Analysis of risky food consumption behavior among university students

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Article Info	ABSTRACT
	Non-communicable diseases (NCD) and oral disease problems can arise in all age groups, including teenagers. Risky behavior is caused by a poor lifestyle and other factors. This study aimed to determine risky behavior and NCD incidence as well as oral problems in students at the Yogyakarta campus. This can lead NCD and oral problems. This research is quantitative descriptive-analytic research condected in a private university in Yogyakarta. The data was collected through an electronic questionnaire (Google form) and analyzed descriptively. Among the students' risky behaviors, 87.27% consumed excessive sweet food, 87.88% salty food, 82.42% oily food, 80% of seasonings, 57.58% consumed instant noodles, 84.85% consumed too little fruit and vegetables, and 87.27% did not participate in physical activity for 30 minutes. In the last 12 months, there was a high incidence of dental and oral health issues among students without symptoms. It was concluded that the most dominant risk behavior for non-communicable disease correlated with poor diet related to food consumption and lack of physical activity. All students had no symptoms or no doctor's diagnosis, but students experienced oral health problem within 12 months. A healthy diet, regular exercise, and good oral hygiene can reduce the risk of NCDs and dental and oral diseases.

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1. INTRODUCTION

Adolescence is a transitional age between children and adults with a high curiosity about their surroundings. According to UNICEF data for 2021 it shows that 17% of the 270,203,917 total population in Indonesia are teenagers of productive age, as many as 46 million people are teenagers with an age range of 10 to 19 years with the proportion of women as much as 48% and men 52% [1]. According to Piaget's theory, suggests that adolescence is the age when individuals integrate with adult society, the age when children no longer feel below the level of older people but are at the same level, at least in solving problems [2].

The World Health Organization (WHO) in 2018 reported that around 75% of the causes of death in the world are non-communicable diseases (NCD) with 80% occurring in middle and low-income countries. Most occur due to heart and blood vessel disease by 35%, cancer 12%, chronic respiratory disease 6%, diabetes 6%, and 15% caused by other NCD, with risk factors for NCD 80% due to lifestyle such as lack of fruit and vegetable consumption, smoking, lack of physical activity, and obesity [3]. The 2018 Riskesdas results show the prevalence of NCD has increased from 2013. The prevalence of cancer in 2018 has increased from 1.4% to 1.8%; stroke prevalence increased from 7% to 10.9% and chronic kidney disease increased from 2% to 3.8%. Based on blood sugar examination, diabetes mellitus increased from 6.9% to

8.5%; and blood pressure measurement results, hypertension rose from 25.8% to 34.1%. The increase in the prevalence of NCD is related to unbalanced lifestyles and eating patterns, including smoking, consumption of alcoholic beverages, physical activity, and insufficient consumption of fruits and vegetables [4], [5].

As much as 60% of mortality in all age groups is a negative impact of the development of NCD such as cardiovascular disease, diabetes mellitus, cancer and chronic obstructive pulmonary disease. Risk factors for the incidence of NCD 80% are due to a bad lifestyle such as lack of consumption of fruits and vegetables, smoking, lack of physical activity, and obesity [3], [6]. The description of the health status of the adult population in the future is determined by the health status of today's adolescents. Adolescents have the opportunity to obtain optimal health status, but it is not always in line with the health behavior of adolescents. Tobacco use, drug abuse, including alcohol begins at this age. Risky behavior during adolescence greatly influences the incidence of chronic disease in the following decades. As risk factors are smoking behavior, alcohol, diet, physical activity, traffic behavior and emotional distress [7].

Risky behavior, especially diet, physical activity, in the future will have a negative impact on the body such as NCD. A good diet is needed to fulfill optimal nutritional needs for adolescents so that they are able to prevent or minimize the risk of various non-communicable diseases (NCDs) that appear in old age such as diabetes mellitus, heart disease and stroke and are able to prevent anemia and stunting. Especially for women, if risky behavior continues into adulthood and marriage, it will have an impact on pregnancy, namely babies are susceptible to disease and can cause stunting in children [8], [9]. According to IFRC Non-communicable diseases are diseases that are not spread through infection or through other people, but are usually caused by unhealthy behavior. Non-communicable diseases are a major cause of death worldwide and present a major threat to health and development, especially in low- and middle-income countries with high risk of diseases such as cardiovascular disease, cancer, diabetes and chronic respiratory disease [10]. WHO describes that NCD require a long period of time or are commonly referred to as chronic in their development [11]. Non-communicable diseases are a health problem that causes high morbidity, disability and death rates, as well as creates a large health financing burden Data and Information Center [12].

