Relationship Between Food Consumption Patterns and Nutritional Status in Nambo Sub-District Community

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ABSTRACT

Background*: Nutritional status is an individual's health condition, which is determined by the degree of physical need for energy and nutrients obtained from food. The most important behavior that can affect nutritional status is consumption pattern. This is because the quantity and quality of consumed food and drink will affect nutritional intake, which in turn it will affect the health of individuals and society.* ***Purposes:*** *The purpose of this study is to determine the relationship between consumption patterns of carbohydrate source foods and nutritional status in the people of Nambo District.* ***Method:*** *This research is an observational analytic study with a cross sectional approach. This study's population includes all residents of the Nambo District. The research sample consisted of 106 respondents, who were selected using the purposive sampling technique. Data collection included examining nutritional status by weighing and measuring height as well as conducting interviews using Food Recall 24 Hours for 2 days. Data were analyzed by Spearman's rank test.* ***Results:*** *The results of this study indicate that there is a significant relationship ($p < 0.05$) between the consumption patterns of carbohydrate source foods and nutritional status in the people of Nambo District, and the value of $r = 0.493$ indicates the strength of the correlation between consumption patterns of carbohydrate source foods and nutritional status in the people of Nambo District is moderate in nature with a positive correlation direction, which indicates a unidirectional correlation direction.* ***Conclusion****: There is a relationship between consumption patterns of carbohydrate source foods and nutritional status among the people of Nambo District.*

Keywords*: carbohydrate; nambo; nutritional status*

INTRODUCTION

The level of a person's physical need for energy and nutrients derived from food determines their nutritional status, which in turn determines their state of health. Nutritional status is the condition in which the body receives all of the nutrients it requires and all of the nutrients it consumes (Siwi and Paskarini, 2018).

Nutritional status is the condition of an individual or group resulting from the ingestion, absorption, and utilization of dietary nutrients. One factor that affects a person's nutritional status is what they consume and what they're surrounded by (Widawati, 2018). The World Health Organization (WHO) reported in 2016 that Indonesia, as a developing country, has a prevalence rate of 16.8% for underweight people

and 27.0% for overweight people (Marlinda, 2020).

According to National Basic Health Research 2018 (Riskesdas), 7.82% residents of Southeast Sulawesi Province were undernourished, while 19.33% were overweight. According to the data of Riskesdas 2018, the prevalence of undernourishment in Kendari City was 7.81%, while the prevalence of obesity was 22.30% (Health Ministry of Indonesia, 2018).

An individual's nutritional status is defined by their energy intake; an individual with a Body Mass Index (BMI) of 18.5 is considered underweight. In contrast, a person with a BMI between 23 and 24.9 is considered overweight (Lee et al., 2015).

Carbohydrate mainly serve to supply glucose to cells, which is then converted into energy. In the form of glycogen, the liver stores excess glucose. One of the liver's functions is to store and release glucose in response to the body's needs. Blood carries glucose to all organs and tissues that require it, including the brain, nervous system, heart, and other organs. In addition to using glucose as an energy source, muscle cells and other cells also use the fat (Siregar, 2017).

Infectious disease, depression, anemia, fatigue, and decreased productivity will result from health problems and inadequate nutrition. Similarly, if you consume an enormous amount of nourishment without getting in adequate physical activity, you will develop physical problems such as obesity. Once the body has more energy than it needs, it stores it as fat tissue, which can lead to an increase in the incidence of disease (Utami et al., 2020).

The most important behavior on nutritional status is the pattern of consumption. This is due to the fact that the quantity and quality of food and drink consumed will affect nutritional intake, thus also changing the health of individuals and communities (Permenkes No.14, 2019).

Food consumption patterns refer to the various types of food that individuals consume every day. These are affected by psychological, physiological, cultural, social, and emotional factors, and they can change significantly with greater physical activity, so it's important to consume the right quantity and quality of food (Putri and Anggraini, 2015).

Generally, a person's nutritional status is determined by one‘s dietary intake and their body's capacity to utilize these nutrients. A normal nutritional status indicates that the quantity and quality of the food consumed fulfill the body's requirements (Silverthorn, 2013).

The consumption pattern of an individual or group can be measured using a food consumption survey, which can be identified using a variety of techniques based on the target population. The food consumption survey method consists of two components: the individual food consumption survey method and the group food consumption survey method (Par’i et al., 2017; Sirajuddin et al., 2018).

The 24-hour consumption recall method can be used to conduct

individual food consumption surveys. The food recall method is a technique for conducting food intake interviews within the previous twenty-four hours. When instantaneous information is required, it is feasible to use this method at any time. This method is used to screen for nutrient intake and to calculate individual nutrient consumption by determining the quantity of food consumed (Par'i et al., 2017; Sirajuddin et al., 2018).

