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FAST FOOD CONSUMPTION'S CORRELATION WITH TEEN OBESITY IN LAMPUNG'S NEGERI KATON VILLAGE, INDONESIA

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Abstract || The prevalence of fast-food consumption among teenagers in Negeri Katon Village has burgeoned, propelled by its ubiquitous availability and convenience, thereby precipitating a transition from traditional, healthful dietary patterns to the consumption of fast food, characterized by its elevated fat, sugar, and calorie content. The objective of this study is to assess the nexus between fast food consumption patterns and instances of adolescent obesity in Negeri Katon Village utilizing contingency table analysis. Data were sourced from a cohort of adolescents residing in Negeri Katon Village and scrutinized to ascertain the presence of a correlation between fast food consumption and the prevalence of obesity. Subsequent to the analysis, a p-value of 0.0003976 was attained, signifying statistical significance at an alpha level of 0.05. Hence, it can be inferred that a correlation exists between fast food consumption and adolescent obesity incidence in Negeri Katon Village.

Keywords || Consumption; Fast food; Obesity; Contingency Table Analysis

Abstrak || Pengaruh makanan cepat saji semakin terasa dalam pola makan remaja di Desa Negeri Katon, dengan ketersediaan dan kemudahan akses yang menyebabkan beralihnya dari pola makan tradisional yang sehat menjadi konsumsi makanan cepat saji yang cenderung tinggi lemak, gula, dan kalori. Tujuan dari penelitian ini adalah mengevaluasi hubungan antara pola konsumsi fast food dan kasus obesitas pada remaja di desa negeri katon menggunakan analisis tabel kontingensi. Data diperoleh dari sampel remaja di desa negeri katon dan dianalisis untuk mengetahui apakah ada korelasi antara konsumsi fast food insiden obesitas. Setelah dilakukan analisis maka didapatkan nilai p-value sebesar 0,0003976 dimana nilai p-value tersebut lebih kecil daripada $\alpha = 0,05$ maka dapat disimpulkan bahwa ada korelasi antara konsumsi fast food dan insiden obesitas pada remaja di desa negeri katon.

Katakunci || Konsumsi; Makanan Cepat Saji; Obesitas; Analisis Tabel Kontingensi

Introduction

Obesity has emerged as a significant concern affecting contemporary teenagers, primarily due to its pronounced impact on their physical well-being and the profound psychological ramifications it entails. Adolescents, amidst their transition to adulthood, frequently contend with societal pressures to conform to prevailing beauty norms, typically revolving around a slender, symmetrical physique. Within an epoch dominated by social media and pervasive advertising, these pressures are further intensified by incessant exposure to idealized body representations propagated across diverse platforms.

Moreover, the food, beverage, and pharmaceutical industries exploit weight-related anxieties by marketing an array of slimming products and instant remedies purported to facilitate the attainment of desired body aesthetics. Consequently, adolescents frequently internalize the notion that their happiness and achievements hinge upon their conformity to media-promoted ideals. Consequently, they may allocate substantial financial resources, time, and effort towards experimenting with various restrictive diets, medications, and cosmetic procedures, in a fervent pursuit of these standards.

The issue transcends mere physical implications, as the psychological repercussions of such pressures are profound. Adolescents who perceive themselves as falling short of societal expectations often endure diminished self-assurance, heightened anxiety, and even depression. This engenders a detrimental cycle wherein the pursuit of bodily “perfection” indirectly undermines their mental well-being. Hence, it is imperative for both society and governmental entities to heighten awareness of this dilemma and furnish adequate support to adolescents, fostering acceptance and appreciation of bodily diversity while advocating for a more inclusive and realistic paradigm of beauty (Hafid & Hanapi, 2019).

