders (Jung et al., 2022).

Physical exercise had long been recognized as an effective intervention for reducing Overweight. Among various training methods, circuit training stood out as one of the most popular and effective approaches. This training system integrated both aerobic and anaerobic elements, enhancing cardiovascular fitness, muscle strength, and body fat reduction (Harsono, 2015; Boraczyński et al., 2021). Circuit training offered flexibility and time efficiency, making it suitable for diverse population groups (Rago & Mohr, 2023). Research indicated that circuit training could yield significant benefits within a relatively short duration. This form of exercise not only enhanced VO_2max but also improved metabolic profiles, including lipid levels and insulin resistance. Furthermore, when combined with other methods, such as High-Intensity Interval Training (HIIT), circuit training demonstrated an ability to increase muscle strength and further reduce body fat (Pashaei et al., 2024).

Home-based circuit training programs also showed positive results in improving cardiometabolic fitness among the elderly with comorbidities such as type 2 diabetes and osteoarthritis (Al-Mhanna et al., 2024). In lower socio-economic contexts, circuit training became an ideal solution because it could be done at minimal cost and in a shorter time compared to conventional training methods (Mehmood et al., 2022). However, the success of circuit training was not only determined by the training method itself but also by individual motivation. Motivation was a key element that influenced the success of participation in exercise programs. Research indicated that individuals with high motivation were more likely to adhere to training programs and achieve better results (Batrakoulis et al., 2020). Conversely, a lack of motivation often became a major obstacle in achieving fitness goals. In addition to motivation, gender also played an important role in the effectiveness of physical exercise. Hormonal differences between men and female affected the body's adaptation to physical exercise, especially in terms of reducing visceral fat and increasing cardiovascular capacity (Gilardini et al., 2024). For instance, men tended to show faster metabolic responses to high-intensity training, while female might require a more endurance-focused approach to achieve similar results (Pahlavani et al., 2024).

Considering these factors, home-based circuit training programs could be tailored to meet the needs of various individual groups, ensuring a more personalized and effective approach to improving cardiometabolic fitness. Although numerous studies have highlighted the benefits of circuit training, there remains a gap in the literature regarding how motivation and gender influence the effectiveness of this exercise, particularly in the context of reducing waist circumference. Most research tends to focus on one or two aspects, such as cardiovascular fitness parameters or body composition, without considering the complex interactions among these factors (Seo et al., 2019). This study aimed to fill that gap by exploring the influence of circuit training methods, exercise motivation, and gender on the reduction of waist circumference in overweight individuals. Waist circumference is recognized as an important indicator for assessing the accumulation of visceral fat. Visceral fat, concentrated around vital organs such as the liver, kidneys, and intestines, is closely linked to the risk of cardiovascular disease, insulin resistance, and metabolic syndrome (Fareed et al., 2017). Measuring waist circumference is also a practical and widely used parameter for evaluating the success of interventions targeting visceral Overweight (Howlader et al., 2018).

The multifactorial approach of this study allowed for a more holistic analysis of the interactions between variables, aiming to provide new insights relevant to fitness practitioners and researchers. Furthermore, this study was designed to contribute practically to the development of more inclusive and effective exercise programs. By exploring how motivation and gender could modify responses to circuit training, the results of this study are expected to help design more personalized interventions tailored to individual needs and applicable on a broader scale. The urgency of this research lies not only in its efforts to enhance the effectiveness of circuit training but also in its potential to support better public health policies. By providing more comprehensive empirical evidence, this study could serve as a foundation for developing intervention programs that systematically address Overweight challenges. The training methods used in this study were isometric and isokinetic circuit training as treatments for reducing waist circumference, with exercise motivation and gender as attribute variables.

Materials and Methods

The Type of Research

The type of research conducted used a quasi-experimental design with a multifactorial approach to examine the influence of several independent variables (circuit training methods, exercise motivation, and gender) on the dependent variable (waist circumference reduction). The study employed a 2×2×2 factorial design, with groups based on the combinations of the three independent variables. The research was carried out four times a week, resulting in a total of 16 treatment sessions.

Participants

The population in this study consisted of members of Celebrity Fitness Paragon Mall in Semarang, Indonesia, totaling 50 individuals. To determine the sample, the researcher used purposive sampling technique. Based on predetermined criteria, the top 20 individuals with high

exercise motivation and the last 20 individuals with low exercise motivation were selected as samples, resulting in 40 samples. These samples were then divided into 8 groups. From these 8 groups, 2 main groups were formed to undergo treatment: one group for isometric training and another for isokinetic training. Each of these main groups was further divided into two subgroups based on gender, resulting in male and female training groups for both isometric and isokinetic exercises.

