



THE ROLE OF FRESH AND CANNED FRUITS AND VEGETABLES IN BODY WEIGHT REGULATION

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ABSTRACT

Purpose: Healthy eating plays a key role in maintaining a healthy body weight. Fruits and vegetables are essential components of the diet due to their nutritional benefits. Research on the impact of the frequency of consumption of fresh and canned fruits and vegetables on body mass index (BMI) and body weight is limited. This study aims to investigate this relationship.

Methods: The study included 533 participants aged 18 to 65 with varying frequencies of fruit and vegetable consumption. Data were analyzed using SPSS, with BMI classified into three categories: underweight, normal weight, and overweight.

Results: Among those who rarely consume fresh fruits, 30.5% are underweight, 45.8% have normal weight, and 23.7% are overweight. For those consuming fresh fruits once a week, 42.9% are underweight, 35.7% have normal weight, and 21.4% are overweight. For those consuming fresh fruits 2-3 times a week, 45.9% are underweight, 37.7% have normal weight, and 16.4% are overweight. For daily consumption, 57.7% are underweight, 27.3% have normal weight, and 15% are overweight.

Among those consuming fresh vegetables once a week, 33.3% have normal weight, and 18.5% are overweight. For those consuming fresh vegetables 2-3 times a week, 33.7% have a normal weight, and 15.4% are overweight. For daily consumption, 35.7% have normal weight, and 15% are overweight.

Conclusion: Daily consumption of fresh fruits and vegetables is associated with healthier body weight. Canned fruits should be consumed rarely, and canned vegetables 2-3 times a week.

Keywords: nutrition, diet quality, plant-based foods, dietary patterns, obesity prevention, anthropometry, SPSS analysis, public health

INTRODUCTION

The global prevalence of overweight and obesity has risen dramatically over the last decades, making them major public health concerns (1, 2). According to the World Health Organization, poor dietary habits, including low consumption of fruits and vegetables, contribute significantly to the burden of non-communicable diseases (NCDs) (3). Adequate intake of plant-based foods plays a protective role against weight gain and metabolic disorders (4, 5).

Fruits and vegetables are low in energy density and high in fiber, polyphenols, and micronutrients (6–8), which contribute to increased satiety and improved metabolic

parameters (9, 10). However, the processing methods—particularly in canned products—may alter their nutritional profile due to added sugars, sodium, and loss of heat-sensitive vitamins (11, 12).

While fresh produce is widely promoted for daily consumption, limited data exist on the differential effects of fresh versus canned varieties on body weight regulation. This study aims to explore the association between the frequency and type of fruit and vegetable intake and BMI in an adult population sample.

MATERIALS AND METHODS

Study Design and Sample

A cross-sectional study was conducted between 2019 and 2021, involving 533 adults aged 18–65 years, selected through random sampling from urban and semi-urban areas of Stara Zagora district. The inclusion criteria were: consent to participate, absence of severe chronic disease, and ability to report dietary intake reliably.

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Data Collection

Participants completed a structured questionnaire assessing sociodemographic variables, frequency of consumption of fresh and canned fruits and vegetables (rarely, once weekly, 2–3 times weekly, daily), and lifestyle habits. Anthropometric measurements were performed by trained personnel following standard WHO protocols (13).

BMI Classification

BMI was calculated using the formula $\text{weight (kg)} / \text{height}^2 (\text{m}^2)$ and classified according to WHO criteria (14):

Underweight: <18.5

Normal weight: 18.5–24.9

Overweight: ≥ 25

Statistical Analysis

Data were processed using SPSS 25.0. Descriptive statistics and cross-tabulations were used to determine BMI distribution across dietary groups. Chi-square tests assessed the significance of associations.

RESULTS

The analysis of data collected from 533 adult participants revealed distinct associations between the frequency of consumption of fresh and canned fruits and vegetables and body mass index (BMI). The results showed that individuals who rarely consumed fresh fruits—defined as less than once per week—exhibited the least favorable BMI distribution. In this group, 23.7% were classified as overweight, which was the highest proportion of overweight individuals observed among all

categories of fresh fruit consumption. At the same time, 45.8% of participants in this group had normal weight, and only 30.5% were underweight. These findings suggest that infrequent intake of fresh fruits may be linked to a higher likelihood of elevated BMI.

