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Fat Intake in Overweight Adolescents with Health Belief Model Approach

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Abstract: Obesity in childhood is associated with early mortality, psychiatric, and cardiometabolic comorbidities, and is likely to remain into adulthood. One of the most often utilized models in health-related research to describe and predict behavioral health is the Health Belief Model. The current research aims to ascertain the link between adolescent fat intake and all HBM components. The design of this study was cross-sectional. Purposive sampling was the sampling method, and 110 participants from 4 secondary schools were included. The research data were analyzed using SPSS 27. Measurement of fat intake using a 24-hour food recall interview with two repetitions on non-consecutive days. HBM measurement using questionnaires with 59 questions representing 6 HBM constructs. The bivariate test was performed with the Spearman and Pearson tests. Variables significantly related to fat intake are cues to action and self-efficacy. The higher the cues to action, the lower the adolescent fat intake. Likewise, the higher the self-efficacy, the less fat intake in adolescents. HBM-based education is needed to increase adolescents' perceptions and beliefs regarding health problems, especially overweight, to support handling overweight issues in adolescents.

Keywords: Adolescent; Fat intake; Health belief model; Overweight

Introduction

Being overweight is a common problem that has increased in emerging countries in recent years (Rachmi et al., 2017). The proportion of overweight or obese children and adolescents globally rose from 4% to 18% between 1975 and 2016 (WHO, 2023). The percentage of 16–18-year-olds in Indonesia who are overweight increased from 5.7% in 2013 to 9.5 per cent in 2018 (Kemenkes, 2013, 2018). Obesity in childhood is associated with early mortality, psychiatric, and cardiometabolic comorbidities, and is likely to remain into adulthood (Jebeile et al., 2022). Gaining weight after experiencing an increase in body mass index has been associated with an increased risk of type 2 diabetes, hypertension, cardiovascular disease, and cancer. Furthermore, acquiring 2.25 kg or more of weight might exacerbate physical pain and make it more difficult for the body to operate correctly (Hruby et al., 2016).

A complex disorder, overweight is impacted by various factors such as genetic, behavioral, and societal influences. Managing excess weight requires a change in one's food and activity habits (Lee & Yoon, 2018). Bad eating habits are one of the things that lead to the appearance of overweight in teenagers. Consuming a lot of packaged meals, soft drinks, and beverages with added sugar is one of the bad eating habits (Kemenkes, 2012). Adolescents who consume too much energy are 2.97 times more likely to become obese than teens who consume enough energy and frequently eat fast food, who are 4.412 times more likely to become obese (Telisa et al., 2020). Adolescents who consume more fat have twice the chance of becoming obese compared to those who consume enough fat (Muriyati et al., 2023). The findings of studies on obese adolescents indicate that 50% of adolescents consume excessive amounts of fat (Handayani et al., 2019).

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The Health Belief Model is one of the most often used models in health-related research to characterize and forecast behavioral health (Lo et al., 2015). Three primary aspects comprise HBM: chance of action, changing behavior, and individual perception. HBM focuses on an individual's incentive to undertake health behaviors (Romano & Scott, 2014). According to student research findings, there is a connection between student weight and certain HBM components. In addition, excess badan-related BMI can be predicted by HBM (McArthur et al., 2018). HBM constructions can also forecast a person's ability to control their weight. Individuals who have varying nutritional statuses perceive obesity and weight loss in different ways (Saghafi-Asl et al., 2020). HBM variables can predict behavior related to nutrition and physical activity, which is also a risk factor for the start of cardiovascular disease, according to other research conducted on students (Rahmati-Najarkolaei et al., 2015).

Adolescent obesity and high-fat consumption are becoming more common, which highlights the need for research on attitudes about changing behavior to embrace a healthy lifestyle through dietary intake—particularly fat intake. As far as we know, no studies have been conducted on the general construction of HBM in connection to fat consumption in teenagers who are overweight. As such, the present investigation aims to ascertain the correlation between adolescent fat intake and all components of HBM. It is expected that the results of this study, which emphasize adolescents' health confidence, would serve as a reference for programs aimed at addressing obesity.

