

# Response: Relationships among Body Mass Index, Body Image, and Depression in Korean Adults: Korea National Health and Nutrition Examination Survey 2014 and 2016 (J Obes Metab Syndr 2019;28:61-8)

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Received June 25, 2019

Reviewed July 12, 2019

Accepted July 22, 2019

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Depression is one of the most common psychiatric disorders and is related to obesity and underweight.<sup>1,2</sup> Our previous study showed that the prevalence of depression was higher in women (7.0%) than in men (3.9%).<sup>3</sup> According to body weight status, there was a significant difference in the prevalence of depression (underweight, 16.2%; normal weight, 5.5%; overweight, 4.3%; obese [body mass index, BMI  $\geq$  30 kg/m<sup>2</sup>], 6.9%). Compared to the normal weight group, the underweight group had a higher adjusted odds ratio (OR) for depression (OR, 2.38; 95% confidence interval [CI], 1.45–3.88) adjusted for age, sex, educational level, household income, habitation, marital status, comorbidities, smoking, alcohol, and stress perception.<sup>3</sup> Obese women had higher adjusted OR for depression (OR, 1.75; 95% CI, 0.79–3.88), while obese men had lower ORs for depression (OR, 0.62; 95% CI, 0.17–2.27), although it was not statistically significant.<sup>3</sup>

There can be several factors affecting the relationship between obesity and depression, including age, sex, nationality, cultural background, ethnicity, and social status.<sup>4</sup> In addition, there was definite sex difference in relationship between body weight and de-

pression. Likewise, other studies reported a positive relationship between obesity and depression in women but not in men.<sup>5,6</sup>

We agree with that women are more exposed to and affected by media.<sup>4</sup> For women, menopause can affect mental health, and is associated with depression.<sup>7</sup> We performed analysis after adjusting for age, thus menopause condition was adjusted. We analyzed sex difference between BMI and depression in previous study.<sup>3</sup>

Subsequently, we analyzed the relationship between body image perception and depression in the recently published article in the *Journal of Obesity & Metabolic Syndrome*.<sup>8</sup> In multivariate analysis, the risk for depression was high in the underweight group and among participants who perceived themselves as extremely lean or extremely obese.<sup>8</sup> Further study is needed to analyze sex difference regarding body image perception and depression.

Biased BMI and body image perception are associated with increased incidence of depression.<sup>8</sup> In addition, specific weight control methods, such as fasting, skipping meals, and reducing food consumption, rather than exercise, are associated with increased incidence of depression.<sup>8</sup> Therefore, healthy methods to establish

healthy body image and maintain normal-range BMI should be considered. Society needs to focus its attention and establish systematic support on attempts to achieve healthy body weight.

### CONFLICTS OF INTEREST

The author declares no conflict of interest.

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