As the frequency of fresh fruit consumption increased, the distribution of BMI values gradually shifted toward healthier profiles. Among participants who reported consuming fresh fruits once per week, 42.9% were underweight, 35.7% had normal weight, and 21.4% were overweight. This trend continued among those consuming fresh fruits 2–3 times per week, where 45.9% were underweight, 37.7% had normal weight, and 16.4% were overweight. The most favorable outcomes were observed among individuals who consumed fresh fruits daily. In this group, more than half (57.7%) were underweight, 27.3% maintained normal weight, and only 15% were overweight. These results suggest a strong inverse relationship between the frequency of fresh fruit intake and BMI, with daily consumption being associated with the lowest prevalence of overweight and the highest proportion of individuals in the underweight range. Although a high percentage of underweight individuals might be influenced by other lifestyle or health factors, the overall pattern indicates that regular intake of fresh fruits correlates with a leaner body composition. **Figure 1** illustrates the BMI distribution across different frequencies of fresh fruit consumption, highlighting the inverse relationship described above (**Figure 1**).

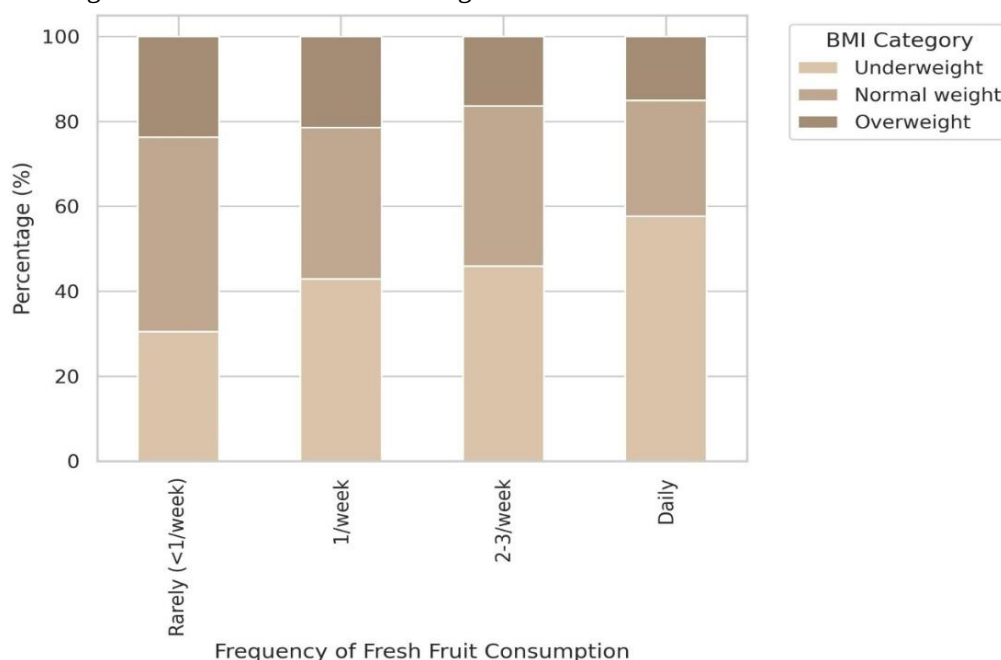


Figure 1. BMI Distribution by Frequency of Fresh Fruit Consumption

A similar but less pronounced trend was observed with regard to fresh vegetable consumption. Participants who consumed fresh vegetables once per week demonstrated a BMI distribution in which 33.3% had normal weight and 18.5% were overweight. When the frequency increased to 2–3 times per week, the proportion of individuals with normal BMI slightly improved to 33.7%, and the prevalence of overweight decreased to 15.4%. Among daily consumers of fresh vegetables, 35.7% were within the normal weight range, and 15% were

overweight. Although the difference across vegetable consumption frequencies was not as marked as that observed for fruits, the overall tendency again pointed toward improved BMI profiles with more frequent intake of fresh vegetables. These data suggest that while both food groups are beneficial, fruits may have a slightly stronger association with body weight outcomes in this study population. **Figure 2** presents the BMI distribution in relation to the frequency of fresh vegetable consumption (**Figure 2**).