Method

This study was cross-sectional in design. Adolescents aged 15 to 18 who were overweight and from Malang City made up the study's sample. Purposive sampling was used in the sample process, and 110 participants were chosen from four secondary schools. Participants could be any age between 15 and 18, Body Mass Index for age beyond 1 SD, written agreement from the participant's guardian. Participants cannot include adolescents who smoke cigarettes, adhere to strict diets, or have illnesses that impair their eating habits. After receiving all the information, each participant gave their consent before the study started. In 2023, data was gathered between July and August.

The Body Mass Index according to age (BMI for age) is computed and placed into the WHO Anthroplus program to generate a z-score value after obtaining the subject's height and weight. The z-score values are categorized by the Republic of Indonesia's Minister of Health's Regulation No. 2 of 2020 about Children's Anthropometry Standards (Peraturan Menteri Kesehatan RI No 2 Tahun 2020 Tentang Standar Antropometri Anak, 2020).

Assessment of fat consumption using two repeats of a 24-hour meal recall questionnaire on non-consecutive days. Using food photos to elicit information on food consumption over the previous 24 hours, an interview was conducted. The 2007 Nutrisurvey program used the interview data to determine the average daily intake of fat.

The 59 items on the questionnaires that were obtained from McArthur et al. (2018) and Saghafi-Asl et al. (2020) for HBM measurement comprise six HBM constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Perceived susceptibility is the degree to which an individual believes they are susceptible to a particular condition. Perceived severity is the degree to which a condition is thought to be serious enough to affect a person's life. A person's perception of the benefits of changing their behavior is referred to as their perceived benefit. A person's belief in a barrier to changing their behavior is known as the perceived barrier. A state that promotes someone's preparedness to make a change is known as a cue to action. A person's confidence in their ability to successfully carry out an activity is known as self-efficacy. Linkert scales range from 1 (extremely inappropriate) to 5 for the questions. (very appropriate). Prior to the study's use of questionnaires, 30 respondents had their validity and reliability evaluated. According to the reliability test results, every perception has a Cronbach's Alpha score between 0.706 and 0.901. Given that the questionnaire's Conbarch Alpha value is higher than 0.7, these results imply that the questionnaire is reliable.

The study data was analyzed using SPSS 27. The subject characteristics and univariate analysis are shown in the table. The Spearman and Pearson tests are used to determine the relationship between independent factors and bivariate dependent variables. This study has been approved as ethical by the Faculty of Medicine at Sebelas Maret University (number 134/UN27.06.11/KEP/EC/2023). The sequence of research steps is presented as figure 1.

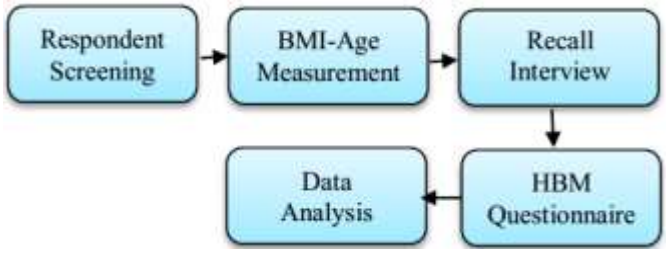

Figure 1. Research flow

Result and Discussion

The study individuals' characteristics are displayed in Table 1. The subjects consisted of 70 girl respondents (63.6%) and 40 boy respondents (36.4%). The nutritional status of 42 subjects had overweight nutritional status (38.2%) and 68 00 had obese nutritional status (61.8%). Most respondents had a family history of overweight at 78.2%. Research-based on individuals with obesity and family trees has successfully detected mutations in human genes that cause overweight (Albuquerque et al., 2016). Individuals who have a family history of obesity were significantly more likely to be obese than those who did not. They were found to have a much stronger correlation with elevated adipose tissue levels as determined by a number of physiological and physical parameters as well as clinical manifestation. The obesogenic environment, of which the family is the closest environment, is one of the variables influencing the prevalence of overweight. Overweight is more likely in households where obesity-promoting behaviors—such as poor eating, sleeping, and exercise habits—are practiced (Jebeile et al., 2022). Parenting in terms of improper feeding can be a cause of overweight in children (Kansra et al., 2021). Changes in the nutritional status of family members becoming obese are associated with changes in nutritional status in children becoming obese. This is because families usually have the same diet, family eating habits, the same socioeconomic and the same genes (Brambila-Paz et al., 2022).

