Correlation between Online Order of Sugary Drinks and Risk of Obesity among Adolescents during Covid-19 Pandemic in Surabaya

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Abstract

Background: Obesity has turned out to be a primary public health problem and its prevalence has increased in all age groups in almost all countries within the world, especially in adolescent groups. Literature studies show that many factors can increase the risk of obesity on each individual, one of the factors is highconsumption of sugary drinks. Entering the industrial revolution 4.0 era, the most common technological development is an online food delivery application. It was hypothesized that adolescents choose the online food delivery application during covid-19 pandemic because it is more effective than to buy it itself. Aims: The aim of this study is to analyze the relationship between online order of sugary drinks and the risk of obesity during covid-19 pandemic in Surabaya. Settings and Design: This was an analytic observational study using a case-control design. The sample size was 38 students of class XI at five high schools in Surabaya with a ratio of 19 people for the case group and 19 people for the control group. Methods and Material: Samples selected by simple random sampling. Statistical analysis used: The data obtained were analyzed using the chi-square statistical test. Results: The result of this study indicates a relationship between online order of sugary drinks with the risk of obesity (p = 0.001). It is concluded that the amount of sugary drinks consumed and ordered online can increase the risk of obesity among adolescents. Conclusion: Adjusting eating patterns that lower in sugary beverages is recommended for adolescents to reduce the risk of obesity.

Keywords: adolescents, obesity, online food delivery application, sugary drinks

Key Messages:
Provide appropriate messages of about 35-50 words to be printed in centre box. Emphasise on new messages derived from the manuscript.
Introduction

Changes such as physical, cognitive, and psychosocial growth or behavior happen very quickly in adolescence (Adriani and Wirjatmadi, 2012). Adolescence also involves many physical and emotional changes, along with increased independence and more personal choices. Food choices have an impact on adolescents’ intake and nutritional status (More, 2014). One of the behavioral changes in adolescents is a change in eating behavior that tends to be healthy or that tends to lead to unhealthy eating behavior (Proverawati, 2010). In Indonesia, the prevalence of obesity in the adolescent group ≥ 15 years shows a figure of 31%. This has increased from the previous year of 2013, which was 26.6% (RISKESDAS, 2018). Obesity is a serious problem that occurs in many countries. In general, obesity is more caused by an imbalance between energy intake and energy expenditure (Adriani and Wirjatmadi, 2012). This dietary pattern can lead to an imbalance in nutritional intake and is a risk factor for the emergence of nutritional problems such as obesity and decreased physical activity, which are especially evident in big cities (Almatsier, 2011). Entering the industrial era 4.0, the development of information technology is running very rapidly and can affect various aspects, one of which is the influence of food preferences. Technological developments can help making it easy to reduce the limitations of distance, time, and cost. One proof of technological developments that are widely used by adolescents in urban areas is the online food delivery application. According to Amalia, et al. (2016), the ease of access to foods and drinks, especially sweet beverages, can increase the incidence of obesity in respondents. Technological developments in the food industry will ultimately affect changes in people's diet which will directly affect the intake of macronutrients and the level of physical activity in the community. The aim of this study is to analyze the relationship between online order of sugary drinks and the risk of obesity during covid-19 pandemic in Surabaya. Based on this, the researchers were interested in further analyzing what factors could be related to the incidence of obesity in adolescents related to technological developments such as the online food delivery application. In this case, the researchers focused on individual internal factors that can influence the incidence of obesity which consist of the frequency of using online food delivery service application including consumption of sweet beverages.

Subjects and Methods

The type of research used by researchers to conduct research is analytic observational using a case-control design study. This research is a type of quantitative research. These research design and approach were used to determine the relationship between the use of online food delivery application and the consumption of sweet beverages on adolescents in Surabaya. The sample size was 38 students of class XI at five high schools in Surabaya with a ratio of 19 people for the case group and 19 people for the control group, and samples were selected by simple random sampling method. The
case group in this study was students of class XI at each school who were not experiencing health problems which required them to undergo a diet and live with their parents. The case group is the respondents with an overweight or obese nutritional status based on the BMI/Age index. The control group in this study was students of class XI at each school who were not experiencing health problems requiring them to undergo a diet and live with their parents. The control group was respondents who had a normal nutritional status based on the BMI / age index. From the calculations, a minimum sample size of 15 samples was obtained in each sample group with a case: control group ratio = 1:1. The minimum sample result must also be multiplied by 10% for the addition of the drop out rate assumption, so that the minimum sample size is 17 for the case group and 17 for the control group. The minimum total sample size used in this study is 34 people at minimum. Research on five schools that have been determined by the proportional random sampling method is based on predetermined inclusion criteria. This research was approved by Ethic Comission of Nursing Faculty with KEPK numbered 1961-KEPK.

Results

One of the variables examined in this study is sweet beverage intake through online food ordering. Sweet beverage intake is obtained from purchases through online delivery applications or other delivery orders. The online food order assessment will be viewed within a period of seven days with the food record method.