Instrument

The data collection techniques used in this study involved tests and measurements. Two types of data were collected: 1) Waist circumference was measured using Metline, which is useful for measuring distances that are straight, angular, or circular. Waist circumference measurements were taken before and after the treatment to determine the Gain achieved by participants, which was then analyzed. 2) The instrument used to collect data on exercise motivation was a questionnaire. This questionnaire utilized a modified Likert scale with four answer choices: strongly agree, agree, disagree, and strongly disagree. The scale included four alternative answers: Strongly Agree (SA) with a score of 4, Agree (A) with a score of 3, Disagree (D) with a score of 2, and Strongly Disagree (SD) with a score of 1.

Statistical Analysis

Given that this study involved several independent variables (training methods, motivation, and gender) and one dependent variable (waist circumference reduction), the data analysis technique used was a 3-Way Factorial Analysis of Variance (3-Way ANOVA). This analysis aimed to evaluate the effects of three independent variables: training methods (with two levels: isometric and isokinetic), motivation (with two levels: high and low), and gender (male and female) on the dependent variable, which was waist circumference reduction. This approach allowed researchers to examine the main effects of each independent variable, the interactions between two independent variables, and the interaction among all three independent variables simultaneously.

The analysis began with testing the main effects to determine if each independent variable individually influenced waist circumference reduction. Following this, the interactions between two independent variables were analyzed to identify possible interactive relationships between the combinations of two variables. The study also included testing the interactions among all three independent variables to explore the complex influence of training methods, motivation, and gender on waist circumference reduction. When main effects or interactions were found to be significant, further analysis was conducted through post-hoc tests, such as Tukey HSD or Bonferroni, to identify specific groups showing significant differences.

It was crucial to ensure the assumptions of ANOVA, such as data normality and homogeneity of variances among groups, were met. However, since the data were not normal, alternative non-parametric methods, like the Kruskal-Wallis test for main effects or rank-based ANOVA for interactions, were used. Additionally, if significant interactions were found, simple effects analysis was performed to gain deeper insights into how a particular independent variable influenced the dependent variable under specific conditions of the other independent variables. To support the interpretation of results, visualization in the form of interaction plots was used. One such graphical form was the profile plot, which displayed the patterns of relationships among the levels of independent variables. These plots included error bars to depict the 95 % confidence intervals, making the results more intuitively understandable.

Results

Based on the descriptive statistics presented on table 1, data analysis was conducted to understand the influence of the combination of motivation, gender, and type of exercise on waist circumference reduction. These variables were grouped into various combinations, and the data were summarized in terms of mean, standard deviation, and the number of participants (n) for each group.

In the low motivation group, males who participated in isometric exercises experienced an average waist circumference reduction of -1.80 with a standard deviation of 0.84, indicating some individual variability. In contrast, males in the isokinetic exercise group had a greater average reduction of -2.40, with a smaller standard deviation (0.55), indicating more consistent results. Overall, the combined average reduction for males with low motivation was -2.10 with a standard deviation of 0.74. For females, similar results were observed, with an average reduction of -1.60 in the isometric exercise group and -2.40 in the isokinetic exercise group. The variability of results among females remained low in both types of exercise, with a combined average reduction of -2.05 and a standard deviation of 0.69.

In the high motivation group, more significant results were found. Males in the isometric exercise group recorded an average waist circumference reduction of -2.60 with a low standard deviation (0.55), while the isokinetic exercise group showed a much larger average reduction of -4.60, with very small variability (0.55). The total combined average reduction for males with high motivation was -3.60 with a standard deviation of 1.18. High motivation females showed nearly similar results, with an average reduction of -2.40 in the isometric exercise group and -4.60 in the isokinetic exercise group, resulting in a combined average reduction of -3.55 with a standard deviation of 1.19. This indicates that high motivation significantly contributed to waist circumference reduction, especially in the isokinetic exercise group.

