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The effect of water intake on body composition, weight, BMI, body fat and total body water in obese men

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Abstract

A popular recommendation for weight loss programs is to drink a lot of water. Only a small number of systematic researches have tackled this idea, though. The consequences of consuming an additional 2.25 liters of water per day on the body weight, body mass index (BMI), body fat, and body composition of individuals who were obese were evaluated in this study. The goal is to assess how much water consumption affects an obese person's ability to lose weight and body fat. For 12 weeks, the 100 obese men in this study were told to drink 750 ml of water three times a day, 15 minutes before breakfast. The study used the body analysis system (GS6.5 B. S161118S1544). Body weight, body mass index, and body fat were measured before and after the study. Statistical Analysis to determine the statistical significance of the findings, a paired t-test and IBM SPSS Statistics 27.0 were utilized. The mean body weight, body mass index, body water, body fat, and body composition scores were 93.63 kg, 33.490 kg/m2, 47.33 percentages, 33.519 percentages, and 51.240 percentages respectively, before and after the study. From a statistical perspective, all the parameters' results were quite significant except body weight, which was not significant. In conclusion, the effect of water-intake in obese participants' weight reduction is established by a decrease in body weight, body mass index, body fat, and body composition scores at the conclusion of the study period.

Keywords: obese, body composition, body weight, body fat, body mass index.

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https://jcope.uobaghdad.edu.iq

Introduction

Water function in maintaining health is still not fully understood the importance of water for survival is well known: without water, a person could only survive 2–4 days water makes up about 60% of the human body weight (Michael T. McDermott, 2013, and De Palma, J.R, 2001) and is essential for vital functions Nevertheless, many questions remain unanswered whether consuming water is superior to consuming other liquids or what the exact effect of replacing water with other liquids (e g various high-calorie or diet drinks) in the diet is there is increasing agreement that consuming calorie-dense beverages does not reduce dietary intake, and further research is needed on the effects of choosing beverages other than water at meals on energy intake and body weight (DiMeglio DP Mattes RD, 2000, and Wolf A Bray GA Popkin BM, 2008). Obesity is a major public health problem affecting both adults and children worldwide (Vij VA, Joshi AS, 2014) in both developed and developing countries obesity increases the risk of developing osteoarthritis, heart disease, type 2 diabetes, and some malignancies, among others it also induces physical stress on various biological processes (Ali, Diyar Muhammed, 2025 and Aronne LJ, Isoldi KK, 2007) There is a national obesity epidemic in the United States As a result, nearly 1 in 4 children between the ages of 2 and 5 is overweight or obese Unfortunately, even some of the youngest children are affected drinking can significantly increase a preschooler's calorie intake (Wang YC, Bleich SN, Gortmaker SL, 2008) The Centers for Disease Control and Prevention (CDC) says they may need more water than the average person What kind of water you drink will depend on where you live Hot, humid, or dry climates mean you'll need more water If you live in mountain or alpine regions, you will also need more water (Viscor G, Corominas J, Carceller A, 2023) On the other hand, tap water is an inexpensive, calorie-free beverage Providing tap water to children instead of sugary drinks or excess juices can reduce added sugar and calories (Wang YC, Ludwig DS, Sonneville K, Gortmaker SL, 2009) Fluoridated tap water not only prevents tooth decay, but also helps keep a child's developing body hydrated (Featherstone JD, 1999) Recent studies have shown that drinking water increases thermogenesis, or metabolism, and creates a sympathetic nervous response that increases daily energy intake (Boschmann M, et al, 2003).Therefore, the purpose of this study was to determine whether water intake actually results in weight loss.

Methodology

100 male participants took part in the study; the study took 12 weeks to complete. The subjects gave their written, informed consent. They received an explanation of the aim and rationale of the study, this research was conducted at a tertiary care Jihan clinic in Garmain, Iraq.

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https://jcope.uobaghdad.edu.iq

Inclusion criteria: The research involved obese young men aged 18 to 26 with a BMI of 30 to 34.9 kg/m2.

Criteria for exclusion: Subjects were required to be free from major illnesses, eating disorders, and medications.

