



ORIGINAL ARTICLE

Association of eating frequency with anthropometric indices and blood pressure in children and adolescents: the CASPIAN-IV Study[☆]



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KEYWORDS

Eating frequency;
Blood pressure;
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Abstract

Objectives: This study was conducted to explore the association of eating frequency (EF) with anthropometric indices and blood pressure (BP) in children and adolescents.

Methods: This nationwide cross-sectional study was performed on a multi-stage sample of 14,880 students, aged 6–18 years, living in 30 provinces in Iran. Parents were asked to report dietary intake of children as frequency of food groups and/or items. EF was defined as the sum of the daily consumption frequency of main meals and snacks. Association of EF with weight disorders, abdominal obesity, and elevated BP was assessed using different logistic regression models adjusted for potential confounding factors.

Results: Eating more frequently (≥ 6 vs. ≤ 3) was found among students who were at younger age (11.91 vs. 13.29 years) ($p < 0.001$). Students who reported an EF of 4 (OR: 0.67, CI: 0.57–0.79), 5 (OR: 0.74, CI: 0.62–0.87), and 6 (OR: 0.54, CI: 0.44–0.65) had lower odds of being obese compared to those who had EF ≤ 3 . Having EF of 4 (OR: 0.82, CI: 0.71–0.94), 5 (OR: 0.86, CI: 0.74–0.99), and ≥ 6 (OR: 0.73, CI: 0.63–0.85) was related to lower prevalence of abdominal adiposity.

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PALAVRAS-CHAVE

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Conclusion: Higher EF was associated with lower mean values of anthropometric and BP measures, as well as with lower prevalence of generalized and abdominal obesity in children and adolescents. Longitudinal studies are needed to assess the long-term effects of EF on body composition in the pediatric age group.

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Associação da frequência de alimentação com índices antropométricos e pressão arterial em crianças e adolescentes: o Estudo CASPIAN-IV

Resumo

Objetivos: Este estudo foi realizado para explorar a associação da frequência de alimentação (FA) com índices antropométricos e pressão arterial (PA) em crianças e adolescentes.

Métodos: Este estudo transversal nacional foi realizado em uma amostra de várias etapas de 14880 estudantes com idade entre 6 e 18 anos de 30 províncias do Irã. Foi pedido que os pais relatassem o consumo alimentar das crianças como a frequência de grupos e/ou itens alimentares. A FA foi definida como a soma da frequência de consumo diária das principais refeições e lanches. A associação entre FA e disfunções do peso, obesidade abdominal e PA elevada foi avaliada utilizando diferentes modelos de regressão logística ajustados pelos possíveis fatores de confusão.

Resultados: Foi constatada uma alimentação mais frequente (≥ 6 comparação a ≤ 3) entre estudantes mais novos (11,91 em comparação a 13,29 anos) ($P < 0,001$). Estudantes que relataram 4 [Razão de chance (RC): 0,67; Intervalo de confiança (IC): 0,57-0,79], 5 (RC: 0,74; IC: 0,62-0,87) e 6 (RC: 0,54; IC: 0,44-0,65) refeições apresentaram menores chances de se tornarem obesos em comparação aos que apresentaram FAs ≤ 3 . FA de 4 (RC: 0,82; IC: 0,71-0,94), 5 (RC: 0,86; IC: 0,74-0,99) e ≥ 6 (RC: 0,73; IC: 0,63-0,85) foi associada a menor prevalência de adiposidade abdominal.

Conclusão: A FA mais alta foi associada à redução nos valores médios das medidas antropométricas e de PA, bem como à menor prevalência de obesidade generalizada e abdominal em crianças e adolescentes. São necessários estudos longitudinais para avaliar os efeitos de longo prazo da FA sobre a composição corporal na faixa etária pediátrica.

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Introduction

It is well documented that non-communicable diseases originate from early life,¹ and that their major risk factors, such as elevated blood pressure (BP) and excess weight, track from childhood to adulthood.

Hypertension is recognized as one of the main possible leading cause for several forms of end-organ damage.² Prevalence and new incidence of elevated BP are increasing among children and adolescents.³ It has, however, been demonstrated that elevated BP in childhood increases the risk of pre-hypertension and hypertensive adulthood.⁴

Body weight status is one of the strong risk factors contributing to hypertension.³ The alarming rate in the prevalence of overweight and obesity is now becoming a serious public health issue worldwide.^{5,6}

Multiple underlying factors, such as the high interaction between genetics and environment, including dietary components, might affect the body weight status.⁷ Dietary approaches focused on specific nutrients and foods do not completely explain the establishment of childhood obesity and its associated complications. Thus, it is of great importance to concentrate on dietary patterns and eating behaviors, such as eating frequency (EF).⁸

Previous studies have indicated that greater EF is associated with a healthier body weight and lower likelihood of hypertension among adult population.^{9,10} However, current evidence on the relationship of EF and adiposity among children and adolescents is not conclusive.^{11,12} Some associations are reported between skipping meals and increased risk of obesity in youth,¹³ whereas some other studies have not confirmed such a relationship.¹⁴ Therefore, this study aimed to explore the association of EF with anthropometric indexes and BP in a pediatric population.

Methods

This cross-sectional, multi-centric survey was conducted in 2011–2012 as the fourth phase of a nationwide surveillance program, entitled the Childhood and Adolescence Surveillance and Prevention of Adult Non-communicable disease (CASPIAN-IV) study.

Study details and protocols have been described previously.¹⁵ In brief, the CASPIAN-IV survey was conducted on a stratified multi-stage probability sample of 14,880 children and adolescents, aged 6–18 years, living in urban and rural areas of 30 provinces in Iran. Ethical committees of

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