Overall, the combined average reduction in waist circumference for males was -2.85 with a standard deviation of 1.23, while for females it was -2.75 with a standard deviation of 1.25. Isometric exercises produced an average reduction of -2.10 with low variability (standard deviation 0.78), while isokinetic exercises resulted in a larger reduction of -3.50 with higher variability (standard deviation 1.23). The thematic analysis showed that isokinetic exercises consistently produced better results compared to isometric exercises, regardless of motivation levels or gender. High motivation had a more significant impact on waist circumference reduction, particularly in the isokinetic exercise group. For low motivation groups, males tended to have a greater reduction in waist circumference compared

to females, but in the high motivation groups, this difference became insignificant, with results nearly equal between genders.

Table 1. Descriptive statistics data of the combination of motivation, gender, and type of exercise

Circuit Traininng	Motivation	Gender	Mean	Std. Deviation	n
		Male	-1.80	0.84	5
	Lower	Female	-1.60	0.55	5
		Total	-1.70	0.67	10
		Male	-2.60	0.55	5
Isometric	High	Female	-2.40	0.55	5
		Total	-2.50	0.53	10
		Male	-2.20	0.79	10
	Total	Female	-2.00	0.67	10
		Total	-2.10	0.72	20
		Male	-2.40	0.55	5
	Lower	Female	-2.40	0.55	5
		Total	-2.40	0.52	10
		Male	-4.60	0.55	5
Isokinetic	High	Female	-4.60	0.55	5
		Total	-4.60	0.52	10
		Male	-3.50	1.27	10
	Total	Female	-3.50	1.27	10
		Total	-3.50	1.24	20
		Male	-2.10	0.74	10
	Lower	Female	-2.00	0.67	10
		Total	-2.05	0.69	20
		Male	-3.60	1.17	10
Total	High	Female	-3.50	1.27	10
		Total	-3.55	1.19	20
		Male	-2.85	1.23	20
	Total	Female	-2.75	1.25	20
		Total	-2.80	1.22	40

Dependent Variable: abdominal circumference

The Analysis of Variance (ANOVA) conducted in this study evaluated the influence of motivation, gender, and type of exercise (Circuit Training) on waist circumference reduction, as well as the interaction among these independent variables (see table 2). The resulting statistical model demonstrated a high explanatory power, with an R-Squared value of 0.808, indicating that 80.8 % of the variability in waist circumference reduction could be explained by the combination of variables in the model. The Adjusted R-Squared value of 0.766 further reinforced the accuracy of this model after adjusting for the number of predictors used.

The analysis results indicated that motivation had a significant impact on waist circumference reduction. With an F-value of 64.286 ($p < 0.001$) and Partial Eta Squared (η^2) of 0.668, motivation accounted for approximately 66.8 % of the data variability. This finding underscored the importance of motivation in achieving significant waist circumference reduction. Conversely, gender did not have a significant impact on waist circumference reduction, with an F-value of 0.286 ($p = 0.597$) and η^2 of only 0.009, suggesting that gender contributed minimally to the data variability, less than 1%. The type of exercise, or Circuit Training, was also found to have a significant impact on waist circumference reduction, with an F-value of 56.000 ($p < 0.001$) and η^2 of 0.636. This indicated that the type of exercise accounted for 63.6% of the variability in waist circumference, making it a crucial factor in determining the outcomes of the training program. Further interaction analysis showed that the effect of motivation on waist circumference was not influenced by gender, as evidenced by the non-significant Motivation*Gender interaction ($F = 0.000$, $p = 1.000$, $\eta^2 = 0.000$). Additionally, the interaction between gender and type of exercise was also non-significant ($F = 0.286$, $p = 0.597$, $\eta^2 = 0.009$), indicating that the impact of the type of exercise did not differ substantially between males and females.

However, a significant interaction was found between motivation and type of exercise, with an F-value of 14.000 ($p = 0.001$) and η^2 of 0.304. This finding indicated that the effectiveness of the type of exercise on waist circumference reduction was highly dependent on the participants' level of motivation, with the interaction contributing 30.4 % to the data variability. On the other hand, the three-way interaction of Motivation*Gender*Circuit Training did not show a significant influence on waist circumference reduction ($F = 0.000$, $p = 1.000$, $\eta^2 = 0.000$). The analysis results were further supported by the observed power of the relevant variables. Motivation and type of exercise had an observed power of 1.000, indicating a high ability to detect significant effects. Conversely, the non-significant interactions, such as Motivation*Gender or Gender*Circuit Training, had low observed power (0.050–0.081), reflecting their inability to detect small or weak effects.