Nutritional knowledge has a substantial impact on dietary habits. In August 2022, researchers conducted a preliminary study in which they counseled 101 local residents from the Nambo District on balanced nutrition and conducted a pre-test prior to the counseling. According to the results of the pre-test, there were still a significant number of individuals in the Nambo District who lacked knowledge of balanced nutrition. In consideration of this, the authors are interested in investigating the relation between consumption patterns of carbohydrate-source foods and nutritional status among the residents of Nambo District.

METHODS

This research was carried out in Nambo District in December 2022. Using a cross-sectional methodology, this study combines observational and analytical research. The technique of purposive sampling was utilized, with a total sample size of 106 residents of the Nambo district.

Through two days of 24-hour dietary recall interviews of the residents of Nambo District was carried out to determine carbodyhrate intake. Determination of nutritional status based on body mass index for Asia Pacific with anthropometric examinations including measuring body weight (in kg) and height (in m^2).

Use a manual stepping scale to measure weight to the accuracy of 0.1 kilogram. The participants were instructed to wear the lightest possible apparel and to remove all accessories and luggage. Two measurements are taken. The scale's weight is then recorded and the outcomes of the first and second measurements are averaged.

Using a microtoise, the height was measured with an accuracy of 0.1 cm. The subject was instructed to stand upright, look directly ahead, remove any hair accessories that could obstruct the examination, and attach a flat surface to the neck, shoulders, buttocks, calves, and heels. In a relaxed position, both arms are resting alongside the body with palms facing the quadriceps and shoulders. The respondent's height is determined by raising the microtoise above his or her head and reading the number in a parallel position. The measurement will be conducted twice, recorded, and then averaged.

Body weight and height measurements are used to determine the index body mass (BMI). The BMI is calculated by dividing body weight in kilograms by height in meters squared (kg/m^2).

The Spearman rank correlation test was used to analyze the data. Spearman's rank was used for data analysis because according to the results of the Kolmogorov-Smirnov normality

test, the distribution of data for carbohydrate intake per day in research respondents is normal, whereas the distribution of data for body mass index is not normal. The Health Research Ethics Commission, Faculty of Medicine, Halu Oleo University, has issued a letter of ethical approval for this study with the following number: 072/UN29.17.1.3/ETIK/2022.

RESULTS

The characteristics of respondents based on age, gender, last education, occupation, income level, and medical history are displayed in Table 1. There are a total of 50 respondents aged 30-49 years (47.2%), followed by 29 respondents aged 19-29 years (27.4%), 18 respondents aged 50-64 years (17.0%), 5 respondents aged 16-18 years (4.7%), and 4 respondents aged 13-15 years (3.8%). There were 70 female respondents (66%) and 36 male respondents (34%). In addition, people with secondary education (junior high school) had the highest percentage with a total of 60 respondents (56.6%), followed by people with basic education with 40 respondents (37.7%), people not attending school with 5 respondents (4.7%), and one respondent (0.9% with higher education).

According to occupation, 70 respondents (66%) were unemployed, followed by trained employees of 30 respondents (28.3%), uneducated and untrained workers of 5 respondents (4.7%), and an educated workforce in last place. One person (0.9% of the population) responded. The highest income level was Rp. 2,823,315 with a total of 80 respondents (75.5%), and the lowest income level was Rp. 2,823,315 with a total of 26 respondents (24.5%).

The characteristics of the respondents based on age, height, weight, and body mass index are displayed in Table 2. The average height and weight were 157.09 6.58 cm and 57.16 10.05 kg, respectively. The median age was 37 (15-58) years old, and the BMI was 22.62 (15.55-34.63) kg/m^2.

The distribution of respondents according to their carbohydrate consumption patterns and nutritional status is shown in Table 3. The Kolmogorov-Smirnov normality test revealed a normal distribution of data for the carbohydrate intake per day of the study participants, but an anomalous distribution for the body mass index. The average daily intake of carbohydrate was 88.89 16.39 grams, while the median BMI was 22.62 (15.55-34.63) kg/m^2.

Two days of 24-hour dietary recall forms were used to determine the carbohydrate intake of research subjects (one working day and one weekend). The data is obtained in the form of household size and converted to grams (macronutrients). The Recommended Dietary Allowance (RDA) is calculated based on carbohydrate intake divided by RDA carbohydrate requirements based on age and sex. The evaluation criteria included categories for inadequate (80% RDA) and sufficient (80% RDA) intake.

According to the literature, the majority of subjects had adequate carbohydrate intake (80% RDA), specifically 75 respondents (70.8%).

