

The Effect of Cold-Weather Walking on Weight Loss: In Case of Ginba City Administration, South Wollo, Amhara Region, Ethiopia (2024)

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Abstract

Some individuals believe that exposure to cold weather is detrimental to health or increases the likelihood of catching a cold. This study aimed to examine the effects of walking in cold weather on body weight loss and fat reduction. The study included twelve participants ($n = 12$; age: ± 21.67 years; weight: ± 74.33 kg; height: ± 1.56 m; BMI: ± 30.51 kg/m²), all of whom were young housewives residing in Ginba City, Amhara Region, Ethiopia. Participants were selected using a convenience sampling technique. The study employed a one-group pre-test post-test quasi experimental design. After obtaining consent and agreement, baseline measurements—including body weight (kg), BMI (kg/m²), waist-to-hip ratio (cm), and four-site skinfold thickness (abdomen, suprailiac, thigh and triceps) were recorded for each participant. The intervention involved walking in cold weather for 20 minutes, three times per week, over a two-month period (October and November). Following the intervention, post-test measurements were collected and compared to baseline data. Statistical analysis was conducted using a paired sample t-test in SPSS version 26, with a significance level set at 0.05. Results indicated a significant reduction in body weight and fat percentage ($p = 0.00$). Findings suggest that walking in cold weather can support weight loss and fat reduction by activating brown fat, increasing calorie expenditure, and stimulating the release of irisin.

Keywords: White Fat, Brown Fat, Irisin, walking, Cold-Weather, Fat Metabolism, Endocrine Function.

Introduction

Obesity and overweight conditions are major public health challenges worldwide, contributing to a range of chronic diseases such as diabetes, cardiovascular diseases, and certain cancers. Effective weight management strategies are crucial for mitigating these health risks. Among various approaches, physical activity, particularly walking, is widely recommended due to its accessibility, low cost, and numerous health benefits [1].

Walking is a simple yet effective form of exercise that can help individuals achieve and maintain a healthy weight. It is associated with improved cardiovascular health, enhanced mood, and increased energy expenditure. However, the effectiveness of walking for weight loss can be influenced by various factors, including environmental conditions [2].

Cold weather presents unique physiological challenges and opportunities for weight loss. When exposed to cold temperatures, the body must work harder to maintain its core temperature, a process known as thermogenesis. This increased energy expenditure could potentially enhance the calorie-burning effects of walking. Additionally, cold weather may influence the body's

metabolism, potentially leading to greater fat oxidation and weight loss [3].

Statement of the Problem

Many people think that going outside in the cold is unhealthy or increases the risk of catching a

Cold, although research suggests otherwise. People living in cold environments tend to spend much of their day under blankets and consume hot drinks, such as tea, soup, or coffee, to maintain their body temperature. Additionally, cold conditions often lead to frequent hunger and repetitive eating habits, which can contribute to weight gain over time [4-6].

Being outside in the cold can be rather uncomfortable, especially if you're not used to such low temperatures or aren't properly dressed for the cold weather. But, it turns out that there are quite a few baseless misconceptions about cold-weather walking. Many people believe that walking outside in the cold is not good for you or could put you at risk of catching a cold. While it's true that exercising outside in the cold weather is more of a physiological stressor to the body than working out in warmer weather since your body is trying to maintain this actually boosts your

metabolic rate [7].

Despite the potential benefits, there is limited research on the specific impact of walking in cold weather on weight loss. Most studies have focused on the effects of exercise in controlled, moderate temperatures, leaving a gap in understanding how colder environments might alter the outcomes of physical activity. Furthermore, the psychological and behavioral aspects of exercising in cold weather, such as motivation and adherence to walking routines, are not well understood.

This study aims to fill these gaps by investigating the effects of walking in cold weather on weight loss & fat reduction by examining both the metabolic and behavioral responses to walking in cold conditions. This research seeks to provide a comprehensive understanding of how environmental factors can influence the effectiveness of physical activity for weight management. Understanding these dynamics could provide valuable insights for developing more effective weight loss interventions and recommendations tailored to different environmental conditions [8].

Objectives of the Study

General Objective

To investigate the effect of walking in cold weather on body weight loss & fat reduction.

Specific objectives

- To assess the impact of walking in cold weather on body weight reduction.
- To identify the effect of walking in cold weather on BMI.
- To analyze the effect of walking in cold weather on waist- to hip circumference ratio.
- To determine the effect of walking in cold weather to reduce fat percent of belly & thigh.

Hypotheses of the Study

1. Walking in cold weather does not has a significant impact on body weight reduction.
2. Walking in cold weather doesn't has significant effect on BMI.
3. Walking in cold weather doesn't has significant effect to reduce waist- to-hip circumference ratio.
4. Walking in cold weather doesn't has significant effect to reduce percentage of body fat.