Adolescents are an age group that is very vulnerable to bad health habits/behaviors related to lifestyle. Efforts to prevent NCD that are easy to do are indirect factors, one of which is lifestyle, health promotion and the environment. The results of a preliminary study using the interview method with adolescents at a Yogyakarta campus resulted in the preferred risky food, namely junk food, they stated that it was easy to get junk food, the good taste of junk food made them like it. Another behavior is physical activity that is difficult to do consistently. Even though they are teenagers studying in the field of public health who are later expected to become health cadres who are able to provide education to the community in maintaining health and improving health. Based on this description, the purpose of this study is to analyze health behavior that is at risk of developing NCD in students of one of the tertiary institutions in Yogyakarta, Indonesia.

2.   RESEARCH METHOD

This is a quantitative descriptive analytic method to describe the health behavior of students in a private university in Yogyakarta, Indonesia. An overview of student health behavior was taken using a survey on health behaviors that referred to questions in the Indonesian Basic Health Research called RISKESDAS. The population of this study were all fisrt year students in a private university in Yogyakarta. With accidental sampling technique, we reached sample of 165 students. Data collection was carried out using an electronic questionnaire (Google form) which was then distributed directly to students consisting of two parts, namely the characteristics of the respondents and the core questions totaling 57 questions regarding the health conditions and behavior of students [13]. The questionnaire consisted of questions regarding health behavior and daily habits. Behavior of consuming risky foods, carbonated drinks, smoking and alcohol consumption: i) risky (≥ 1 time per day and ≥ 1-6 times a week); ii) not at risk (≤ 3 times per month), fruit and vegetable consumption behavior: i) at risk (not consuming and/or consuming 1-2 servings); ii) not at risk (3-4 servings and three servings of vegetables, two servings of fruit). The data obtained was then subjected to quantitative descriptive analysis based on risky and non-risk health behaviors and habits in college students. This study was approved by the ethic committee of the Jendral Achmad Yani University with ethic number SKep/254/KEP/VI/2023.

3.   RESULTS AND DISCUSSION
3.1. Results
3.1.1. Characteristics of respondents
Table 1 presents the characteristisc of respondents. The table shows that the majority of students are women (83.03%). The age range was dominated by students aged 18 years (52.12%), then from the calculation of the body mass index most of the students were underweight (76.97%).

Table 1. Characteristics of respondents

Characteristics	N	%
Gender		
Man	28	16.97
Woman	137	83.03
Age		
17 years	2	1.21
18 years	86	52.12
19 years old	55	33.33
20 years	17	10.30
21 years	5	3.03
Body mass index (BMI)		
Normal	29	17.58
Obesity I	4	2.42
Obesity II	3	1.82
Overweight	2	1.21
Underweight	127	76.97
Total	165	100

3.1.2. Student health behavior
Student health behavior, including risk eating behavior, smoking behavior, alcohol consumption, and exercise habits are presented in Table 2. The table shows that health behaviors that pose a risk to students are excess food and drink consumption behavior and lack of physical activity. Student eating and drinking behavior is dominated by risky behavior that can trigger NCD. Students have risky behavior in consuming sweet foods (87.27%), as well as consuming salty foods (87.88%) students, consuming oily foods such as fried foods (82.42%), consuming food containing seasonings or MSG (80%), excessive eating behavior of instant noodles (57.58%), lack of fruit and vegetable consumption 140 (84.85%). As well as having less exercise habits (87.27%). Furthermore, student behavior that is not at risk is a history of not smoking in the last one month (89.70%) and the habit of not consuming alcohol (99.39%).

Table 2. Health behavior towards non-communicable diseases among respondents

Behavioral risk factors	No risk	%	Risk	%
Sweet eating behavior	21	12.73	144	87.27
Salty eating behavior	20	12.12	145	87.88
Greasy/fried eating behavior	29	17.58	136	82.42
Burning eating behavior	86	52.12	79	47.88
Eating behavior with seasonings	33	20	132	80
Behavior of eating instant noodles	70	42.42	95	57.58
Fruit and vegetable eating behavior	25	15.15	140	84.85
Drinking behavior of carbonated/carbonated drinks	91	55.15	74	44.85
Smoking history in the last month	148	89.70	17	10.30
Habit of consuming alcohol	164	99.39	1	0.61
Habit of doing exercise for 30 Minutes	21	12.73	144	87.27

3.1.3. Incidence of non-communicable diseases and dental and mouth problems
The incidence of non-communicable diseases among students during is described Table 3. Based on Table 3, it is known that the incidence of non-communicable diseases in college students is dominated by students who have no symptoms or no doctor's diagnosis. However, the results showed that students had problems with oral and dental health, including dental caries (36.97%), tooth extraction (15.15%), swollen gums and/or abscesses (15.15%), gums that bleed easily (15.15%), recurrent canker sores (14.55%) and loose teeth (12.12%).