Meanwhile, 29.2% of respondents had inadequate carbohydrate consumption (80% RDA). The majority of respondents (68 respondents, 64.2%) had a normal nutritional status, whereas 12 respondents (11.3%) were malnourished. While the nutritional status of as many as twenty-six (24.5%) respondents varied, there were no significant differences.

The relationship between consumption patterns of carbohydrate-source foods and nutritional status is shown in Table 4. It shows the connection between carbohydrate consumption patterns and nutritional status. Ten (9.4%) of the respondents exhibited a pattern of consuming less carbohydrate and having a poorer nutritional status. There were 2 respondents (1.9%) with an inadequate nutritional status who consumed an adequate amount of carbohydrate. Twenty-one respondents (19.8%) reported insufficient carbohydrate consumption with normal nutritional status, whereas 47 respondents (44.3%) reported adequate carbohydrate consumption with normal nutritional status. There was no correlation between consumption of fewer carbohydrate and nutritional status, whereas a correlation between adequate carbohydrate consumption and nutritional status was observed in 24.5% of respondents (26 individuals).

The Spearman Rank test performed on the statistical data presented in the table yielded a significant value of p = 0.000 and a correlation value of r = 0.493. The significance of p = 0.05 indicates that Ha is accepted, implying that there is a relationship between Nambo District residents' carbohydrate-source food consumption patterns and their nutritional status. The value of r = 0.49 indicates a moderate relationship between carbohydrate consumption patterns and nutritional status.

DISCUSSION

Based on the study's findings, the majority of respondents (70.8%) consumed sufficient carbohydrate, with rice serving as the primary source of most of those carbohydrate. In addition to rice, other forms of carbs that are frequently consumed every day include instant noodles and fried bananas, based on the findings of interviews with respondents on their dietary habits. These carbs come from a class of simplex carbohydrate that, when ingested in excess, quickly convert into fat. The majority of respondents rarely or never even eat things like milk and fruit that contain complex and other simple carbohydrate. This is because the respondent's household is in a poor condition and is located on the coast, making it more expensive and difficult to get these foods than it is to get rice and bananas. Since it is a coastal location, the majority of people in Nambo sub-district are employed as fishermen, earning an average annual salary of Rp. 2,823,315.-. The economy's key component of income, income contributes to the community's rising standard of living. Women in rural areas consume carbs more frequently than women in urban areas, One of the reasons for the higher consumption of

foods containing carbohydrate in rural societies than in urban ones is thought to be the quantity of energy required for employment. More rural communities will therefore favor energy sources with relatively low costs. In contrast to women in urban areas, women in rural areas consume more food sources of energy, particularly carbs, which is fairly high. This consumption is impacted by education, socioeconomic level, and employment (Firdaus et al., 2020).

In the Nambo subdistrict with a higher nutritional status, 26 respondents (24.5%) reported that they consume enough carbohydrate. According to the data collected, residents of Nambo District frequently eat white rice. Together with bananas, sweet potatoes, and instant noodles, the residents of Nambo District also eat other high-carbohydrate meals.

In addition to eating carbohydrate-rich foods, some respondents also frequently eat high-fat foods like fried dishes, such as fried sweet potatoes and fried bananas. Long-term high fat consumption can raise the risk of obesity (Praditasari and Sumarmik, 2018)

A normal nutritional status was obtained by 21 respondents (19.8%) who consumed less carbohydrate. This happens because intakes of fat and protein as well as carbs serve as the body's primary sources of energy. If the respondent's energy intake is in line with the activities that is engaging in, there will not be a problem with his nutritional status. Fat and protein can also provide energy (Siwi and Paskarini, 2018). The body will switch to use fat and protein instead of carbohydrate as an energy source if the amount of carbohydrate was taken then it is insufficient (Savitri, 2015). Individuals with a deficit and a shortage of carbs can still have a healthy nutritional status because proteins and other high-fat foods, as well as carbohydrate, help to produce energy. Protein and fat can also be converted into energy, thus as long as the respondent's energy intake corresponds to their activity level, their nutritional condition is unhampered. Nambo Sub-District produces a wide range of marine products due to its coastal location, including different kinds of fish and other marine products. So, it is possible that less carbohydrate are consumed, but that other proteins and fats make up for the lost energy, restoring the nutritional status to normal.