Table 1. Subject Characteristics

Characteristics	Frequency	
	N	%
Sex		
Boys	40	36.4
Girls	70	63.6
Age		
15 years old	23	20.9
16 years old	42	38.2
17 years old	35	31.8
18 years old	10	9.1
Nutritional Status		
Overweight	42	38.2
Obesity	68	61.8
History of overweight in the family		
Yes	86	78.2
No	24	21.8

Table 2 illustrates the results of descriptive analysis of independent variables and dependent variables. The average perceived benefits score was the highest compared to other independent variables, at 3.95 out of 5. Individuals will perform a health behavior when they feel the benefits of an action (Skinner et al., 2015). The average score for the cues to action variable was 3.58 out of 5. Cues to action has a positive relationship with diet quality that affects nutritional intake (Keshani et al., 2018). The perceived barriers variable had the smallest average score of 2.77 out of 5. Anything that could negatively affect a health metric will make it difficult to engage in acceptable activity (Irwan, 2017). Furthermore, the average perceived severity is likewise modest, indicating that teenagers are not overly concerned about how their present eating habits may affect their health in the future. Teenagers may be to blame for this if they don't know enough about healthy eating habits (Al-Mutairi et al., 2015).

Table 2. Descriptive Analysis of Variables

Variable	N	Mean ± SD	Min	Max
Perceived susceptibility	110	2.95 ± 0.71	1.00	5.00
Perceived severity	110	2.78 ± 0.69	1.00	4.40
Perceived barriers	110	2.77 ± 0.70	1.00	4.70
Perceived benefits	110	3.95 ± 0.74	1.17	5.00
Cues to action	110	3.58 ± 0.69	1.00	5.00
Self-Efficacy	110	3.36 ± 0.58	1.33	4.58
Fat intake (g)				
Boys	40	73.81 ± 26.18	20.08	124.67
Girl	70	65.16 ± 20.78	27.97	112.30

The average intake of fats in both boy and girl participants was still below the daily value, 73.81 grams (SD=26.18) and 65.16 grams (SD=20.78). Low intake is caused because teenagers often skip breakfast in the morning before activities. Skipping breakfast increases appetite throughout the day, skipping it is linked to an increased risk of being overweight or obese (Kok et al., 2023). As many as 68.3% of adolescents do not always regularly consume breakfast in the morning because they didn't have time (Niswah et al., 2014). Adolescents tend to consume ready-to-eat foods at breakfast because it is considered easier and faster to consume (Permana et al., 2020). Breakfast foods consumed also do not meet the requirements of healthy foods where energy and carbohydrates are sufficient and low in fat. Breakfast foods do not meet a balanced menu and are more often dominated by carbohydrate sources (Sari et al., 2016).

Table 3. HBM Construct Bivariate Test with Overweight Adolescent Fat Intake

Variable	R	p-value
Perceived susceptibility[a]	-0.145	0.066
Perceived severity[b]	0.019	0.423
Perceived barriers[b]	-0.013	0.446
Perceived benefits[b]	-0.143	0.068
Cues to action[a]	-0.273	0.002*
Self-Efficacy[a]	-0.225	0.009*

[a]Pearson Correlation, [b]Spearman Correlation, *significance

The Pearson and Spearman correlation tests determined the relationship between the independent

variables and fat intake (Table 3). The results showed a negative relationship between cues to action (r= -0.273. p=0.002) and self-efficacy (r=-0.225. p=0.009) on fat intake in subjects. The higher the cues to action, the lower the fat intake. The association of cues to action and self-efficacy with fat intake was included in the low relationship. These findings are consistent with the research. Saghafi-Asl et al. (2020) states that cues to action have a significant effect on greater weight management desirability. Cues to act have a positive relationship with diet quality that affects nutritional intake. The lure of being able to get a better degree of health, fear of the impact of obesity and knowing the pain in the closest person can bring up a person's desire to make weight changes (Martinez et al., 2016). A person will consume better quality foods that match nutritional needs when they feel the need to perform the behavior (Keshani et al., 2018).