Overall, this study demonstrated that motivation and type of exercise were the primary factors contributing significantly to waist circumference reduction, with substantial contributions from each ($\eta^2 = 0.668$ and $\eta^2 = 0.636$, respectively). Gender did not have a significant influence, either independently or in its interaction with other variables. The significant interaction between motivation and type of exercise indicated that the effectiveness of the exercise type was highly dependent on the participants' motivation level. With an R^2 value of 0.808, this model provided a very strong explanation for the changes in waist circumference observed in the tested exercise programs.

The factorial test plots in graphic 1 revealed the interaction between the type of circuit training (Isometric and Isokinetic) and the level of motivation (low and high) on waist circumference reduction in female. Generally, Isokinetic training resulted in a greater reduction in waist circumference compared to Isometric training, indicating higher effectiveness. In the Isometric training group, the difference between participants with low and high motivation was small, with the high motivation group showing a slightly better reduction in waist circumference. However, in the Isokinetic training group, this difference became much more significant, with the high motivation group showing

Table 2. The analysis of variance (ANOVA) with tests of between-subjects effects

Dependent Variable: abdominal circumference								
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**	**Noncent. Parameter**	**Observed Power[b]**
Corrected Model	47.200[a]	7	6.743	19.26	.00	.81	134.86	1.00
Intercept	313.60	1	313.60	896.00	.00	.97	896.00	1.00
CircuitTraining	19.60	1	19.60	56.00	.00	.64	56.00	1.00
Motivation	22.50	1	22.50	64.29	.00	.67	64.29	1.00
Gender	.10	1	.100	.29	.60	.01	.29	.09
CircuitTraining * Motivation	4.90	1	4.90	14.00	.001	.30	14.00	.96
CircuitTraining * Gender	.100	1	.10	.29	.60	.01	.29	.08
Motivation * Gender	.00	1	.00	.00	1.00	.00	.00	.050
CircuitTraining * Motivation * Gender	.00	1	.00	.00	1.00	.00	.00	.050
Error	11.20	32	.35					
Total	372.00	40						
Corrected Total	58.400	39						

a. R Squared = .808 (Adjusted R Squared = .766)

b. Computed using alpha = .05

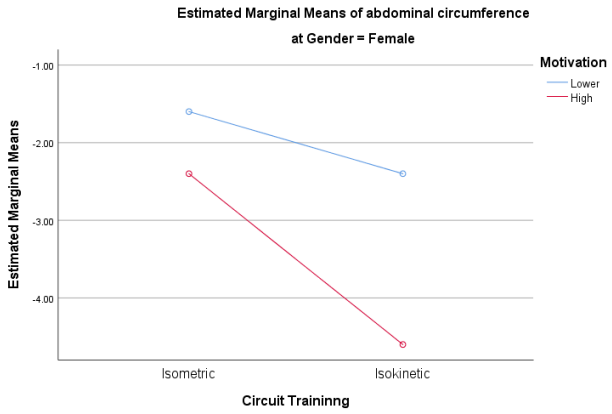

Fig. 1. The factorial test plots the interaction analysis in female

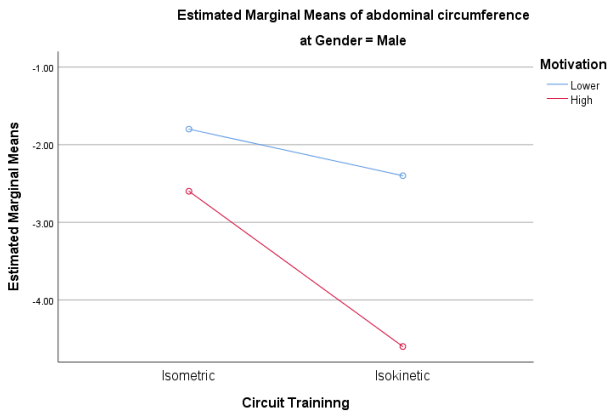

Fig. 2. The factorial test plots the interaction analysis in male

a much larger reduction in waist circumference compared to the low motivation group. Furthermore, the level of motivation proved to be crucial in determining outcomes, with highly motivated individuals consistently achieving greater reductions in waist circumference, regardless of whether they were in the Isometric or Isokinetic training group. The observed interaction effects indicated that Isokinetic training became significantly more effective when participants had high motivation. Conversely, the effect of motivation was not as pronounced in the Isometric training group. Overall, these results highlight that the combination of Isokinetic training and high motivation has the greatest impact on reducing waist circumference in female.

