

## RESEARCH STUDY

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# Association between the Role of Peers and Social Media Exposure with Level of Sugar-Sweetened Beverages Consumption in Adolescents

## Hubungan antara Peran Teman Sebaya dan Paparan Media Sosial dengan Tingkat Konsumsi Minuman Berpemanis pada Remaja

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Adolescents, Consumption level, Sugar-sweetened beverages, Social media, Peers

**ABSTRACT**

**Background:** Sugar-sweetened beverages, favored by various groups, particularly adolescents, are associated with an increasing risk of obesity and diabetes mellitus. According to preliminary research conducted at SMAN 1 Serang, approximately 60% of students have a high level of sugar-sweetened beverages consumption. Role of peers and social media exposure is considered to have an association with level of sugar-sweetened beverage consumption in adolescents.

**Objectives:** This research aimed to determine association between role of peers and social media exposure with level of sugar-sweetened beverages consumption in adolescents at SMAN 1 Serang.

**Methods:** The analytic observational research was carried out using a cross-sectional design. The study population consisted of 1,085 students from classes X and XI, while the sample size comprised 300 students who were selected using stratified random sampling and the data obtained were analyzed with chi-square test. Independent variables were measured with a questionnaire consisting of 13 closed-ended questions, while the dependent variable was measured with a Food Frequency Questionnaire.

**Results:** The majority of respondents had a high level of sugar-sweetened beverages consumption (54.3%), bad role of peers (55.7%), and exposure to social media (74.0%). Moreover, this research showed the association between the role of peers ( $p=0.0001$ ) and social media exposure ( $p=0.037$ ) with level of sugar-sweetened beverages consumption.

**Conclusions:** This research showed a significant association between role of peers and social media exposure with level of sugar-sweetened beverages consumption in adolescents. Therefore, forming peer groups and using social media were expected to increase students' awareness, causing a substantial reduction in beverages consumption.

**INTRODUCTION**

Non-communicable diseases have become a health problem that attracts global attention<sup>1</sup>. The increased burden of some non-communicable diseases is due to the obesity epidemic<sup>2</sup>. This is alarming because obesity is associated with the incidence of non-communicable diseases<sup>3</sup>. Moreover, a major factor that can increase the risk of obesity and some non-communicable diseases is sugar-sweetened beverages consumption. The high calories contained in sweetened beverages can lead to weight gain and increase the risk of chronic diseases when consumed continuously<sup>2</sup>.

Indonesia is ranked the third-highest consumer of sugar-sweetened beverages in the Southeast Asian region. Moreover, the lack of regulations managing the availability, affordability, and marketing of these beverages in the country has increased the incidence of

obesity and several non-communicable diseases, such as diabetes mellitus and cardiovascular disease<sup>4</sup>. Data from the 2018 Basic Health Research showed a high proportion of sugar-sweetened beverages consumption, with 61.3% of respondents consuming more than once a day. Among the provinces in Indonesia, Banten has a high consumption level of 61.46%, with Serang showing a proportion of 62.09%, which exceeds the national (61.3%) and provincial (61.46%) average<sup>5,6</sup>.

Manufacturers of sugar-sweetened beverages often target adolescents, as the age range experiences a transition from childhood to adulthood where all trends developing in society are followed without considering the negative impact, such as by trying to consume the latest types of sugar-sweetened beverages<sup>7,8</sup>. Adolescents usually in a group and spend more time outside with their friends, thereby "modeling" behavior

from friends has a significant impact on behavioral changes<sup>7,9</sup>. According to Pamarta et al. (2022), there is association between peer influence and consumption of sugar-sweetened beverages<sup>10</sup>. In addition, social media is also something that is familiar to adolescents nowadays. Exposure to advertisements on social media is associated with high consumption of sugar-sweetened beverages<sup>11</sup>. Fatikasari (2020) also observed an association between the influence of social media exposure and the high consumption level of these beverages<sup>12</sup>.

Preliminary research conducted on 20 students of SMAN 1 Kota Serang showed that approximately 60% had a high level of sugar-sweetened beverages consumption. The location of SMAN 1 Kota Serang in the city center, close to minimarkets and sweetened beverage outlets, facilitates accessibility to these beverages. The implementation of the full-day school system has also contributed to an increase in peer influence as some students often spend time with friends. Approximately 65% of students included in the preliminary research stated that they usually consume sugar-sweetened beverages when they spend time with friends. Additionally, 20 students who became respondents spent an average of 6 hours a day accessing social media, with 12 students following social media accounts sharing information related to sugar-sweetened beverages. Despite the numerous investigations, there is no information regarding the level of consumption, particularly among high school students in Serang. Therefore, this research aimed to identify the association between the role of peers and social media exposure with the level of sugar-sweetened beverages consumption. The results serve as an effort to reduce the consumption of beverages with high sugar which can lead obesity and other chronic disease.