Result and Discussion

Results of the Study

Demographic Characteristics of Study Participants

Descriptive Statistics			
	N	Mean	Std. Deviation
Age of participants	12 21.67		1.231
Weight of participant	12	74.33	1.875
Height	12 1.5625		0.03361

Descriptive Statistics result of the study

Pre post result of variables

Research Methods and Materials

Study Area

This study was conducted in Tulu Awlia city. Tulu Awlia city is a town in the Gimba pasture area, Legambo woreda of South Wollo. It's located about 79km southwest of Dessie, 22km northeast of Akesta, and 52km south from the town of Tenta. Elevation: 3,224m (10,577ft) above sea level.

Participants

The total subjects for the study were twelve ($n=12$, age ± 21.67 , weight ± 74.33 kg, height ± 1.56 M, BMI ± 30.51 kg/m²) young house wife of Ginba City resident, Amhara Region, Ethiopia. The subjects are taken as a sample by using a convenience sampling technique.

Research Design

The purpose of this study was to investigate the effect of walking in cold weather on body weight loss & fat reduction. To achieve this objective the study was conducted by one group pre-test posttest quasi-experimental design.

Procedure

Following the acquisition of consent and agreement, initial measurements were collected from each participant. These included body weight (kg), body mass index (BMI, kg/m²), waist-to-hip ratio (cm), and four-site skinfold thickness measurements (abdomen, suprailiac, thigh, and triceps). Participants then engaged in a walking regimen in cold weather, which involved walking for 20 minutes, three times per week, over a two-month (October & November) period. At the end of this period, post-intervention measurements were taken and compared with the initial pre-intervention data [9].

Method of Data Analysis

To determine body fat percentage, the study employed the Women 4-Site Skinfold Equation. Skinfold measurements were taken at four sites: abdominal, triceps, thigh, and suprailiac. Calculations were performed using an online body fat percentage calculator available at http://www.linearsoftware.com/online.html#google_vignette. Body weight, BMI, and WHR data were analyzed and presented as mean $\pm$ standard deviation. Statistical analyses were conducted using SPSS version 26, incorporating paired samples t-tests to compare pre- and posttest results. Statistical significance was defined at a level of $p \leq 0.05$.

Pre and Posttest Paired Sample t-test Results of the Study

Pair	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% CI Lower	95% CI Upper	DF	Sig. (2-tailed)
1	Pre-post weight in K.G	9.41	2.02	0.583	8.13	10.7	11	0
2	Pre-Post BMI in K.G/M ²	2.89	1.68	0.48	1.82	3.96	11	0
3	Pre-post WHR in CM	0.054	0.027	0.008	0.036	0.071	11	0
4	Pre-post total fat	18.08	2.31	0.66	16.61	19.55	11	0

The mean difference is significant at the 0.05 level. DF= degree of freedom

The results demonstrated a significant difference between pre-test and post-test measurements following the intervention. Specifically, participants experienced reductions in body weight (mean: 9.41 kg), BMI (2.89 kg/m²), WHR (0.054cm), and 4-site body fat percentage (18.08mm). These changes were statistically significant at a confidence level of $p = 0.000$. Consequently, all hypotheses were rejected at the 0.05 level of confidence.

The findings of this study provide compelling evidence that walking in cold weather significantly impacts weight loss and fat reduction, as evidenced by the statistical results. The pre-test and posttest measurements indicate notable decreases in body weight, BMI, waist-to-hip circumference ratio, and body fat percentage among the participants. These results corroborate the hypothesis that cold-weather walking enhances the body's calorie-burning capacity and promotes fat oxidation [10].

Walking in colder conditions forces the body to maintain its core temperature through increased energy expenditure. This concept is supported by Williams (2024), who explored the surprising metabolic benefits of walking in cold weather and its ability to boost systemic health.

Cold exposure likely activates brown adipose tissue, which increases thermogenesis and energy expenditure. This aligns with research by the National Institutes of Health (NIH, 2014), which demonstrated that exposure to cool temperatures could alter human fat metabolism by activating BAT and enhancing calorie burning.

The secretion of irisin, a hormone that converts white fat to brown fat, may also contribute to the fat-reducing effects observed in this study. These physiological mechanisms provide a robust explanation for the significant weight loss outcomes. This corresponds with the findings discussed by Swaroop (2024), who emphasized that walking in cold weather improves endocrine health, including irisin secretion [11].

Conclusion

This study demonstrates that walking in cold weather has a significant effect on weight loss and fat reduction among participants. The intervention, carried out over two months with regular walking sessions in cold temperatures resulted in measurable decreases in body weight, BMI, waist-to-hip circumference ratio, and overall body fat percentage. These findings underline the metabolic advantages of cold-weather walking, including the

activation of brown adipose tissue, increased thermogenesis, and the release of irisin.

The results contribute to the growing body of evidence supporting the role of environmental factors, such as cold exposure, in enhancing the effectiveness of physical activity for weight management. Walking in cold weather emerges as an accessible and cost-effective strategy, particularly for individuals residing in colder climates.

However, the study's limitations, such as the small sample size and absence of a control group, necessitate further research to validate and expand upon these findings. Future investigations should focus on larger, more diverse samples and explore the psychological and behavioral aspects of exercising in cold conditions.

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