Similar results were observed in the plots for male (see graphic 2), where high motivation had a much greater effect on Isokinetic training compared to low motivation. In Isometric training, the difference between high and low motivation was also smaller, though the effect of the exercise was still evident. Overall, these interactions demonstrate that the type of exercise and motivation level have a combined effect on waist circumference reduction. Isokinetic training was more effective in reducing waist circumference, especially for individuals with high motivation. Conversely, Isometric training showed more uniform effects regardless of motivation level. These findings underscore the importance of considering both the type of exercise and the level of motivation in fitness intervention programs for optimal results.

Discussion

The findings from this research indicate that motivation and the type of exercise (circuit training) play a crucial role in reducing waist circumference, while gender does not significantly influence this change. This suggests that individuals with high levels of motivation tend to be more successful in reducing their waist circumference because they are more committed to the exercise program. This result aligns with research by Bruseghini et al. (2019), which revealed that high-intensity training combined with verbal motivation results in significant reductions in body

fat, including waist circumference. Furthermore, high motivation encourages participants to remain consistent with high-intensity training (Gonçalves et al., 2023). Additionally, strong internal motivation significantly impacts the improvement of body composition (Jee, 2019).

The interaction between motivation and type of exercise was also found to be significant, indicating that the effectiveness of exercise depends greatly on the participant's motivation level. These results prove that motivation from training is important for adherence and outcomes (Marcos-Pardo et al., 2019). There are forms of motivation that can be provided in the form of verbal encouragement and goal-oriented strategies (Davis et al., 2011). Highly motivated individuals can achieve greater results from circuit training compared to those who are less motivated. Consequently, high motivation has a more significant impact on waist circumference reduction. For individuals with low motivation, men tend to experience greater waist circumference reduction compared to women, but at high motivation levels, this difference becomes insignificant, with nearly equal results between genders. Conversely, gender did not show a significant influence either independently or in its interaction with other variables, indicating that gender differences do not affect the results of waist circumference reduction achieved. Therefore, motivation and the type of exercise (circuit training) are crucial in reducing waist circumference, while gender does not significantly impact these changes.

Circuit training was found to have a significant impact on waist circumference reduction, explaining 63.6 % of the data variability. This indicates that circuit training is an effective method for reducing waist circumference by incorporating various high-intensity movements that efficiently burn calories. This result is supported by previous research showing that high-intensity circuit training is effective in managing overweight individuals (Malarvizhi et al., 2017). An eight-week full-body circuit training program can improve cardiorespiratory fitness and body composition in overweight individuals (Rago & Mohr, 2023). Moreover, circuit training can be an effective exercise method for improving cognitive risk factors in elderly Korean women with Overweight (Kang et al., 2024). Circuit training also contributes to the aerobic portion of guidelines for adults living with Overweight (Keshavarz et al., 2024).

Thematic analysis revealed that isokinetic exercises consistently produced greater results compared to isometric exercises, regardless of motivation levels or gender. This finding aligns with previous research indicating that isokinetic training programs combined with aerobic exercises result in significant weight loss and body fat reduction, including waist circumference (Ghroubi et al., 2016). Additionally, isokinetic resistance training combined with aerobic interval training significantly reduces waist circumference and metabolic disease risks (Bruseghini et al., 2015). Furthermore, isokinetic training reduces pain and increases muscle strength for overweight women (Hammami et al., 2024). Isokinetic training is also effective in reducing waist circumference and improving cardiometabolic fitness (Marc-Hernández et al., 2019). Therefore, isokinetic training is recommended for more significant and consistent results, while efforts to enhance participant motivation should also be prioritized.

The implications of these findings are that effective exercise programs must consider participant motivation as a key factor in designing and implementing workouts. Programs that can enhance motivation, such as by setting clear goals and providing positive feedback, will be more effective in encouraging participants to achieve optimal results. Additionally, circuit training can be a primary choice in waist circumference reduction programs, given its proven effectiveness. Exercise programs should also be tailored to the motivation levels of participants, as more motivated individuals will achieve better results from more intensive workouts. low motivation leads to major problems and poor adherence to exercise programs resulting in physical inactivity (Collado-Mateo et al., 2021). In addition, motivation determines the appropriateness of a person in doing exercise activities that affect the level of fat in the body (Picorelli et al., 2014). Overall, the results of this study indicate that the main focus in designing waist circumference reduction programs should be on enhancing motivation and using effective exercises like circuit training, without the need to differentiate based on gender. The hope is that this motivation will result in people continuing to do the activity at home (unsupervised) with the same impact as supervised training (Jansons et al., 2016).

