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# Hubungan Gambaran Kecukupan Gizi dengan Status Gizi Siswa di SMA Negeri 10 Surabaya Selama Pandemi

## *Relationship Of Nutritional Adequacy Figures To Nutritional Status Of Students Of Sma Negeri 10 Surabaya During The Pandemic*

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### ABSTRAK

**Latar Belakang**: Angka kecukupan gizi adalah jumlah nutrisi yang diperoleh tubuh untuk mempertahankan status gizi seseorang secara memadai. Selama pandemi, pemenuhan kebutuhan gizi menjadi lebih sulit, karena sulitnya akses untuk keluar rumah dengan bebas. Selain itu, remaja selama pandemi ini lebih memilih untuk memenuhi kebutuhan mereka secara daring, termasuk dalam memenuhi kebutuhan makanan dan minuman yang dikonsumsi setiap hari.

**Tujuan**: Penelitian ini bertujuan untuk menganalisis hubungan antara angka kecukupan gizi dan status gizi siswa SMA selama pandemi.

**Metode**: Penelitian ini merupakan studi observasional analitis yang dilakukan di SMA Negeri 10 Surabaya, dengan total 202 siswa berusia antara 15 hingga 17 tahun. Pengukuran yang dilakukan terhadap responden antara lain pengukuran status gizi responden, antropometri, aktivitas fisik, asupan gizi, serta angka kecukupan gizi yang diperoleh melalui formula Harris Benedict yang disesuaikan dengan aktivitas fisik dan jenis kelamin masing-masing responden. Analisis statistik yang dilakukan untuk menguji hipotesis penelitian ini menggunakan tes *chi-square*.

**Hasil**: Hasil analisis statistik penelitian ini menunjukkan bahwa dari sejumlah 144 responden non-obesitas, terdapat 51 siswa memiliki status gizi defisit ringan, 43 siswa mengalami defisit sedang, 26 adalah defisit yang parah, dan 24 siswa tidak mengalami defisit kecukupan gizi. Sementara itu, di antara responden yang mengalami obesitas, 33 siswa tidak mengalami defisit, 15 siswa mengalami defisit ringan, 9 siswa dengan defisit sedang, dan hanya terdapat 1 siswa yang mengalami defisit yang parah. Berdasarkan ada hubungan yang signifikan antara status gizi dan angka kecukupan gizi siswa dengan p-value=<0.001.

**Kesimpulan**: Ada hubungan yang signifikan antara kecukupan gizi dan status gizi responden selama pandemi.

**Kata Kunci:** angka kecukupan gizi, status gizi, pandemi, defisit

### ABSTRACT

*Background: Nutritional adequacy figures are the amount of nutrients obtained by the body to maintain a person's nutritional status adequately. During the pandemic, the fulfillment of nutritional needs becomes more difficult. Due to the movement restrictions imposed. Consequently, teenagers also prefer to meet their needs online, such as oerdering foods and beverages daily.*

*Objective: This study analyzed the relationship between nutritional adequacy figures and the nutritional status of high school students during the pandemic.*

*Method: This was an analytical observational study conducted at SMA Negeri 10 Surabaya, with a total of 202 students aged between 15 and 17 years. Measurements of respondents' nutritional status, anthropometry, physical activity, nutritional intake, and nutritional adequacy figures obtained through the Harris Benedict formula adjusted to the physical activity and gender of each respondent. The hypothesis was analized statistically using the chi-square test.*

*Results: The results of the nutritioal status revealed that 51 students had mild deficits, 43 students had moderate deficits, 26 had severe deficits, and 24 students did not experience any deficit in nutritional adequacy. Among obese students, 33 students had no deficit, 15 students had mild deficits, 9 students had moderate deficits, and one student had a severe deficit. Based There was a significant relationship between the nutritional status and nutritional adequacy figures of students with p-value=<0.001.*

*Conclusion: There is a significant relationship between nutritional adequacy and the nutritional status of respondents during the pandemic.*

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## INTRODUCTION

According to the World Health Organization (WHO), adolescence is a period of transition from childhood to adulthood (WHO, 2019). Adolescence is between those two periods. During the transition, adolescents are then divided into three age categories, namely 10 to 14 years old, 14 to 17 years old, and 17 to 21 years old which is the end of adolescence (WHO, 2019). At each category, there are different activities and needs carried out by adolescents, one of the different needs is nutritional needs.