Table 3. Incidence of non-communicable diseases and dental and oral problems among respondents

Non-communicable diseases	Yes	%	No	%
Asthma	3	1.82	162	98.18
Cancer	0	0	165	100
Diabetes mellitus	0	0	165	100
Heart disease	2	1.21	163	98.79
Hypertension	3	1.82	162	98.18
Strokes	0	0	165	100
Chronic renal failure	0	0	165	100
Joint disease	1	0.61	164	99.39
Dental caries	61	36.97	104	63.03
Missing teeth due to extraction	25	15.15	140	84.85
Rocking teeth	20	12.12	145	87.88
Swollen gums and or boils (abscess)	25	15.15	140	84.85
Gums bleeding easily	25	15.15	140	84.85
Recurrent thrush	24	14.55	141	85.45

3.2. Discussion

Based on the results of the study, it was shown that the behavior of consuming food and drink, exercise for at least 30 minutes can trigger the risk of non-communicable diseases in adolescents. So, it can be said that students have a poor diet and lack of daily physical activity. According to previous studies, poor eating patterns are prone to the emergence of non-communicable diseases such as diabetes mellitus, hypertension, and heart disease. Also supported by less physical activity can increase the risk of developing NCD from an early age [14], [15]. Previous research said that one of the non-communicable diseases that often appears asymptomatic and can appear since adolescence and whose prevalence has increased in recent years is hypertension. Many people do not realize this, that hypertension that occurs in adolescence will continue into adulthood and increase the risk of morbidity and mortality. Excessive consumption of sodium or foods with excessive levels of salt (salty) has a 14,752 greater risk of developing hypertension [16].

Non-communicable diseases are diseases that cannot be transmitted so they are considered not to threaten the condition of others. Until now NCD is still a health problem in developing countries and industrial countries. Based on the WHO report, NCD which is often found in the Southeast Asia region and contributes to very high incidence and death rates, namely heart (cardiovascular) disease, DM, cancer, chronic obstructive respiratory disease and diseases due to accidents [17]. Risky behavior adopted by teenagers due to unhealthy associations and information that is not directed [18]. Adolescents are a vulnerable group because they are in a period of development and a period of searching for identity and tend to engage in risky behavior. Risk factors in adolescents include increased blood pressure, blood sugar, body mass index or obesity, unhealthy eating patterns, lack of physical activity, and smoking and alcohol. The increase in these risk factors will have an impact on increasing the proportion of NCD in adolescents, including diabetes mellitus and hypertension [6], [19].

The results of the same study conducted on Halu Oleo University students showed that apart from smoking and consuming alcohol, risk factors for lack of physical activity (56.3%), and eating patterns based on frequency of eating/drinking trigger NCD for frequent consumption of types of food contains sugar (72.1%), contains sodium (salt) (35.0%), contains high fat (55.5%), while the type of drink containing caffeine with habit is a trigger factor for NCD, from risk factors This gave rise to diseases such as obesity (21.8%), and hypertension (13.9%) [20]. Lifestyle behaviors at risk for NCDs with the greatest proportion in adolescents are insufficient consumption of fruits and vegetables, excessive consumption of sodium, excessive consumption of fat, lack of physical activity and smoking [21]–[23]. Consuming excessive risky foods such as excessive junk food, consumption of sweet foods, processed foods with preservatives has a close relationship with the incidence of non-communicable diseases will trigger the emergence of nutritional disorders at a young age which can increase the risk of NCD [24]–[26].

Poor eating patterns such as junk food can affect adolescent nutrition including overweight and obesity, because the high content of junk food will be salt, fat, sugar, and calories, but little nutrition and fiber can increase the risk of several diseases, such as obesity, diabetes, hypertension, and blood lipid disorders or dyslipidemia [26], [27]. So, maintaining a healthy diet and increasing the intensity of physical activity, especially when the age has entered >40 years and a healthy lifestyle is very important. This is due to the trend of increasing prevalence of non-communicable diseases caused by the epidemiological transition, which begins with the dominance of communicable diseases and ends with the dominance of NCD [28].

