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ORIGINAL ARTICLE

# Eating alone and metabolic syndrome: A population-based Korean National Health and Nutrition Examination Survey 2013–2014

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## KEYWORDS

Eating alone;  
Commensality;  
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**Summary** Eating alone has been an emerging social concern in modern life. However, there is little research on the association between eating alone and Metabolic syndrome (MetS).

We aimed to assess the association between eating alone and the MetS and to identify whether sociodemographic factors modify this association.

This study included 7725 adults ( $\geq 19$  years) who participated in the Korean National Health and Nutrition Examination Survey (KNHANES) 2013–2014. Multivariable logistic regression analysis was used for assessing the association of eating alone (none, 1 time/day, and  $\geq 2$  times/day) with MetS.

The percentages of subjects with MetS were 30.4% in men and 24.2% in women. 20.8% of men and 29.2% of women ate alone  $\geq 2$  times/day. Individuals who ate alone 2 or more times per day showed higher frequency of living alone, having no spouse, skip meals, and less eating out ( $p < 0.05$ ). Women with eating alone  $\geq 2$  times/day had a crude OR of 1.29 (95% CI:1.08–1.53,  $p$ -trend = 0.001) for MetS compared with women without eating alone. However, this association was no longer significant after adjustments for confounding factors. Eating alone  $\geq 2$  times/day was significantly associated with increase abdominal obesity (OR, 95% CI:1.45, 1.10–1.91,

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$p$ -trend=0.039) and MetS (1.64, 1.28–2.10,  $p$ -trend=0.004) in men. Eating alone was associated with a higher likelihood of having a MetS in men without spouse as compared with those with spouse (OR for men without spouse 3.02, 95% CI:1.50–6.11 and OR for men with spouse 1.48, 95% CI:1.22–1.7,  $p$ -interaction=0.027).

Our results indicate that eating alone may be a potential risk factor for MetS.

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## Introduction

The modern industrialised society towards individualisation caused significant changes in living arrangements and lifestyles. Nuclear family or one person household are rapidly growing [1]. At the same time, eating patterns have become irregular, informal, and individualised in the form of more eating alone [2]. Eating alone has been an emerging social concern along with increasing life expectancy and single-person households [3]. The Thai Cohort Study ( $n=39,820$ ; 55% women) demonstrated that sociodemographic attributes associated with eating alone were being male, older age, unmarried, smaller household, lower income, and urban residence [4].

The influence of eating alone on health has not been studied very much. Evidences suggested that eating alone might have a negative impact on psychological health in view of social relationship and on physical health through increasing nutritional risk as well [5–10]. Eating alone was strongly associated with depressive symptom [5–7,11], disordered eating behaviours [12], and obesity or underweight [8–10]. Interestingly, a case-control study by Katsarou et al. [13] suggested that eating with or without company may present novel predictor for acute coronary syndrome. However, relatively little is known on the influence of eating alone on metabolic and cardiovascular risk in general population.

Metabolic syndrome (MetS) is a cluster of cardiovascular risk factors, which leads to an increased risk for developing type 2 diabetes and cardiovascular disease (CVD) [14]. Though its exact mechanism has not been fully clarified, insulin resistance and central obesity have been acknowledged as important causative factors [14]. In addition, unfavourable lifestyle behaviours, including low physical activity [15], cigarette smoking [16], heavy

alcohol consumption [17], and an atherogenic diet [18] can elicit clinical consequences of MetS. Therefore, it is possible that eating alone, as one of the important eating behaviours in contemporary society, is associated with the increased prevalence of MetS, but there was no study that investigated this association. Furthermore, whether sociodemographic attributes related with eating alone mediate and/or moderate the adverse effect of eating alone on the MetS has not been well studied and appreciated yet.

Hence, we performed this study to investigate the association between eating alone and the MetS and its components and to identify whether sociodemographic factors, such as age, sex, living alone, presence of occupation, and presence of spouse, can modify this association.

## Materials and methods

### Study population

This study was based on data from the 6th Korea National Health and Nutrition Examination Survey (KNHANES) 2013–2014. KNHANES is a nationwide survey using a stratified multistage probability sampling design and consists of a health interview, behavioural and nutritional surveys and a medical examination. Additional details regarding study design and methods are reported elsewhere [19]. A total 12,089 adults aged 19 years or more participated in the 6th KNHANES 2013–2014. We excluded individuals with missing value in question about “eating alone” ( $n=3999$ ) or participant who did not provide data for MetS and its components ( $n=1879$ ). Finally, 7725 adults were included in the analysis.

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