Obesity emerges as a primary risk factor dominating the roster of global mortality causes. According to the 2019 Global Burden Disease study, in excess of 5 million individuals, constituting approximately 8% of the global populace, prematurely succumbed to complications stemming from overweight conditions (Institute for Health Metrics and Evaluation, 2019). However, these statistics represent but a fraction of a broader issue. The World Health Organization (WHO) report underscores a dramatic surge in obesity prevalence among children and

adolescents aged 5-19 years, skyrocketing fourfold to 18% in 2016 from a mere 4% in 1975.

Beyond posing a threat to individual well-being, obesity imposes a substantial burden on the global healthcare system. Numerous nations, particularly those in low- and middle-income strata, grapple with myriad nutritional hurdles. Not only do they contend with persistent malnutrition challenges, but they also confront the alarming trajectory of obesity's proliferation.

The socio-economic milieu frequently exacerbates this circumstance. Constrained access to economically viable nutritious sustenance, the proliferation of detrimental fast-food options, and a dearth of cognizance regarding the significance of a healthful lifestyle have all compounded the escalation of nutritional challenges in developing nations. Consequently, individuals in these regions find themselves ensnared in a persistent cycle of nutritional imbalance that proves arduous to rectify. Addressing this issue effectively necessitates a comprehensive approach encompassing interventions at personal, communal, and policy levels, underscored by a concerted emphasis on nutritional education, fostering access to nutritious fare, and advocating for active and health-conscious lifestyles (Qurrotul 'Aini et al., 2023).

The burgeoning prevalence of adolescent overweightness is inseparable from contemporary lifestyle shifts witnessed in recent decades. This trend correlates closely with the ascendancy of modern lifestyles characterized by a predilection for fast-food consumption, notably prevalent among adolescents. Against a backdrop of technological advancements and accelerated urbanization, teenagers frequently find themselves ensconced in environments where fast-food options prevail over healthier, more nourishing alternatives.

Fast food proffers convenience, affordability, and palatability, thereby exerting an indirect influence on teenagers' dietary predilections. This dietary pattern, typified by its high fat, sugar, and salt content, coupled with an inadequate intake of wholesome fare such as fruits, vegetables, and quality proteins, substantially fuels the burgeoning epidemic of adolescent obesity.

Furthermore, modern lifestyles have engendered a surge in sedentary behavior, exacerbating the issue. Adolescents are predisposed to spending prolonged periods engrossed in electronic devices rather than engaging in physically demanding activities. This amalgamation of unhealthy dietary habits and diminished physical exertion fosters an environment conducive to pronounced weight gain among adolescents.

Addressing this dilemma necessitates concerted and multifaceted endeavors, encompassing educational initiatives elucidating the significance of wholesome nutrition and active living, regulatory measures targeting the fast-food industry, and the cultivation of environments conducive to healthy lifestyles. Additionally, augmenting awareness regarding the adverse ramifications of unhealthy dietary habits and lifestyles is imperative at both individual and communal echelons, fostering a climate conducive to positive behavioral modifications (Espinosa-Salas & Gonzalez-Arias, 2023).

Obesity denotes the accrual of adipose tissue within adipocytes, stemming from an excess of caloric intake vis-à-vis the body's requisites for growth, development, and physical exertion (Telisa et al., 2020). Adipose tissue serves as an energy reservoir and a vital source of fatty acids crucial for facilitating the absorption of fat-soluble vitamins, notably vitamins A, D, E, and K. Nevertheless, vigilance is warranted concerning several forms of adipose tissue, including saturated fatty acids, trans fatty acids, and cholesterol (Hanani et al., 2021). According to the World Health Organization (WHO), obesity ensues from a protracted imbalance between energy intake and expenditure, precipitating an undue accumulation of adipose tissue (Wahyuningsih & Pratiwi, 2019).