**METHODS**

This analytic observational research was carried out at SMAN 1 Serang from January to July 2023 using a cross-sectional design. The target population was all students in the 2022/2023 academic year at SMAN 1 Serang, with a study population of 1,085 students from classes X and XI. This population was purposively selected to represent the age range of the middle adolescence group (15-17 years). The minimum sample size was determined using the Slovin formula to obtain a total of

300 students. Subsequently, a stratified random sampling method was used based on the list of students at each level and major. This research was approved on May 29, 2023, by the Health Research Ethics Commission of the Faculty of Public Health, Diponegoro University, with number 304/EA/KEPK-FKM/2023.

The independent variables include the role of peers and social media exposure as measured by 13 questions that have been tested for validity and reliability. Respondents can answer with the options "Yes" (score 1) or "No" (score 0), based on their situation. This was followed by the summation of scores on each question and categorization based on the median value. The role of peers is categorized into "poor" when the total score is  $\geq 2$  and "good" with a score of  $< 2$ . Social media exposure is categorized into "exposed" when the total score is  $\geq 5$  and "not exposed" with a total score of  $< 5$ . Meanwhile, the dependent variable is the consumption level as measured by the Food Frequency Questionnaire containing 7 types of sugar-sweetened beverages which have also been tested for validity and reliability. Consumption frequencies were scored as follows,  $\geq 3$  times/day (50), 1 time/day (25), 3-6 times/week (15), 1-2 times/week (10), 2 times/month (5), and never (0), which is adjusted to the respondent's consumption in the past month. The scores on each question were added and categorized based on the median value, with a score of  $\geq 60$  and  $< 60$ , indicating high and low consumption, respectively. Confounding variables consisted of respondent characteristics, including gender, family history of diabetes, and age specifically middle adolescents (15-17 years). Data collection was carried out by filling out questionnaires independently by respondents, which were processed using univariate and bivariate analyses (chi-square tests).

**RESULTS AND DISCUSSIONS**

Based on research conducted at SMAN 1 Serang on 300 respondents, it was found that most respondents were female (60.7%) and had no family history of diabetes (83.0%). Furthermore, most of the respondents had a high level of sugar-sweetened beverage consumption (54.3%), bad role of peers (55.7%), and were exposed to social media (74.0%), as shown in the frequency distribution presented in Table 1.

**Table 1.** Frequency distribution of respondents' characteristics

| Variable                                       | n   | %    |
|--|-----|------|
| Gender   |     |      |
| Male   | 118 | 39.3 |
| Female   | 182 | 60.7 |
| Family History of Diabetes                     |     |      |
| None   | 249 | 83.0 |
| Exist  | 51  | 17.0 |
| Level of Sugar-Sweetened Beverages Consumption |     |      |
| High   | 163 | 54.3 |
| Low  | 137 | 45.7 |
| Role of Peers                                  |     |      |
| Bad  | 167 | 55.7 |
| Good   | 133 | 44.3 |
| Social Media Exposure                          |     |      |
| Exposed  | 222 | 74.0 |

| Variable  | n   | %     |
|-----------|-----|-------|
| Unexposed | 78  | 26.0  |
| Total     | 300 | 100.0 |

The level of sugar-sweetened beverages consumption was higher in male (64.4%) compared to female (47.8%). Additionally, respondents who did not have a family history of diabetes had a higher consumption level (55.4%) compared to those with a

family history (49.0%). The cross-tabulation of variables of gender and family history of diabetes with the sugar-sweetened beverages consumption level is presented in Table 2.