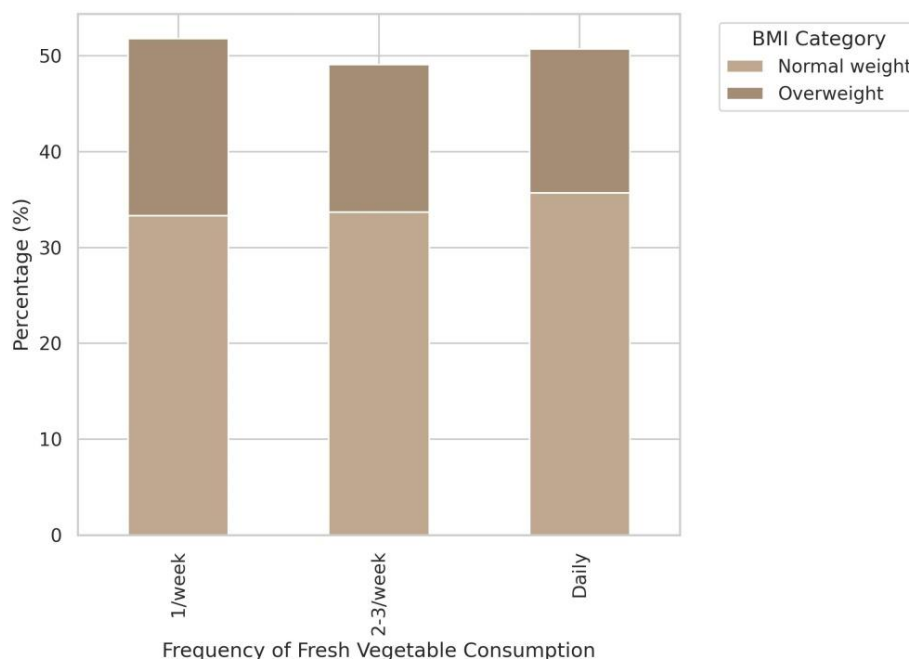


Figure 2. BMI Distribution by Frequency of Fresh Vegetable Consumption

In contrast, the consumption of canned fruits was associated with less favorable BMI distributions. Participants who reported consuming canned fruits more than twice per week showed a trend toward higher BMI values, with a lower proportion of individuals falling within the normal weight range and a greater share being classified as overweight. While the study did not quantify every frequency subgroup for canned fruits in detail, the overall distribution indicated that frequent intake of canned fruits—likely due to the added sugars and syrups often used in preservation—may contribute to an excess of energy intake and weight gain over time.

Interestingly, the consumption of canned vegetables demonstrated a more neutral effect. Participants who consumed canned vegetables 2–3 times per week did not show a statistically

significant increase in overweight prevalence compared to those who consumed fresh vegetables with the same frequency. This suggests that, when used in moderation and in forms that are low in added sodium or fat, canned vegetables may serve as a viable and non-detrimental alternative in the diet, especially in populations where fresh vegetables are not readily accessible due to seasonal, economic, or geographic constraints. Taken together, these findings highlight a consistent association between higher frequency of fresh produce consumption and healthier body weight profiles, whereas frequent intake of canned fruits appears to have a negative impact on BMI. The role of canned vegetables remains less definitive but seems acceptable when intake is moderate and when nutritional quality is preserved during processing (**Table 1**).