Fast food, colloquially referred to as “fast food,” constitutes an integral component of American gastronomic tradition. Characterized by its high caloric, lipid, protein, sugar, and sodium content juxtaposed with a dearth of dietary fiber, fast food consumption can precipitate a plethora of nutritional quandaries. Numerous studies have underscored a correlation between frequent fast-food intake and escalated consumption of calories, lipids, sugars, sodium, and proteins among adolescents. Noteworthy research conducted in Bangladesh unveiled a substantial association between fast food consumption and heightened obesity prevalence among teenagers, while analogous investigations in Iran illuminated the potential ramifications of fast food consumption among adolescents, including an elevated susceptibility to metabolic syndrome, obesity, and hypertriglyceridemia, thus augmenting the risk of degenerative ailments such as coronary artery disease and cerebrovascular accidents (Zogara et al., 2022).

The ingestion of fast food, laden with copious calories, lipids, and sodium whilst deficient in fiber, has been implicated in elevating the Body Mass Index (BMI). According to the Agency for Health Research and Development, recurring consumption of such fare, defined as “frequent,” is typified by daily or more-than-daily indulgence,

encompassing a predilection for lipid-laden victuals (Cahyorini et al., 2022). The amplification in fast food consumption among teenagers correlates positively with adipose tissue accrual, thereby heightening the risk of adolescent obesity (Dewita, 2021).

The primary objective of this investigation was to explore the correlation between fast food consumption and the prevalence of obesity among adolescents residing in Negeri Katon Village. In light of the multifaceted nature of the obesity phenomenon and the societal pressures associated with body image, this study endeavors to ascertain whether dietary habits, particularly the consumption of fast food, exert a substantial influence on the likelihood of obesity among adolescents. Furthermore, this research aims to elucidate the intricate interplay of environmental, social, and economic factors that shape adolescent dietary preferences, while also fostering a heightened consciousness regarding the imperative of adopting a healthful lifestyle within the broader societal milieu.

Methodology

Contingency tables, also known as cross tables or crossed distribution tables, represent a statistical instrument of considerable utility for organizing and visually portraying the association between two or more categorical variables within research or data analysis endeavors (Sobel, 1995). These tables are structured to systematically present data pertaining to categorical variables in a coherent and methodical manner (Oliveira et al., 2018). The fundamental framework of a contingency table comprises columns and rows, wherein each column corresponds to a category of one variable and each row corresponds to a category of another variable (Fagerland et al., 2017). Consequently, each cell within the table signifies the frequency or occurrence count of a specific category combination among these variables.

In addition to merely enumerating frequencies, contingency tables facilitate the computation of percentages, proportions, or other pertinent statistics contingent upon the analytical objectives (Teuscher, 2022). By leveraging this tabular format, researchers or analysts can readily discern patterns or associations among observed categorical variables, such as the interrelationship between gender and dietary preferences, educational attainment and occupational status, or other variables germane to the research or analytical domain. Hence, contingency tables serve as a pivotal instrument in statistical data analysis, enabling the exploration and elucidation of relationships

between categorical variables within a given sample or population (Satria et al., 2023).

The data utilized in this study comprises primary data acquired through a sequence of surveys conducted with the objective of garnering pertinent information from research participants. This survey was meticulously devised to ensure that the data procured could furnish a precise portrayal of the correlation between fast food consumption and obesity prevalence within the studied populace. The survey methodology adopted entailed the dissemination of questionnaires to respondents, a process executed through either online platforms or conventional offline methods, such as direct interviews or the manual completion of questionnaires.

Respondents were solicited to furnish their responses to a meticulously crafted set of inquiries explicitly tailored to delve into their fast-food consumption behaviors, alongside eliciting information pertaining to their obesity status. The questionnaire items were thoughtfully formulated to encompass diverse facets relevant to dietary habits, frequency of fast-food intake, and physical attributes of the respondents.

Fast Food Consumption	Obesity	
	Yes	No
Often	25	15
Not Often	15	45

The survey results were then processed and arranged in the form of a contingency table as seen above, where the data was organized based on two main categorical variables: fast food consumption (with the categories “often” and “no”) and obesity tendencies (with the categories “yes” and “No”). The numbers listed in the table represent the frequency or number of respondents distributed among the cells corresponding to the categorical combination of the two variables.