**Table 2.** Cross-tabulation of gender and family history of diabetes with level of sugar-sweetened beverages consumption

| Variable                   | Level of Sugar-Sweetened Beverages Consumption |      |     |      | Total | %     |
|----------------------------|--|------|-----|------|-------|-------|
|                            | High   | %    | Low | %    |       |       |
| Gender                     |  |      |     |      |       |       |
| Male                       | 76   | 64.4 | 42  | 35.6 | 118   | 100.0 |
| Female                     | 87   | 47.8 | 95  | 52.2 | 182   | 100.0 |
| Family History of Diabetes |  |      |     |      |       |       |
| None                       | 138  | 55.4 | 111 | 44.6 | 249   | 100.0 |
| Exist                      | 25   | 49.0 | 26  | 51.0 | 51    | 100.0 |

The higher sugar-sweetened beverages consumption in male is attributed to higher activity levels than female<sup>13</sup>. This is due to the belief in the benefits of isotonic drinks that facilitate water and electrolyte recovery as well as energy during or after physical activity<sup>14</sup>. Additionally, female adolescents have concerns about their body shape and higher awareness to maintain health by avoiding sugar-sweetened beverages<sup>15,16</sup>.

The existence of a family history of disease plays an important role in adopting a healthy lifestyle, including consuming less sugar<sup>17</sup>. Respondents with a family history of diabetes mellitus show a 2.3 times greater tendency to reduce sugar consumption. Respondents whose parents have history of diabetes mellitus typically know that diabetes mellitus is an inherited disease, so they tend to reduce their sugar consumption<sup>18</sup>.

**Table 3.** Results of bivariate analysis of the role of peers and social media exposure with level of sugar-sweetened beverage consumption

| Variable              | Level of Sugar-Sweetened Beverage Consumption |      |     |      | Total | %     | p-value |
|-----------------------|---|------|-----|------|-------|-------|---------|
|                       | High  | %    | Low | %    |       |       |         |
| Role of Peers         |   |      |     |      |       |       |         |
| Bad                   | 110   | 65.9 | 57  | 34.1 | 167   | 100.0 | 0.0001  |
| Good                  | 53  | 39.8 | 80  | 60.2 | 133   | 100.0 |         |
| Social Media Exposure |   |      |     |      |       |       |         |
| Exposed               | 129   | 58.1 | 93  | 41.9 | 222   | 100.0 | 0.037   |
| Unexposed             | 34  | 43.6 | 44  | 56.4 | 78    | 100.0 |         |

Table 3 shows the bivariate analysis results to identify the association between the role of peers and social media exposure with the level of sugar-sweetened beverages consumption. The proportion of respondents with high sugar-sweetened beverage consumption levels due to bad peers (65.9%) was greater than those with good peers (39.8%). Furthermore, the proportion of respondents with high sugar-sweetened beverage consumption levels due to exposure to social media (58.1%) was greater than those who were not exposed (43.6%). The results of bivariate analysis between the role of peers and consumption level showed a p-value of 0.0001 (<0.05), indicating a significant association. Bivariate analysis between social media exposure and consumption level obtained a p-value of 0.037 (<0.05), which showed a significant association between both variables.

Adolescents generally have characteristics such as forming friendships and group dynamics, which affect

their behavior, including sugar-sweetened beverages consumption<sup>7</sup>. Based on adolescents' development theory, adolescents become increasingly independent from their parents after entering middle school<sup>19</sup>. This condition increases time spent with friends, resulting in modeling behavior from peers. In social interactions, peers have a role as "models" who can have a crucial influence on eating habits among adolescents. Research by Ina et al. (2020) stated that a strong influence of peers would increase the pattern of sweet consumption<sup>20</sup>.

The results obtained from this study show that most respondents have friends who consume sugary drinks, give recommendations to choose sugar-sweetened drinks, and show interest in trying sugar-sweetened beverage recommendations that have been recommended by their friends. Research by Pamarta et al. (2022) also states that peer influence can be seen in the presence of friends who like sugar-sweetened beverages, always buy sugar-sweetened beverages when

gathering together, and who constantly invited to buy sugar-sweetened beverages<sup>10</sup>. Qualitative interviews by Wang et al. (2022) showed that friends of the respondents also consume sugary foods and beverages regularly. The habit of sharing food and drinks among peers, providing recommendations for food and drinks, and peer pressure are social forces that encourage adolescents to consume sugar-sweetened foods and drinks<sup>21</sup>. Adolescents will try to fit in with their peer group by adopting preferences and making food or beverage choices based on peers. Choices based on peer pressure can influence adolescents in the formation of behavior, for example, related to the consumption of sugar-sweetened beverages<sup>22</sup>.