In addition to external cues, internal cues can affect the likelihood of eating. Stress and negative affect are two examples of internal cues that have been demonstrated to cause eating episodes in obese people. These episodes may be prompted by the desire to manage bad affect through the consumption of high-fat foods and the resulting reward experience (Elliston et al., 2017). Social cues and the availability of food are examples of external cues to eat. Through interactions and observation during meal times, social cues influence dietary behaviors. A standard of eating is established and boundaries for acceptable food and drink consumption are established by watching others eat. Additionally, altering one's eating habits as a result of seeing others consume could point to a social modeling mechanism. On the other hand, social isolation and loneliness have also been linked to more eating, and this relationship may be mediated by bad affect (Elliston et al., 2017; Schüz et al., 2015).

Self-efficacy is a crucial element of successful health communication and disease prevention interventions. It is acquired through knowledge, comprehension, and skill development. Self-efficacious people are more likely to take on challenges with ease, have a greater sense of commitment, and deal better with unforeseen events or disappointment. They also tend to be optimistic about engaging in behaviors rather than dwelling on negative thoughts about their incapacity to achieve a goal (Muturi et al., 2016). Self-efficacy is influenced by the surrounding environment. In adolescents, self-efficacy is influenced by peers. Adolescents with peers who tend to consume unhealthy foods tend to have low self-efficacy for a healthy diet (Fitzgerald et al., 2013). Although there are some teenagers who make parents as role models in choosing food, there are also teenagers who want to be free to determine for themselves. Peer influence increases as parental involvement decreases in their children's activities (Wrobleski et al., 2018).

The consumption of fat decreases with increasing self-efficacy. This is consistent with studies (Fitzgerald et al., 2013) it claims that eating a balanced diet is linked to increased levels of self-efficacy. Poor food intake is linked to lower self-efficacy of healthy eating patterns and higher peer endorsement of unhealthy eating patterns. The study's findings run counter tothe research Keshani et al. (2018) that indicates that whereas self-efficacy is highly correlated with food quality in teenagers, it is not significantly correlated with fat intake in adolescents. Teens with high BMIs, particularly those who practice mindfulness frequently, have high levels of self-efficacy, which contributes to their high levels of self-efficacy in managing their weight. They also demonstrated that teenagers with high self-efficacy in their ability to control their weight are better able to handle stress and negative emotions, and they eat less emotionally to deal with those issues (Bektas & Gürkan, 2023).

Consumption of fat was not substantially correlated with perceived benefits, perceived severity, perceived barriers, and perceived susceptibility. The social and physical environments are always influencing how people regulate their eating habits and self-control. It's possible that some individual cues, while acting in an adverse social and/or physical context, do not alter a person's eating behavior, and vice versa (Deliens et al., 2014). A person realizes the importance of doing healthy behaviors but does not always apply them to his life. In adolescents, eating consumption is influenced by the environment of friends, eating habits in the family, and the availability of food (Sogari et al., 2018). In addition, the stigma on obesity can also affect the decrease in a person's motivation to do healthier behaviors that can worsen the situation (Vartanian & Porter, 2016).

Conclusion

Variables significantly related to fat intake are cues to action and self-efficacy. The higher the cues to action, the lower the adolescent fat intake. Likewise, the higher the self-efficacy, the less fat intake in adolescents. HBM-based education is needed to increase adolescents' perceptions and beliefs regarding health problems, especially overweight, to support handling overweight issues in adolescents. Further research is required to determine the relationship between adolescents' beliefs about overweight, nutritional intake, consumption patterns, and food diversity. In addition, research is also required on providing education by emphasizing

adolescent confidence through adopting HBM to deal with poor dietary consumption in adolescents.

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Conceptualization, D.E.R., E.P.P., S.M., methodology, D.E.R.; validation, D.E.R.; formal analysis, D.E.R., E.P.P., S.M.; investigation, D.E.R., E.P.P., S.M.; resources, D.E.R., E.P.P., S.M.; data curation, D.E.R.: writing—original draft preparation, D.E.R., E.P.P., S.M..; writing—review and editing, D.E.R.: visualization, and D.E.R., E.P.P., S.M. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest
The authors declare no conflict of interest.

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