
ORIGINAL RESEARCH

Energy distribution patterns in Australia and its relationship to age, gender and body mass index among children and adults

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Abstract

Aim: To assess daily energy distribution among Australians, provide evidence on the relative importance of eating occasions to energy intake and its relationship to age, gender and body mass index.

Methods: Dietary data collected via 24-hour recalls during the 1995 National Nutrition Survey ($n = 10\,851$ adults) and the 2007 National Children's Nutrition and Physical Activity Survey (4837 = children) were analysed. Percentage of total energy intake was tabulated according to time, eating occasions, body mass index, age and gender.

Results: The Australians consumed three main meals and two to three snacks, with the highest energy intake at 'dinner'. Among children, 'breakfast' accounted for 15% of the energy, 'lunch' 19%, 'dinner' 30% and 'snacks' 35%. For adults, energy from 'breakfast' was 14%, 'lunch' 21%, 'dinner' 37% and 'snacks' 28%. Younger children and older adults consumed a lower per cent energy during the later part of the day. No difference in energy distribution was observed by gender. No difference in body mass index was observed for children and inconsistent differences were seen for adults.

Conclusion: A high proportion of energy was consumed at 'dinner', but snacks were also an important source of energy intake. A variety of energy distribution patterns appear to be moderated by age. Older children consumed significantly less at breakfast and more snacks than younger children. In contrast, older adults consumed more energy at breakfast and less as snacks compared with younger adults. The findings indicate some key messages for informing primary prevention strategies among specific age groups including the need to attain a more even distribution of energy throughout the day.

Key words: adult, BMI, children, energy intake.

Introduction

In Australia, the prevalence of overweight and obesity has been increasing over the last two decades.¹ The latest survey shows that 53.6% of Australians² and 25% of children³ are overweight or obese. Culturally relevant strategies to facilitate a reduction in energy intake in the overweight and obese and to maintain weight in normal-weight individuals are needed. Socially determined factors related to obesity, such as eating patterns and energy distribution, particularly at different life stages, are not well understood. Overweight or obese individuals may have different energy intake patterns

from normal-weight individuals, and if so, this may provide one potential intervention strategy.

Meal timing and frequency of food intake have a direct regulatory relationship with the circadian system,⁴ which when socially altered, such as in shift work, adversely affects metabolism and weight regulation.⁵ Higher eating frequency has been associated with lower body weight among adults,^{6–8} while other studies are inconclusive⁹ or show a positive relationship.¹⁰ Among children, higher meal frequency has been shown to decrease obesity risk.¹¹ Specifically, meal skipping has been associated with increased obesity risk in children and promoting a regular meal pattern is recommended for the early prevention of overweight and obesity.

Not only is meal frequency important in weight management, it also has been shown to have a positive impact on metabolism,¹² appetite control,¹³ hormonal fluctuation¹⁴ and cholesterol.¹⁵ There are currently no national or international recommendations for per cent of daily energy intake distributions throughout the day or recommendations relating to

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