Adolescent nutrition is divided into different categories according to existing nutritional status. The nutritional status is underweight, normal or ideal weight, and excess weight (Kementrian Kesehatan, 2013a). Overweight and obesity experienced by children continued to increase until in 2014 there were 41 million children who were overweight (WHO, 2016). Cases of overweight and obesity in Indonesia are among the highest rates in Southeast Asia, with a percentage of 11.5% (Asia Development bank, 2016). Data stored by the East Java Provincial Health Office, there was an increase in cases of obesity in children and adolescents as much as more than one hundred and twenty million cases within a year, namely from 2015 to 2016 (Kementrian Kesehatan, 2019). Based on these data can be concluded that excess weight in children is a health problem that has a tendency to increase every year, so this case can be a serious problem for adolescents and adults because adolescence is a period of transition from childhood to adulthood.

Health problems related to weight loss are closely related to the nutritional intake consumed by the teenager. Dietary changes can be experienced by adolescents, either individually or influenced by the environment, such as the occurrence of pandemics that cause access to food purchases to be hampered and change people's daily consumption (Gan et al., 2019). Naturally, changes in intake occur naturally due to changes in adolescent activity, increased activity causes adolescents to need more and more diverse nutritional intake (Kanah, 2020). It is necessary to prepare to maintain the condition when in adulthood, but changes in consumption and supan can also cause problems if not controlled, one of the problems that can arise is excess weight. Nutritional adequacy figures is a form of control over the intake received by the body, so that there will be no excess or lack of asuan that can become health problems in the future (Tello, 2020). For adolescents, the nutritional adequacy figures required differ depending on gender and physical activity, but in general in one day young women must meet 210 calories, while for young men it takes about 2650 calories (Kementrian Kesehatan, 2019). Persistent deficiencies and excess nutritional adequacy rates can cause health problems for both adolescents at that age, as well as those who have reached adulthood.

The World Health Organization officially declared coronavirus (COVID-19) a pandemic on March 9, 2020 (WHO, 2020). That is, coronavirus has spread widely in the world. The term pandemic seems scary but in fact it has nothing to do with the ferocity of the disease but rather on its widespread spread (Maretha et al., 2020). Remember, in general coronavirus causes mild or moderate symptoms, such as fever and cough, and most can be cured within a few weeks.

## METHODS

The research that uses observational analytics as a type of research design was conducted in February 2021 at Senior High School (SMA) Negeri 10 Surabaya. This research has been approved by the Research Ethics Commission of the Faculty of Nursing, Universitas Airlangga on February 1, 2021 (Number: 2153-KEPK). The study involved 202 male and female high school students ranging in age from 15 years old to 17 years old. The study respondents were randomly selected by simple random sampling method with inclusion criteria, among others, students aged 15 to 17 years, status as students at SMA Negeri 10 Surabaya, and willing to be respondents in this study. As for the exclusion criteria, namely students who are in a sick condition and students who use wheelchairs or are in a difficulty standing so can not perform anthropometry measurements (Notoatmodjo, 2010).

Data obtained from this study, namely data on nutritional status, physical activity, and nutritional adequacy figures. Nutritional status data obtained from anthropometry measurements are then divided into two categories, namely obesity and non-obesity. For physical activity data assessed using GPAQ questionnaire with the division of categories into two categories, namely light physical activity and heavy physical activity. And for the data Nutrition adequacy figures, obtained from the calculation using the harris benedict formula that corresponds to the gender, nutritional status, and physical activity of respondents. The Data on Nutritional

Adequacy Figures is divided into four categories, namely heavy deficit, medium deficit, light deficit, and not deficit (Notoatmodjo, 2013).