According to the results, 2 respondents (1.9%) had adequate carbohydrate consumption patterns but they had low nutritional status. Food intake and disease are two elements that directly impact a person's nutritional status. Unfortunately, no particular evaluation of the respondents' disease-related difficulties was done in this study. So, it is possible that people consume a healthy amount of food, but their nutritional status is nonetheless affected by certain diseases. The body will need more energy when suffering from several diseases than usual. A person's nutritional state is also impacted by elements related to physical activity. The more physical activity, the more energy is needed. Based on the results of this study, there

is a significant relationship (p = 0.000) between the pattern of consumption of food sources of carbohydrate and the nutritional status of the residents of Nambo sub-district, with a correlation value of r = 0.493, which indicates a moderate correlation strength in a positive direction. This means that the nutritional status, which in this case is determined by the body mass index, will improve as body weight increases in proportion to the amount of carbohydrate consumed. This study is consistent with other research conducted by Marlinda (2020) in the Sampara District, which shows a correlation between carbohydrate consumption and nutritional status (p=0.000, r=0.308). In accordance with research conducted by Sulistyadewi and Masitah (2020), a substantial correlation (p=0.000, r=0.735) was observed between adolescent carbohydrate consumption and nutritional status. Similarly, research conducted by Ilham et al (2019) discovered a correlation between carbohydrate intake and nutritional status (p 0.05).

In addition to being directly impacted by nutritional status, consumption, and infectious diseases, health is also indirectly affected. The accumulation of fat in the body and a decline in nutritional status may result from an imbalance between food intake and physical activity. The liver and muscles will store excess energy and carbs as glycogen, and the stomach, kidneys, and skin will store excess fat, which can lead to obesity (Sulistyadewi and Masitah, 2020). Obesity is caused by an imbalance between energy consumption and energy expenditure, which results in the storage of excess energy as fat tissue. Either a high energy intake or a low energy output is responsible for the excess energy. Lack of body metabolism, physical inactivity, and the impacts of food thermogenesis result in poor energy output, whereas excessive food consumption is the source of high energy intake (Setyawati and Rimawati, 2016).

CONCLUSION

There is a correlation between the consumption patterns of foods rich in carbohydrate and the nutritional status of the residents of Nambo District.

SUGGESTION

It is hoped that future authors will develop research using a different design and minimize bias in order to assess the relationship between consumption patterns of carbohydrate source foods and nutritional status, thereby providing more information and knowledge.

According to this research, the community can gain an understanding of the significance of healthy eating practices.

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Table 1. General Characteristics of Respondents Based on Age, Gender, Last Education, Occupation, Income Level and Disease History

Characteristics	Amount (n)	Percentage (%)
Age Grouping, Years		
13 – 15	4	3.8
16 – 18	5	4.7
19 – 29	29	27.4
30–49	50	47.2
50–64	18	17.0
Gender		
Man	36	34
Woman	70	66
Last education		
No school	5	4.7
basic education	40	37.7
Middle education	60	56.6
higher education	1	0.9
Profession		
Doesn't work	70	66
Educated Workforce	1	0.9
Trained Workforce	30	28.3
Uneducated and Untrained Workforce	5	4.7
Income Level		
< Rp. 2,823,315,-	80	75.5
≥ Rp. 2,823,315,-	26	24.5
Disease History		
Exist	0	0
There isn't any	106	100

Source: Primary Data, 2022

Table 2. Characteristics of Respondents Based on Age, Height, Weight and Body Mass Index

Characteristics	Results
Age, years	37(15-58)*
Height, cm	157.09 ± 6.58**
Weight, kg	57.16 ± 10.05**
Body mass index,kg/m2	22.62(15.55-34.63)*

*Median(Min-Max)

**Mean ± SD

Source: Primary Data, 2022

Table 3. Distribution of Respondents Based on Carbohydrate Consumption Patterns and Nutritional Status

Characteristics	Mean ± SD/ Median(Min-Max)	n(%)
Carbohydrate intake per day, grams	88.89 ± 16.39*	106(100)
Not enough	69.54(49.22-79.61)**	31(29.2)
Enough	93.69(80.38-128.67)**	75(70.8)
Body Mass Index, kg/m2	22.62(15.55-34.63)**	106(100)
Nutritional status		
Not enough	17.52 ± 0.89*	12(11.3)
Normal	22.11 ± 1.68*	68(64.2)
More	28.03(25.07-34.63)**	26(24.5)

*Mean ± SD
**Median(Min-Max)
Source: Primary Data, 2022

Table 4. Relationship Analysis of Carbohydrate Source Food Consumption Patterns with Nutritional Status

Carbohydrate Consumption Patterns	Nutritional status						Amount		Sig. (p)	Correlation Value (r)
	Not enough		Normal		More					
	n	%	n	%	n	%	n	%		
Not enough	10	9.4	21	19.8	0	0	31	29.2	0.000	0.493*
Enough	2	1.9	47	44.3	26	24.5	75	70.8		
Total	12	11.3	68	64.2	26	24.5	106	100		

*Spearman's Rank Test
Source: Primary Data, 2022