Conclusion

This study convincingly demonstrated that motivation and type of exercise (circuit training) had a significant impact on reducing waist circumference in overweight individuals. Isokinetic training proved to be more effective than isometric training in reducing waist circumference in both low and high motivation groups. These findings highlight the importance of choosing the right type of exercise in weight management programs, especially for individuals aiming to reduce visceral fat accumulation associated with serious health risks. Motivation emerged as a key element in the success of exercise programs, with highly motivated individuals showing far more significant results compared to those with low motivation. This underscores the importance of psychological support and strategies to boost motivation when designing fitness programs. Strategies such as setting clear goals, providing constructive feedback, and creating a supportive environment can help encourage higher levels of commitment. Conversely, gender did not have a significant impact on waist circumference reduction, indicating that the effectiveness of circuit training and motivation does not depend on biological differences between men and women. These findings support the argument that circuit training-based fitness programs can be universally applied without requiring special adjustments based on gender.

The practical implications of these findings are crucial for developing more effective and inclusive Overweight intervention programs. By prioritizing motivation and selecting optimal exercise methods like isokinetic circuit training, weight loss programs can become more efficient and have a broader impact. Future research with a wider population scope and multifactorial approach is recommended to ensure the validity of these findings and to explore additional factors that might influence the results. Overall, this study provides significant contributions to the literature on Overweight management and opens

opportunities for more personalized and effective exercise-based interventions.

This study does have some limitations. Firstly, the subjects were limited to members of one fitness center, so generalizing the results to a broader population may require caution. Secondly, the relatively short duration of the study might limit the assessment of the long-term effects of the tested training methods. Therefore, further studies are recommended to involve more diverse participants, including individuals from different social, cultural, or fitness backgrounds. Extending the intervention duration could also help evaluate the long-term effects of the training methods used, including potential declines in motivation or body adaptations to the exercise.

Conflit of Interest

Authors declare no conflict of interest regarding this paper.

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Оцінка впливу методу колового тренування та рівня мотивації на гендерно-специфічне зменшення талії у групах населення з надмірною вагою

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

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Історія питання. Надмірна вага є глобальною проблемою охорони здоров'я, яка тісно пов'язана з підвищеним ризиком розвитку серцево-судинних і метаболічних захворювань. Окружність талії, як показник вісцерального жиру, виконує функцію важливого параметра оцінки ефективності інтервенцій, спрямованих на зниження маси тіла. Вважається, що мотивація і тип фізичних вправ, включаючи колові тренування, відіграють значну роль в успішному впровадженні програм із контролю ваги.

Мета дослідження. Метою цього дослідження було проаналізувати вплив мотивації, гендеру та методів колового тренування (ізометричного та ізокінетичного) на зменшення окружності талії в осіб з надмірною вагою.

Матеріали та методи. У дослідженні застосовано факторний дизайн 2×2×2 із квазіекспериментальним підходом. Сорок учасників з фітнес-центру було розподілено на вісім груп залежно від комбінації рівня мотивації (високий і низький), гендеру та методу тренувань (ізометричний та ізокінетичний). Дані щодо окружності талії вимірювались перед початком та після завершення курсу впродовж 16 тренувань, а аналіз даних проводився за допомогою трифакторного дисперсійного аналізу (ANOVA).

Результати. Ізокінетичні тренування показали вищу ефективність у зменшенні окружності талії порівняно із ізометричними тренуваннями, причому високий рівень мотивації був чинником, який сприяв покращенню результатів. Натомість гендер не мав суттєвого впливу на зменшення окружності талії. Мотивація і тип фізичних вправ суттєво впливали на результати ($p < 0,001$), тоді як між мотивацією і типом вправ спостерігалася значна взаємодія ($p < 0,01$), що підкреслює важливість поєднання цих двох чинників.

Висновки. Мотивація та методи колового тренування є ключовими факторами для досягнення успішного результату в питаннях щодо зменшення окружності талії, причому для реалізації оптимальних результатів рекомендується застосовувати метод ізокінетичних тренувань в якості пріоритетного варіанта. Отримані дані надають практичні рекомендації для розроблення більш ефективних та інклюзивних програм із контролю надмірної маси тіла, що ґрунтуються на принципах фізичної активності.

Ключові слова: надмірна вага, окружність талії, колове тренування, мотивація.

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