This research was conducted at SMA Negeri 10 Surabaya with the consideration of many nutritional problems and affordability of these students in obtaining food and beverages online because of the many food outlets around. Data collection for this study will begin in February 2021, and the reporting of the results will be conducted from February to March 2021.

The data taken in this study is secondary data derived from various questionnaires given to respondents online. This is done because of the pandemic period that requires minimizing activities outside the home as well as face-to-face to avoid yourself and others from the transmission of the disease, in this case covid-19. This study used several instruments, namely questionnaires about respondents' personal data, questionnaires about respondents' diet and physical activity of respondents. The questionnaire was chosen because it can provide an overview of what researchers need to know about respondents, in which case it is personal data about their name, age, and daily activities, as well as foods that are often consumed. The analysis conducted for this study is univariate data analysis conducted in the form of a table. The second analysis used is a bivariate analysis used to look at the relationship between independent and dependent variables

**Tabel 1.** Respondent Overview

| Variables | Kategori | N | % |
|---|---|---|---|
| Age | 15 years old | 2 | 1 |
|  | 16 years old | 95 | 47 |
|  | 17 years old | 105 | 52 |
| Gender | Boy | 88 | 43,6 |
|  | Girl | 114 | 56,4 |

**Respondent Overview**

In accordance with Table 1, there were 202 students and students involved in this study. Respondents were divided into 2 15-year-olds, 95 16-year-olds, and 105 17-year-olds. The gender distribution of reponden is divided into 88 male students and 114 female students. This age is still classified as an age that does not attach importance to any intake that enters the body. As long as the food and drink they consume is able to energize the body, the teenagers no longer take dizziness with the type of intake. It is also overshadowed by the environmental conditions that are experiencing a pandemic, the prohibition to leave the house makes teenagers, even adults, difficult to meet the appropriate intake of body needs (Das, 2017). The intake obtained as a large amount comes from orders through the delivery of food delivery services, raw or cooked

**Tabel 2.** Research Variables

| Variables | Category | N | % |
|---|---|---|---|
| Nutritional status | Obesity | 58 | 28,7 |
|  | Non obesity | 144 | 71,3 |
| Physical activity | Low | 94 | 46,5 |
|  | High | 108 | 53,5 |
| Nutritional adequacy figures | Severe deficit | 27 | 13,4 |
|  | Moderate deficit | 52 | 25,7 |
|  | Mild deficit | 66 | 32,7 |
|  | Non deficit | 57 | 28,2 |

**Research Variables**

Based on Table 2, most of the nutritional status of respondents is non-obese, which is as many as 144 respondents or a total of 71.3 percent, while there are 58 respondents or as many as 28.7 percent who are obese. Physical activity conducted by respondents during the pandemic was almost divided equally, namely as many as 94 respondents (46.5 percent) performed light physical activity and 108 respondents (53.5 percent) performed strenuous physical activity. As for the results of nitritional adequacy figure calculation, respondents in this study had the most light deficits of 66 respondents or 32.7 percent, followed by respondents who did not have a deficit of 57 respondents or 28.2 percent, a moderate deficit of 52 respondents or 25.7 percent, and 27 respondents with a heavy deficit or as much as 13.4 percent. Nutritional status is a measure of the success of nutritional fulfillment that is facilitated by the balance between nutritional needs and inputs (Ministry of Health of the Republic of Indonesia, 2013). When the needs of the body and the input of nutrients into the body are appropriate, then the nutritional status can be said to be good or efficient, as well as optimal. This good nutritional status can then help the body in carrying out growth and development, as well as improve work and health skills in general. In general, according to the Ministry of Health tahn 2011, nutritional status can be grouped into five categories according to the results of z-score values obtained from BMI / U measurements

namely very thin, thin, normal, obese, and obese (Ministry of Health of the Republic of Indonesia, 2011). In this study, the category of nutritional status was compressed back into two categories, namely non-obesity and obesity.