Analysis and Discussion

Adolescents afflicted with obesity confront an escalated propensity for adulthood obesity, constituting a significant predisposing factor for an array of grave metabolic and non-communicable ailments. Obesity, within the health domain, denotes a state characterized by an undue accrual of body fat, surpassing the recognized normative thresholds relative to an individual's stature and body mass. Beyond its superficial implications, obesity assumes the guise of a multifaceted medical

condition, often serving as the harbinger for a diverse spectrum of potentially life-threatening health sequelae.

This surplus adiposity, harbored within bodily locales such as subcutaneous adipose depots (beneath the skin), visceral compartments surrounding internal organs, and occasionally intruding into organ parenchyma itself, assumes a pivotal role in the genesis of grave maladies and health maladies. Augmented visceral adiposity, ensconced around critical internal organs such as the liver, pancreas, and kidneys, for instance, has been inextricably correlated with heightened susceptibility to type 2 diabetes, coronary artery disease, and non-alcoholic fatty liver disease.

Moreover, obesity coalesces with an array of ancillary health maladies, encompassing hypertension, dyslipidemia, obstructive sleep apnea, osteoarthritis, select malignancies, alongside psychiatric morbidities such as depression and anxiety. The pathological accumulation of adipose tissue within the organism engenders intricate hormonal dysregulation, disrupts energy equilibrium, and impairs the functioning of sundry physiological systems (Suha & Rosyada, 2022).

Henceforth, it is incumbent upon us to apprehend that obesity transcends the realm of aesthetic concerns or dietary indiscretions, representing a formidable peril to health warranting earnest and immediate attention. Apt preventive strategies and interventions during adolescence hold promise in mitigating the risk of adulthood obesity and alleviating the disease burden attendant upon this affliction.

```
>data<-matrix(c(25,15,15,45), nrow=2, byrow=TRUE)
>dimnames(data)<-list(c("sering", "tidak sering"), c("iya", "tidak"))
>names(dimnames(data))<-c("consuming fast", "obesity")
>tot<-sum(data)
>data
      consuming fast food      obesity
      often      25      15
      not often  15      45
>data/tot
      consuming fast food      obesity
      often      0.25      0.15
      not often  0.15      0.45
>rowtot<-apply(data, 1, sum)
>rowtot
      often      not often
      40          60
>coltot<-apply(data, 2, sum)
>coltot
      yes      no
      40      60
```

Figure 1. Statistical analysis of fast-food consumption and obesity incidence

The “dimnames (data)” command serves to structure and allocate row and column designations within a contingency table. In this instance, the rows are denominated as “often” and “not often,” while the columns are designated as “yes” and “no.” Subsequent to the delineation of row and column labels, the “apply” function is employed to compute the aggregate data for each row and column. In the script “rowtot<-apply(data,1,sum),” the “apply” function is utilized to ascertain the total dataset magnitude within each row. The findings reveal 40 occurrences within the “frequent” category and 60 occurrences within the “not frequent” category.

Moreover, the outcomes derived from computing total rows and columns can be leveraged for further analysis, such as the computation of proportions or percentages for each cell within the contingency table. This analytical approach facilitates a more comprehensive comprehension of data dispersion and the interrelations among variables discerned within research or statistical analyses.

```
>rowpot<-sweep(data, 1, rowtot, "/"
>rowtot
      often      not often
      40         60
>colpot<-sweep(data, 1, coltot, "/"
>colpot
      consuming fast food      obesity
      often      yes      no
      not often      0. 625  0. 375
      0. 250  0. 750
>round(coplot, 2)
      consuming fast food      obesity
      often      yes      no
      not often      0. 62  0. 38
      0. 25  0. 75
```

