Association between Food Insecurity, a Contribution of the Fruit and Vegetables’ Consumption, and Diabetes Incidence among Indonesian Adults

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OBJECTIVE

The relationship between food insecurity and chronic disease are well known. Food insecurity related to hypertension and diabetes, which is the main risk factors for cardiovascular disease [1,2]. Food insecure people have some difficulties in providing themselves a balanced diet [3-5]. Tyrovolas and Panagiotakos suggested that increased fruit and vegetable consumption can be a protector from cardiovascular diseases [6]. However, the contribution of the number of days of fruit and vegetables’ consumption in the association between food insecurity and the incidence of diabetes among Indonesian adults is rather vague.

METHODS

Data in this study were obtained from 3955 participants of the Indonesia Family Life Survey (IFLS) in 2007 and 2014. Further, the measurement of food insecurity was used the World Food Programme (WFP) concept that was employed food frequency questionnaire on a food consumption score analysis [7]. Food security practically associated with the frequency of food and the diversity of a person’s diet [8-10]. The generalized estimating equation (GEE) test was used to test the hypothesis model while accounting for the health behaviors and socio-demographic characteristics in this study.

RESULTS

The GEE test was confirmed the positive association between food insecurity and diabetes in the adjusted and unadjusted model (p = 0.005 – < 0.001). The number of days of vegetables’ consumption was statistically negatively associated with diabetes in both models (p = 0.006 – < 0.001). The number of days of fruits’ consumption was negatively associated with diabetes but not statistically significant in both models. The meal preferences (i.e., fruit and vegetables consumption) are associated with the nutritional knowledge and the ability of the person [3], in particular for people with diabetes.

CONCLUSIONS

Food insecurity is positively associated while the number of days of vegetables’ consumption is negatively associated with diabetes. Strategies to improve the prevention of diabetes among adults may consider enrichment of fruit and vegetables’ tailored-meal on the restaurants’ menu together with the nutrition education, into account.

Table 1. General Estimating Equations (GEE) Result between Food security, Fruit and Vegetables’ Consumption, and Diabetes

<table>
<thead>
<tr>
<th>DV</th>
<th>IV</th>
<th>β Coef.</th>
<th>CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unadjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>FS</td>
<td>-0.010</td>
<td>(0-0.016, 0.039)</td>
<td>0.002</td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
<td>-0.001</td>
<td>(-0.001, 0.002)</td>
<td>0.964</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td>-0.003</td>
<td>(-0.004, 0.002)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Adjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>FS</td>
<td>-2.17x10^-4</td>
<td>3.70x10^-4, 4.39x10^-4</td>
<td>0.005</td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
<td>-7.56x10^-4</td>
<td>1.75x10^-3, 2.35x10^-3</td>
<td>0.135</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td>-0.001</td>
<td>(-0.002, -0.002)</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Abbreviations: DV, dependent variable; IV, independent variable; FS, food security; CI, confidence interval; β, coef. Generalized Estimating Equation (GEE) test was used an independent variable (2007 & 2014) and a dependent variable (2007 & 2014) with family (Gaussian) link (identity) correlation (independent). Adjustments variables are age, sex, body shape index, blood pressure, education level, marital status, geographical residences, smoking status, physical activity level. *Diabetes categorical data (diabetes vs. non-diabetes) as an independent variable. Diabetes defined from the self-reported questionnaire. * Food security level categorized as food secure, food insecure.

BIBLIOGRAPHY


Figure 1. Fruit and Vegetables’ consumption may contribute in the association between Food Security and Diabetes

Figure 2. A contribution of Vegetables’ consumption in the association between Food Security and Diabetes

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