| Physical activity category | Nutritional Status Category | | | | Total | | P-value |
|---|---|---|---|---|---|---|---|
| | Non obesity | | Obesity | | | | |
| | n | % | n | % | n | % | |
| Low | 65 | 69,1 | 29 | 30,9 | 94 | 100 | |
| High | 79 | 73,1 | 29 | 26,9 | 108 | 100 | 0,688 |
| Total | 144 | 71,3 | 58 | 28,7 | 202 | 100 | |

**Relationship of Nutritional Status with Physical Activity**

Respondents with non-obese nutritional status category were divided into two groups, namely respondents with light physical activity and heavy physical activity. In the group with light physical activity there were 65 respondents or 45.1 percent, while for respondents with heavy physical activity in the non-obese category, there were 79 respondents with a percentage of 54.9 percent. In the Chi-Square test, the P-value of 0.103 was obtained which is greater than the alpha ($\alpha$) of 0.05. From these results it can be concluded that H0 is accepted, meaning that there is no significant relationship between nutritional status and physical activity performed by respondents.

In the obesity nutrition status category group, respondents were also divided into the same group, respondents with light and strenuous physical activity. Respondents with mild and severe physical activity in the obesity group had the same number, namely 29 respondents. Therefore, the percentage of physical activity in the obese respondent group also has the same percentage, which is 50 percent. Based on the results of statistical tests, this study did not show any relationship between physical activity and the nutritional status of respondents. One reason is because the absence of activities means pandemic diving that can be done by teenagers in the house. The activities that can be done are mostly just light physical activities that do not require too much energy (Ministry of Health 2019). Minimal exercise habits from the beginning can also add factors in the absence of a relationship between physical activity and nutritional status.

Unlike sports that have standard activities and goals as weight loss or guard, physical activity can be in the form of daily activities that are done without the intention to lose weight. Physical activity is categorized into three levels, namely light, moderate, and strenuous physical activity. In this peelitian, physical activity is then compacted in two categories, namely light and high physical activity. Children and adolescents ranging in age from 5 to 17 years of age, should do at least 60 minutes of moderate to vigorous physical activity every day (WHO, 2019). One of the reasons why this should be done is to keep the nutritional status of adolescents to stay to the existing standards.

| Nutritional Adequacy Figures Category | Nutritional Status Category | | | | Total | | P-value |
|---|---|---|---|---|---|---|---|
| | Non Obesity | | Obesity | | | | |
| | n | % | n | % | n | % | |
| Severe deficit | 26 | 96,3 | 1 | 3,7 | 27 | 100 | |
| Moderate deficit | 43 | 82,7 | 9 | 17,3 | 52 | 100 | |
| Mild deficit | 51 | 77,3 | 15 | 22,7 | 66 | 100 | <0,001 |
| Non deficit | 24 | 42,1 | 33 | 57,9 | 57 | 100 | |
| Total | 144 | 71,3 | 58 | 28,7 | 202 | 100 | |

**Relationship of Nutritional Status with Nutritional Adequacy Figures**

Respondents in the non-obese and obese nutritional status group were divided into four groups, namely severe deficit, moderate deficit, mild deficit, and not deficit. In the non-obese group, respondents in the moderate deisit group were 26 respondents or 18.1 percent, moderate deficits of 43 respondents or 29.8 percent, light deficits of 51 respondents with a percentage of 35.4 percent, and respondents who did not have a deficit as many as 24 respondents or 16.7 percent. In the obesity category, there were 1 respondent who had a severe deficit (1.7 percent), 9 respondents with moderate deficits (15.5 percent), 15 respondents who had a mild deficit (25.9 percent), and respondents who did not have a deficit as many as 33 respondents (56.9 percent). In the Chi-Square test, the P-value result was less than 0.001 which is smaller when compared to alpha ($\alpha$) of 0.05. From these results it can be concluded that H0 is rejected, which means there is a significant relationship between the nutritional status and the nutritional adequacy figures that respondents have.

Nutritional adequacy figures are values that indicate the average need for certain nutrients that must be met daily for almost everyone with certain characteristics including age, gender, level of physical activity, and physiological conditions, to live a healthy life. The nutritional adequacy figures are divided into two categories, namely deficit and not deficit. In this study, there are branches in the deficit category into three advanced categories, namely heavy deficit, medium deficit, and light deficit.

