Reviewer's report

Title: Irregular breakfast eating is negatively associated with adolescents health status and health promoting behavior - a descriptive study in Taiwan

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Reviewer: Anna Keski-Rahkonen

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General

This paper deals with the association irregular breakfast eating and various lifestyle factors, behaviors and attitudes among a relatively large sample of Taiwanese adolescents and young adults. The topic is interesting and includes many relatively novel health-related factors assessed in a relatively large group of participants; few studies like this have ever been conducted in Asia to date.

Unfortunately, these advantages are offset by several major flaws: the present article is poorly organized, it is not easy to understand all the key analyses, and the discussion reads like an early first draft.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

Introduction

The literature review in the introduction is superficial and does not inspire confidence. The relationship between breakfast eating and overweight is more complex than acknowledged here (cf. Ma, Bertone et al Am J Epidemiol 2003 and the longitudinal study by Berkey et al in 2003). A large part of the introduction in the present paper is devoted to the association of breakfast eating and behaviors that this study will not assess (eg, dysmenorrhea, math scores, catching colds). However, some existing literature that deals more closely with the independent variables assessed here is clearly missing. For example, Cavadini et al (Eur J Clin Nutr. 2000) have found that breakfast eating is associated with a health-conscious lifestyle and regular physical activity.

The third paragraphs includes several sweeping statements (“healthy lifestyles decrease susceptibility to disease and increase longevity”, “unhealthy lifestyles are closely correlated with chronic disease”, “breakfast is the most important meal of the day”) that are not sufficiently backed up by the given references.

It would also make sense to more clearly outline what the very vague expressions “healthy lifestyle” / “health status” / “health promoting behavior” will mean in the context of the present study.

Methods

It would facilitate understanding this paper if the study design and population section on p 3 was directly followed by the sample description from page 5, particularly the number of participants and actual participation rates.

To better understand the impact of the behaviors measured by the Adolescent Health Promotion scale, it would be useful to know how the odds ratios were scaled “it appears from the table that you dichotomized the response but you should move this information from the end of the Data analysis paragraph in the Methods section on p 5 to the end of the Health Promoting behaviors paragraph.

The key analysis in the paper (Table 4) remains unclear based on the methods section “is it meant to be multiple or multivariate regression? Since this article targets a public health audience, it would be helpful to clearly outline what is thought to be the outcome / dependent variable(s), and what are the independent variables.

Results
I had a hard time understanding how Table 1 relates to the numerical results given on p 6.

Clearly mark the reference groups with an OR of 1.0, and also make explicit what factors you are adjusting for in the models. Also, do avoid unnecessary acronyms throughout the paper and tables (â€œregularâ€ and â€œirregularâ€ would be much easier than RBE and IRBE).

The following sentence on p 6 is confusing: â€œOverweight adolescents were significantly more likely to eat breakfast irregularly than the non-overweight group (OR 0.6, 95% CI 0.47-0.76).

The 6 last lines on p 6 appear redundant â€“ do you mean that by further adjusting for gender, grade, and living arrangement the association of breakfast eating and health promoting behaviors remained highly statistically significant? I find the Table 4 unnecessarily complex: is the model a multivariate one as you state on p 5 and in the abstract, or just a series of multiple regressions, as you state in the results section. If you really did a multivariate analysis, you should back up its rationale better in the introduction and methods, the walk the reader through it in results, and further examine its implications in the discussion.

**Discussion**

Rates of breakfast skipping / omission / irregularity have been assessed by very many previous authors: they vary widely by age and culture. Comparisons with other culturally similar countries Asian population would have been more appropriate (eg, Murata, Am J Clin Nutr. 2000).

In the beginning of the discussion, there is much speculation about the impact of socioeconomic status on the breakfast skipping - yet you never find a significant association between paternal/maternal education level and breakfast eating, nor do you adjust for it in the multiple / multivariate models.

Your study is strictly cross-sectional in design â€“ implications of causality are not warranted (â€œAdolescents with RBE had a lower probability of becoming overweightâ€ on pp. 7-8). The cross-sectional design very much limits the interpretation of the results of this study and should be listed as a limitation. Both in the introduction and in the discussion, your reading of an earlier longitudinal study on the impact of breakfast eating on body weight by Berkey et al is very imprecise â€“ the relationship is different among obese and non-obese individuals.

Self-reporting bias should clearly be mentioned in the limitations section of this paper.