Table 1: Distribution of Types of Food Ordered Online to Respondents of Obesity Group in SMA Negeri 1, SMA Negeri 3, SMA Negeri 8, SMA Negeri 13, and SMA Negeri 15 Surabaya in 2020

<table>
<thead>
<tr>
<th>Food Type</th>
<th>Frequency</th>
<th>Calories (ccal)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td>1-3x/weeks</td>
</tr>
<tr>
<td>Fried Chicken</td>
<td>42,1%</td>
<td>57,9%</td>
</tr>
<tr>
<td>Nasi Bebek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pizza</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thai Tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bubble Tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown Sugar Tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Es Krim Oreo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ricebox Ayam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ayam Geprek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martabak Manis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows us about the types of food ordered online by the obesity group along with the frequency of ordering and total food calories which explain consumption. The obese group consumed more frequently the online ordered foods with high-calorie foods. The average calorie consumption of the obese group during the seven days of the study was 417.23 kcal with a minimum calorie value of
233.3 kcal and a maximum caloric value of 625.3 kcal. The type of food that is most often ordered by
the group of respondents with an obese nutritional status is a sweet type of bubble tea.

Table 2: Distribution of Amounts of Sweet Beverages Consumed by Ordering Food Online for Obesity and Non-
Obesity Respondents at SMA Negeri 1, SMA Negeri 3, SMA Negeri 8, SMA Negeri 13, and SMA Negeri 15
Surabaya in 2020

<table>
<thead>
<tr>
<th>Food Intake</th>
<th>Obesity</th>
<th></th>
<th>Non Obesity</th>
<th></th>
<th>P Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>High Calorie (≥30% amount energy per day)</td>
<td>9</td>
<td>100,0</td>
<td>3</td>
<td>27,3</td>
<td>0,001</td>
</tr>
<tr>
<td>Low Calorie (≤30% amount energy per day)</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>72,7</td>
<td></td>
</tr>
</tbody>
</table>

This table describes how many food calories in sweet beverages are consumed through online food ordering. In the obesity group, all of the foods ordered online contain high calories or ≥30% of the recommended total energy in a day according to the 2019 Nutritional Adequacy Rate (RDA) or 100% of respondents in the obese group who place orders online. No low-calorie food was consumed in the obese group. In the non-obese group, the amount of high-calorie foods consumed was 27.3%. Meanwhile, the low-calorie foods consumed by the non-obese group was 72.7%. Based on the Chi-square test, the p-value was 0.001. This shows that there is a relationship between the amount of high-calorie foods consumed and ordered online with the nutritional status of the obese and non-obese groups. The average total calories in the seven days of ordering food online in the obese and non-obese group of respondents were 498.13 kcal with a minimum value of 45.2 kcal and a maximum value of 2399.6 kcal.

Discussion

Assessment of online food ordering is obtained through the food record method for seven days by adding information purchased online, and the number of calories in the foods consumed from sweet beverages will be analyzed using Nutrisurvey 2007 software. There is a difference between the obese and non-obese groups. The calculation of the portion of foods is divided into three parts, which are breakfast for 30%, lunch for 40%, and dinner for 30% (Khomsan, 2010). In the non-obese group, respondents who ordered sweet beverages were fewer than those in the obese group. This is the same as Harahap's research (2019) which states that the obese group has a higher online ordering frequency compared to the non-obese group. The types of drinks most frequently ordered online by respondents were thai tea and bubble tea. Based on the results of interviews with respondents, some respondents were not allowed by their parents to order foods directly, so the respondents did not order foods that way and preferred ordering by online applications due to the virus outbreak, so that respondents could minimize the risk of virus transmission. In this study, all obese groups ordered...
foods with high-calorie contents. Meanwhile, for the non-obese group, only 3 people ordered high-calorie foods online, and 8 people ordered low-calorie foods. This study found a significant relationship between ordering high-calorie foods with obesity. This can occur because the majority of the obese group more often consumes sweet beverages that are ordered online with high calories. This study is in line with Kurdanti's (2015) study which shows that the consumption of high-calorie foods has a significant relationship with obesity. Entering the industrial 4.0 era, the development of technology is running very rapidly, so that it affects various aspects, one of which is the influence on food preferences. One proof of technological developments that are widely used by adolescents in urban areas is the online food delivery application. This has a high chance of changing eating behavior, especially in the adolescent group. Adolescent group prefers ordering foods online because it is faster, more practical, and cheaper. After all, they often get discounted prices. The foods ordered also more varied, so the types of foods ordered online can tend towards low-calorie or high-calorie foods. If this happens continuously, the nutritional status of the adolescent group will lead to obesity status (Harahap, 2019).

**Conclusion**

The conclusion of this research is that there is correlation between online order of sugary drinks and the risk of obesity among adolescents. The weakness of this study is that the research respondents are less representative in describing the results of this study because not all of the initial population filled out an online questionnaires that were given by the researchers, given the absence of direct interaction caused by the Covid-19 pandemic. Besides, this method makes the respondents have to estimate how much food is consumed and is a burden to the respondents because they have to record all foods and drinks that have been consumed during the study period. The suggestion from this study for researchers is that it is better to conduct a qualitative analysis of the respondents' eating habits from the past by paying attention to the total respondents from the population and analyzing other factors that affect obesity, so that they can see the risk factors causing obesity in respondents and take direct anthropometric measurements, so that the results of measurements of body weight and height can be validated. Other researchers are also advised to take a larger number of samples to represent the research results.

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**References**