Based on the results of statistical tests in this study, nutritional adequacy figures have a significant relationship with nutritional status. The mild deficit experienced by respondents could be a factor why most respoden are not obese. In addition, the total respondents who experienced a deficit counted more than respondents who did not have a deficit, so that the number of decreased nutritional status from obesity to non-obesity can increase.

| Variable | | Nutritional Status | | | |
|---|---|---|---|---|---|
| | | Non Obesity | % | Obesity | % |
| Physical Activity | Low | 65 | 45,14 | 29 | 50,00 |
| | High | 79 | 54,86 | 29 | 50,00 |
| Nutritional Adequacy Figures | Severe deficit | 26 | 18,06 | 1 | 1,72 |
| | Moderate deficit | 43 | 29,86 | 9 | 15,52 |
| | Mild deficit | 51 | 35,42 | 15 | 25,86 |
| | Non deficit | 24 | 16,67 | 33 | 56,90 |

There is 16 percent of the world's youth population. A total of 344 million adolescents live in South Asia and 296 million are in east Asia and the Pacific. And as much as 24 percent of the total juvenile population is in the African region (UNICEF, 2018). This number is a considerable number considering that teenagers fall into the category of productive age, so with the large number of adolescents will provide more productive human resources in various parts of the world (Das, 2017). However, this can also be a problem if the teenager is experiencing health problems, one of which is related to nutritional status and nutritional adequacy in adolescents (WHO, 2018).

Adolescents in the socioeconomic sphere are characterized by changes in social and economic needs to be more complex than when they were in childhood. The large number of adolescents in a region in addition to being more value because of the high productive age rate, can also be a problem, especially in terms of health, because youth is the foundation before reaching adulthood and seniority. There are a variety of diseases and other health problems that can be prevented starting from adolescence, through physical activity and food intake (WHO, 2016). However, if not prevented immediately, the problem that will arise in old age will be even greater. Adolescents who are susceptible to outside lifestyle influences can interfere with the intake of nutrients that will later become the basis in the self-defense system from disease attacks.

Nutritional status itself is the standard of fulfillment of nutrients derived from the balance between the needs and the amount of nutrients that enter the body. Nutritional needs that are met in a balanced manner can produce a good nutritional status of growth and development of one's body (Gan, 2019). Nutritional status is generally divided into five categories, namely very thin, thin, normal or ideal, obese, and obese. The category can then be narrowed down into two groups, namely the non-obese and obese groups. SMA Negeri 10 Surabaya is one of the schools in the urban area that is quite strategic because it is located near a major road. Urban areas, such as where SMA Negeri 10 Surabaya is located, are areas with nutritional problems that tend to be higher than other regions. Consumption of high-calorie foods is more common in urban areas, one of the causes is the ease of access in reaching the desired food or drink (Fatmawati, 2019). One of the things that makes this convenience even more felt is the presence of a variety of online booking applications that are quite easy to access by almost all walks of life. The Department of Nutrition for Health and Development, in collaboration with the FAO, continues to review new research and information from around the world on human nutritional needs and recommended nutrient intake (FAO, 2019). This nutrition will later become the source of changes in a person's nutritional status, one of which is adolescence. These nutrients include proteins, energy, carbohydrates, fats and lipids, various vitamins, and a number of minerals.

Physical activity is any movement of the body that comes from the movement of muscles and skeletons. Physical activity is not only focused on sports, this activity can be in the form of daily activities, activities performed during work, even small activities while playing. In doing physical activity, energy is needed from nutrient intake. Adolescence requires 60 minutes of moderate to vigorous intensity physical activity that must be done every day. This is done to keep the intake that enters the body is not piled up and can be channeled through physical activity in the form of energy. Nutrients that accumulate too much in the body without being channeled can improve the nutritional status from non-obese to obese. Adolescence is a critical period of development where personal lifestyle choices and behavioral patterns are formed, including the option to be physically active. Physical inactivity, sedentary behavior and low respiratory fitness are strong risk factors for the development of chronic diseases resulting in morbidity and mortality, as well as the economic burden to the wider community of health and social care provision, and decreased work productivity.