The study parameters

Body weight score, body mass index (BMI) and body composition were measured before the study and compared with the values after the study. Body mass index (BMI) is the cornerstone of today's classification system, and its benefits have been widely used in a variety of purposes, from global screening to individual patient assessment (Prentice AM, Jebb SA, 2001). For the physical structure (body composition), we used the body analysis of GS6.5 B. S161118S1544.

Procedure of the Study

Before starting the research, the weights and heights of the 100 male participants were measured and documented. Body Analyzer G6 calculated body mass index (BMI) and body composition. After the initial readings, participants were instructed to increase their water intake by an additional 2.25 liters, in addition to what they normally drink in a day. This rise in water intake was accomplished by consuming 750 ml of water 15 minutes prior to every meal. The participants were closely monitored while they raised their water consumption before breakfast and lunch and were advised on the amount they needed to increase before dinner. At the end of the 12-week period, the study's parameters were reassessed. The participants typically adhered to the instructions effectively.

Analysis of statistics

A professional statistician performed the statistical analysis of the data from the current study. IBM SPSS Statistics was utilized for data analysis. Statistical significance at a p-value of 0.05 was utilized for all tests by IBM Co. in Armonk, NY, USA. As the research was interventional, a paired t-test was employed to determine the statistical significance of the findings. A p-value below 0.05 showed statistically significant results, while a p-value under 0.01 indicated highly significant results.

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Results

Body weight: The mean value for the pre-study body weight for all participants was 93.63 kg and that for post-study body weight was 89.5 kg. The p-value was higher than 0.01, the result for body weight was not significant statistically (Table 1). Body water: The body water result was likewise statistically significant, with mean pre and post-test values of 47.33 and 51.41 percentage points, respectively, and a p-value of less than 0.01 (Table 2). Body mass index (BMI): The average BMI before the study was 33.49 kg/m^2, whereas after the study it was 32.546 kg/m^2. The p-value of less than 0.01 showed that the body mass index findings were also statistically significant (Table 3). Mean body composition score before the study was 51.24mm, compared to 56,321 mm after the study. The p-value was below 0.01, suggesting that the body composition score was also statistically significant (Table 4). Body fat: The mean body fat for pre-test was 33.519 percentages, compared to post-test 32.719 percentages. The p-value was below 0.01, suggesting that the body fat percentage was also statistically significant (Table 4).

Table 1. *Pre and post–study body weight*

Parameter	**Paired samples statistics**						**Paired samples test**			
Body weight (kg)	Pre-test weight			Post-test weight			Paired differences		*t*-value	*p*-value
	Mean	SD	SEM	Mean	SD	SEM	Mean	SD	5.764	1.830
	93.63	2.223	0.115	89.5	3.142	0.564	2.065	0.919		

* ($p > 0.01$) (no significant statistically)

Table 2. *Pre and post–study body water*

Parameter	**Paired samples statistics**						**Paired samples test**			
Body water (percentage)	Pre-test weight			Post-test weight			Paired differences		*t*-value	*p*-value
	Mean	SD	SEM	Mean	SD	SEM	Mean	SD	1.734	0.03

Journal of Physical Education
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	47.33	1.543	0.435	51,41	2.054	0.578	4.08	0.511

* ($p < 0.03$) (highly significant statistically)

Table 3. *Pre and post–study BMI*

Parameter	**Paired samples statistics**						**Paired samples test**			
BMI (kg/m^2)	Pre-test weight			Post-test weight			Paired differences		*t*-value	*p*-value
	Mean	SD	SEM	Mean	SD	SEM	Mean	SD	2.100	0.02
	33.490	1.237	0.783	32.546	4.387	1.284	0.944	3.150		

*($p < 0.02$) (highly significant statistically)

Table 4. *Pre and post–study body score*

Parameter	**Paired samples statistics**						**Paired samples test**			
Body score percentage	Pre-test weight			Post-test weight			Paired differences		*t*-value	*p*-value
	Mean	SD	SEM	Mean	SD	SEM	Mean	SD	15.429	0.001
	51.240	5.376	2.054	56.321	8.821	3.916	5.081	3.445		

* ($p < 0.001$) (highly significant statistically)