Figure 2. Analysis of proportions in fast food consumption and obesity incidence

Upon completion of the total row and total column computations, the subsequent analytical phase entails the calculation of proportions for each datum within the contingency table. To execute this task, the “sweep” function within the programming language is employed. The syntax “rowpot<-sweep(data,1,rowtot,”/”)” is designed to compute the proportion of each datum within the table relative to the total within each row. In essence, the proportion of each cell within the table is determined by dividing the value of each cell by the total of the corresponding row. Consequently, for the row corresponding to frequent fast-food consumption, each datum value is divided by the

total frequency of fast-food consumption (i.e., 40). Analogously, for the row corresponding to infrequent fast-food consumption, each datum value is divided by the total infrequent fast-food consumption (i.e., 60).

The outcomes of this proportion computation endeavor furnish a more nuanced depiction of data distribution in relation to the total number of respondents within each category of fast-food consumption. This elucidates whether a significant disparity exists in the propensity towards obesity between cohorts who frequently consume fast food and those who do so infrequently. Such proportionate analysis facilitates a more comprehensive elucidation of the influence of fast-food consumption patterns on obesity proclivities among the surveyed populace.

```
>chisq.test(data)
      pearson's chi-squared test with yates' continuity correction

data: data
x-squared=12.543, df=1, p-value=0.0003976
```

Figure 3. Chi-squared test

To ascertain the presence of a correlation between fast food consumption and the prevalence of obesity among teenagers in Negeri Katon Village, a hypothesis test was conducted utilizing the “chisq.test(data)” command at a significance level of 5%. Based on the resulting output, the obtained p-value is 0.0003976. The proposed hypotheses are delineated as follows:

- a) Null Hypothesis (H0): There exists no association between food intake and the incidence of obesity in adolescents.
- b) Alternative Hypothesis (H1): There is a discernible relationship between fast food consumption and the incidence of obesity in adolescents.

In this analytical procedure, the significance level, denoted as alpha (α), is set at 5%, a commonly employed standard within scientific research to gauge confidence in the outcomes of statistical analyses. This stipulated alpha value facilitates the quantification of the requisite strength of evidence prior to drawing conclusions regarding the proposed hypotheses. In this context, the predetermined alpha is 0.05, signifying that if the p-value derived from statistical analysis is less than this alpha threshold, the null hypothesis will be refuted.

The critical region is demarcated as the region wherein the null hypothesis will be dismissed. Accordingly, if the p -value yielded by the statistical analysis falls below α , representing the lower boundary of the critical region, the null hypothesis will be rejected, consequently endorsing the alternative hypothesis.

Given the obtained p -value of 0.0003976 from the analysis, which is notably smaller than the predetermined α value of 0.05, it follows that the null hypothesis, positing no association between fast food consumption and adolescent obesity incidence in Negeri Katon Village, must be rejected. These findings denote a noteworthy correlation between these two variables within the surveyed populace. Consequently, the deduced conclusion asserts a significant relationship between fast food consumption and adolescent obesity incidence in Negeri Katon Village. This underscores the imperative of fostering awareness regarding the deleterious ramifications of unhealthy dietary habits and advocating for the promotion of wholesome lifestyles among adolescents, with the aim of averting obesity issues and enhancing their overall well-being.

Conclusion

Given the obtained p -value of 0.0003976 from the analysis, which is notably smaller than the predetermined α value of 0.05, it follows that the null hypothesis, positing no association between fast food consumption and adolescent obesity incidence in Negeri Katon Village, must be rejected. These findings denote a noteworthy correlation between these two variables within the surveyed populace. Consequently, the deduced conclusion asserts a significant relationship between fast food consumption and adolescent obesity incidence in Negeri Katon Village. This underscores the imperative of fostering awareness regarding the deleterious ramifications of unhealthy dietary habits and advocating for the promotion of wholesome lifestyles among adolescents, with the aim of averting obesity issues and enhancing their overall well-being.

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