Nutritional adequacy figures are the average nutritional needs of a person who must be met in one day. The nutritional adequacy figures are divided into two groups, namely deficit and not deficit. For the deficit itself

again branched out in three categories, namely heavy, medium and light. Calculation of nutritional adequacy figures comes from the respondent's age, physical activity level, gender, and nutritional status of the respondent. Fulfillment of nutritional adequacy figures is generally assessed in percent. Breakfast should meet a percentage of 20 to 25 percent of calorie needs, and for lunch and dinner each should meet 30 percent of calorie needs in one day (Keats, 2018). In addition there are a total of two interlusions between breakfast and lunch as well as lunch and dinner which have a percentage of 10 percent each. As for the division of the percentage of nutrient intake, among others; carbohydrates by 60 to 68 percent, proteins ranging from 12 to 15 percent, fats with a percentage of 15 to 25 percent, and additional vitamins and minerals to taste.

Coronavirus is a group of viruses from the subfamily Orthocronavirinae in the family Coronaviridae and the order Nidovirales. This group of viruses can cause disease in birds and mammals, including humans. In humans, coronavirus causes generally mild respiratory infections, such as colds, although some forms of such diseases; SARS, MERS, and COVID-19 are more deadly (Ministry of Health, 2020). Pandemic itself refers to a disease that spreads to many people in several countries at the same time (Kartika, 2020). The number of corona virus spread itself is increasing significantly and sustainably globally. Pandemic features include: it is a new type of virus, can infect many people easily, and can spread between humans efficiently. Coronavirus has all three characteristics (Ministry of Health, 2020).

During the pandemic, maintaining intake and nutritional adequacy is a must- do, because food and beverages consumed become one of the guards and defense systems of the body in fighting bacteria, viruses, and disease-causing organisms. Improving endurance through food intake, as well as nutritional adequacy figures in accordance with the rules are one of the keys to avoid contracting the covid-19 virus (UNICEF, 2019).

Data in this study showed that there are more than 70 percent of respondents with non-obese nutritional status. This shows that most respondents already understand the issue of their nutritional status. This compares directly with more than 50 percent of respondents who do strenuous physical activity every day. As for the nutritional adequacy figures of respondents, the most number of respondents who have a deficit in nutrition intake of the light category, which is a number of more than 30 percent while the reponden with a deficit of nutritional intake of the weight group ranks last with a percentage of 13 percent.

However, based on the results of statistical tests, this study did not show any relationship between physical activity and the nutritional status of respondents. One reason is because the absence of activities means pandemic diving that can be done by teenagers in the house (Firman, 2020). Schools that use online methods make students do not have exercise time that is usually routinely done in school (UNAIR news, 2021). Based on calculations using chi-square test, on cross tabulation between nutritional status and physical activity the p-value obtained is 0.688 or more than alpha (α). This suggests that there is no significant relationship between the nutritional status of the respoden and the physical activity performed.

Data obtained in the study showed that most respondents experienced a mild deficit, followed by no deficit and a moderate deficit with a figure not far away, as well as some respondents who experienced a heavy deficit. Some respondents who have a severe deficit are respondents who do plan to lose weight during the pandemic because the respondent's weight has reached the category of obesity in the period before the pandemic. While in cross tabulation conducted between nutritional status and nutritional adequacy figures, the resulting p-value is worth 0.001 which is smaller than alpha (α) of 0.05. This value indicates that there is a relationship between nutritional status and nutritional adequacy figures in respondents

**CONCLUSION**

The nutritional status of students and students at SMA Negeri 10 Surabaya is mostly in the non-obese group with a significant relationship to the nutritional adequacy rate which is most widely spread in the category of experiencing a mild deficit. In this study, the results were obtained that the higher the level of overweight experienced by respondents, the lower the percentage of respondents who have a nutritional deficit.

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