In this research, the proportion of respondents with high consumption level due to the bad role of peers was found to be greater compared to the good role. Masri (2018) also observed that respondents with high level of sugar-sweetened beverages consumption are in the group influenced by peers. This phenomenon occurs because most of the time is spent with friends, thereby peers strongly influence the types of beverages consumed<sup>7</sup>. The results of bivariate analysis also showed an association between the role of peers and the level of sugar-sweetened beverages consumption. Similarly, Pamarta et al. (2022) investigated 115 high school students in Solo and found a significant association between the role of peers and the consumption level. The susceptibility of adolescents with high peers influence showed 4.1 times greater tendency to consume sugar-sweetened beverages compared to others<sup>10</sup>.

Peers' influence on eating behavior in adolescents extends from in-person to social media<sup>23</sup>. Specifically, the trend of using social media has led many sugar-sweetened beverage companies to market their products through social media targeting adolescents. This phenomenon can increase the consumption level, potentially causing several health problems<sup>24,25</sup>. Adolescents tend to be exposed to food and beverage marketing on social media through various sources, such as advertisements, individual or celebrity content, and other entertainment content. Social media strongly influence adolescent eating behavior by promoting unhealthy foods and beverages<sup>26</sup>. Adolescents can already make choices to buy sugar-sweetened beverages and are more easily influenced to consume beverages that are currently popular<sup>27</sup>.

The results show that some respondents are interested in trying and consuming sugar-sweetened beverages after advertisements or social media recommendations. According to Gascoyne et al. (2021), exposure to beverage advertisements on social media at least once a week is associated with high consumption of sugar-sweetened beverages<sup>11</sup>. This is because effective and appealing advertisements that are intensively carried out in the media make the product more known and recognized, thereby influencing consumption level<sup>7</sup>. According to Kucharczuk et al. (2022), adolescents tend to be better at remembering unhealthy foods and beverages, brands, and products advertised by celebrities or influencers. This strategy is commonly used by food and beverage companies to market products on social media by targeting the adolescent population<sup>25</sup>. Most

respondents also follow culinary recommendation accounts on social media. In Serang, several Instagram accounts often recommend culinary, such as *serangfood*, *jajanserang*, and *culinary.serang*. Moreover, liking and sharing beverage posts at least once a month is associated with high sugar-sweetened beverages consumption<sup>11</sup>.

In this research, the proportion of sugar-sweetened beverages consumption level was higher among respondents who were exposed to social media. Similarly, Fatikasari (2020) stated that adolescents with high consumption levels were more in the group exposed to social media<sup>12</sup>. Based on the results of bivariate analysis, there was a significant association between exposure to social media and the level of sugar-sweetened beverages consumption. The results are supported by bivariate analysis, where Fatikasari (2020) stated that the influence of social media showed a significant association, serving as the dominant factor influencing the consumption of sugar-sweetened beverages in adolescents. Specifically, respondents who were influenced by social media showed 2.7 times greater tendency to consume sugar-sweetened beverages<sup>12</sup>. In addition, Masri (2018) stated that mass media advertising and social media were the dominant factors influencing the high consumption of high-calorie beverages<sup>7</sup>.

The results provided valuable insights into the factors associated with sugar-sweetened beverages consumption in adolescents, offering essential information for the development of programs to reduce consumption level in adolescents. However, the limitations of this research are the measurement of only sugar-sweetened beverages consumption level using the Food Frequency Questionnaire, which measures how often respondents consume sugar-sweetened beverages without measuring the portion of beverages. The data were also collected by filling out a questionnaire independently through Google Forms, which was influenced by the respondents' understanding. Therefore, the research team provided assistance in the questionnaire filling process until completion to anticipate if the respondent did not understand the question listed in the questionnaire.

## CONCLUSIONS

Research conducted on students at SMAN 1 Kota Serang showed an association between role of peers and social media exposure with the level of sugar-sweetened beverages consumption in adolescents. Therefore, the school and local health department were recommended to collaborate in forming a group of students (peer-group) to provide proper education about sugar-sweetened beverages and use social media optimally to disseminate beneficial information related to sugar-sweetened beverages.

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**CONFLICT OF INTEREST AND FUNDING DISCLOSURE**

The authors declare that there is no conflict of interest in this research. The source of funding for the research comes from the author's personal funds.

**AUTHOR CONTRIBUTIONS**

VRF: conceptualization, investigation, methodology, formal analysis, writing—original draft; MSA & MAW: conceptualization, funding acquisition, supervision, validation, writing-review & editing; SY: supervision, writing-review & editing.

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