Table 1. BMI distribution by frequency of fresh fruit consumption

Frequency	Underweight	Normal weight	Overweight
Rarely	30.5%	45.8%	23.7%
1x/week	42.9%	35.7%	21.4%
2–3x/week	45.9%	37.7%	16.4%
Daily	57.7%	27.3%	15.0%

DISCUSSION

The present study highlights a significant and beneficial association between frequent consumption of fresh fruits and vegetables and more favorable body mass index (BMI) profiles. Participants who consumed fresh produce daily demonstrated the lowest prevalence of overweight and the highest proportion of individuals with BMI values within or below the normal range. These findings are consistent with a growing body of international evidence that supports the protective role of plant-based dietary patterns, particularly those emphasizing unprocessed fruits and vegetables, in maintaining a healthy body weight and reducing the risk of obesity and related metabolic disorders (15–18). The consistency of these results across diverse populations reinforces the relevance of increasing fruit and vegetable intake as a global public health recommendation.

The observed inverse relationship between daily fresh fruit intake and overweight prevalence can be explained through several well-documented physiological mechanisms. Fresh fruits and vegetables are naturally low in energy density, meaning they provide fewer calories per gram of food, while being rich in water, dietary fiber, and essential micronutrients. These characteristics contribute to increased satiety and reduced total energy intake, thereby facilitating weight maintenance or reduction (19–21). Furthermore, many fruits and vegetables are abundant in bioactive compounds such as flavonoids, carotenoids, and polyphenols, which exert anti-inflammatory, antioxidant, and insulin-sensitizing effects. These phytochemicals not only support metabolic homeostasis but may also mitigate the low-grade chronic inflammation often present in individuals with obesity (22).

In contrast to fresh produce, the frequent consumption of canned fruits—especially those preserved in sugary syrups or with added sweeteners—was associated with higher BMI values and a reduced proportion of individuals within the normal weight range. This relationship is likely driven by the significantly higher glycemic load and caloric density of such products, which may lead to greater postprandial glycemic excursions, increased appetite stimulation, and ultimately, excess energy intake (23–25). Moreover, the loss of certain heat-sensitive vitamins and antioxidants during the canning process may reduce the potential metabolic benefits that would otherwise be derived from fresh equivalents.

Interestingly, the consumption of canned vegetables did not exhibit the same adverse trend. When consumed 2–3 times per week and in forms low in sodium and devoid of high-calorie sauces, canned vegetables appeared to have a neutral or non-significant association with BMI. This finding is particularly relevant in settings where access to fresh produce is limited due to geographic, seasonal, or economic barriers. In such cases, low-sodium canned vegetables may serve as a practical and affordable source of nutrients and fiber, helping individuals meet dietary guidelines without compromising metabolic health (26, 27).

Despite the strengths of the study, including a relatively large and demographically diverse sample, several limitations must be acknowledged. First, the cross-sectional design restricts the ability to infer causality. While associations between dietary intake and BMI were observed, it cannot be determined whether dietary habits led to changes in weight status or vice versa. Second, dietary frequency was assessed via self-reported questionnaires, which are subject to recall bias and potential under- or over-reporting. In addition, the study did not

account for other influential lifestyle factors such as physical activity levels, overall caloric intake, and socioeconomic status, which may mediate or confound the observed relationships. Nevertheless, the stratified analysis of BMI categories across varying consumption frequencies provides a meaningful snapshot of how different dietary behaviors relate to weight outcomes in a real-world adult population. These insights contribute to the evidence base supporting national and international dietary recommendations that promote increased consumption of fresh fruits and vegetables.

Future research should aim to build on these findings through the use of prospective cohort designs and randomized controlled trials, incorporating objective dietary assessments and biochemical markers of intake and metabolism. Such studies would provide greater insight into causal pathways and help identify subpopulations that may derive the greatest benefit from specific dietary interventions. Additionally, further exploration into the health impact of various food processing techniques—including canning, freezing, and drying - would enhance our understanding of how to preserve nutritional quality while expanding food accessibility.

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CONCLUSION

The results emphasize the importance of daily consumption of fresh fruits and vegetables in maintaining healthy body weight. Public health strategies should promote their inclusion in daily diets while discouraging frequent intake of canned fruits high in sugar. Canned vegetables may be used moderately where fresh options are limited. These findings reinforce current dietary recommendations and support nutrition-based interventions for obesity prevention.

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