Table 5. *Pre and post–study body fat*

Parameter	**Paired samples statistics**	**Paired samples test**

Journal of Physical Education
Volume 38 – Issue (1) – 2026 Open Access
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https://jcope.uobaghdad.edu.iq

Body fat percentage	Pre-test weight			Post-test weight			Paired differences		*t*-value	*p*-value
	Mean	SD	SEM	Mean	SD	SEM	Mean	SD	11.073	0.000*
	33.519	2.182	1.825	32.744	1.927	0.862	0.775	0.255		

* ($p < 0.001$) (highly significant statistically)

Discussion

The inadequate quality of previous research on this topic led to the conduct of this study, which evaluated the contribution effect of high-water intake to weight loss. We took into consideration the findings of the current investigation and the corresponding hypothesis because no prior studies had been conducted. For 12 weeks, 100 men participated in this study. A p-value of less than 0.05 showed significant results, while a p-value of less than 0.01 indicated very significant results. The study's data were statistically examined using the paired t-test. The average of body composition, weight, body water, body fat, were 65.86 kg and 64.42 kg, 26.7002 kg/m2 and 26.1224 kg/m2, and 79.626 mm and 76.578 mm, respectively, for the pre- and post-study periods. From a statistical perspective, all three results were extremely significant. The Journal of Clinical Endocrinology and Metabolism published research in 2003 that tested the theory that "the sympathetic stimulus that was provided by water drinking could increase the metabolic rate". This study's unique discovery was that 750 ml of water raised both men's and women's metabolic rates by 30%. Within ten minutes of finishing, there was an increase in metabolic rate, which peaked thirty to forty minutes after consuming water. The effect persisted for over sixty minutes. Based on these measurements, it was estimated that increasing water ingestion by 1.5 liters, over and above the normal water intake, would augment daily energy expenditure by approximately 200 KJ. Over one year, energy expenditure would increase by 73,000 KJ (17,400 Kcal), which is the energy content of 2.4 kg adipose tissue (Boschmann M, et al 2003). This study was designed to check whether this Water-intake translated into actual weight loss. Then we find the effect persisted for over fifteen minutes. Based on these measurements, it was estimated that increasing water ingestion by 2.25 liters, over and above the normal water intake, would augment daily energy expenditure by approximately 197 cal. Over one year, energy expenditure would increase by (71,905 Kcal), which is the energy content of 1.0325 kg adipose tissue. In 2011, comparable

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https://jcope.uobaghdad.edu.iq

research was conducted on obese children to assess the impact of water consumption on their resting energy expenditure (REE). This research showed a rise of 25% in REE. After consuming 10 ml of cold water per kilogram of body weight, overweight children continued drinking for more than 40 minutes (Dubnov-Raz G, Constantini NW, Yariv H, Nice S, Shapira N, 2011). Water is crucial for converting stored fat into energy during metabolism and even mild dehydration can slow down the body's metabolism (Blanc, S., et al., 1998). The slower your metabolism, the slower your weight loss will be (Shapses, S.A. and Sukumar, D., 2012.). In order to assess this aspect, the study included measuring the skin fold thickness at certain locations as part of the body composition score evaluation. The total of each separate score was considered as a combined score. Therefore, consuming water stimulates the sympathetic nervous system, leading to an increased metabolic rate known as thermogenesis, which ultimately boosts daily energy expenditure. It is not yet known how water drinking triggers a sympathetic response. Maybe the increase in sympathetic activity from drinking water is triggered by the osmotic properties of water. A 2005 study conducted in Germany and published in the journal 'Neurology' examined the potential mechanism behind the sympathetic response to water consumption (Lipp A, Tank J, Franke G, Arnold G, Luft FC, Jordan J. 2005).

Conclusions

Obesity poses a major danger to people's health. In this current research, the effect of drinking water on weight loss in obese men was investigated. Consuming sufficient water can help lower body weight. At the conclusion of the experiment, the obese participants' weight and BMI decreased, and their body composition changed as water percentages increased, confirming the impact of water intake on their weight loss. Thus, if more study supports this, this minimal intervention may be a useful supplementary treatment for obese individuals who want to increase their energy expenditure.

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