In addition to poor food consumption patterns, risk factors for lack of physical activity also greatly affect the incidence of NCDs in adolescence. One of the negative impacts of lack of physical activity is the emergence of diabetes mellitus and obesity or overweight [23]. According to the Law of the Republic of Indonesia Number 36 of 2009 concerning Health article 141 states that it is necessary to improve the quality

of nutrition through food consumption patterns and physical activity in accordance with the General Guidelines for Balanced Nutrition (PUGS) in order to achieve good nutritional status so that the degree of public health increases. Health is a human right. Research conducted on high school students in Semarang City showed the same results, namely students who did light physical activity as a risk factor for developing hypertension at high school age with a risk of 10.074 times. Mild physical activity in adolescents occurs due to increased insulin levels so that the body will become hungry quickly [16]. Apart from hypertension and obesity, lack of physical activity will cause other health problems such as stress, sleep disturbances, slowed metabolism, and osteoporosis [29], [30].

Increasing the intensity of physical activity, namely 30-45 minutes/day, is very important because it is one of the strategies for managing and preventing hypertension. Regular physical activity can reduce stiffness in the blood vessels and will increase the endurance of the heart and lungs so that it can lower blood pressure [15]. Doing strenuous physical activity or moderate physical activity that cannot control their eating patterns after doing physical activity, so that the incidence of diabetes mellitus does not affect if you have done heavy or moderate physical activity [30]. Physical activity significantly reduces systolic and diastolic blood pressure and can prevent hypertension and other non-communicable diseases. The recommended length of physical activity to prevent hypertension is 150 minutes, with a frequency of five or more days a week [31].

Lifestyles that are at risk increase the risk of non-communicable diseases in adolescents. One of them is by carrying out C=Check your health regularly, E=Get rid of cigarette smoke, R=Have regular physical activity, D=Healthy diet with balanced calories, I=Get enough rest and K=Manage stress (CERDIK) which is healthy behavior that can help a person or group of people who are at risk of non-communicable diseases, so they can be avoided and get a better quality of health. Activities which consist of health check activities accompanied by providing knowledge about diabetes mellitus, non-smoking behavior, physical activity, reducing consumption of Sugar, Salt, Fat, adequate rest, and managing stress. In line with research on adolescents in Ambon who showed good attitudes and knowledge in realizing CERDIK activities, namely frequent physical activity (sports) [32], [33]. Based on the priority indicators of the Non-Communicable Disease Prevention And Control Program in the form of the implementation of an integrated Non-Communicable Disease Fostered Post Program (Posbindu NCD) in each village to carry out early detection of risk factors for non-communicable diseases, control of smoking consumption, and faulty health services for productive age one target is every citizen aged 15 years and over in a village or sub-district, in this case, are youth and adults [6], [34]. Primary prevention efforts for NCD can be started from childhood and adolescence to learn to behave in the right lifestyle. The number of adolescents, 24.01 percent of Indonesia's population, can become agents of change in good lifestyle behavior in preventing the risk of non-communicable diseases (NCD) in adulthood. Knowledge and proper and adequate health-nutrition knowledge and behavior from schools, residences and the surrounding environment such as health education about risky foods and the impact on health through banner media is useful in efforts to control degenerative diseases and prevent NCDs. Furthermore, when they enter the productive group, Indonesia has healthy human resources with high productivity [21], [35].

The results showed that diseases related to dental and oral problems occurred in adolescents, especially students, namely dental caries (36.97%), teeth extracted (15.15%), swollen gums and/or abscesses (15.15%), gums bleed easily (15.15%), recurrent canker sores (14.55%) and loose teeth (12.12%). Dental health efforts need to be reviewed from environmental aspects, knowledge, education, awareness and handling of dental health including prevention and treatment. This is in accordance with research in Ternate, most students from the city of Ternate in the city of Manado ignore the overall condition of dental health. Dental care is considered not very important, even though it has enormous benefits in supporting health and appearance. Apart from that, fear treatment that takes a long time and costs are quite high which allows the risk of caries to students from the city of Ternate. Maintaining oral and dental hygiene is very important, some oral and dental problems occur because we don't maintain dental and oral hygiene. Awareness of maintaining oral hygiene is very necessary and is a medicine to prevent caries [36].

The 2013 Indonesian Basic Health Research obtained an index to assess dental health status due to caries in permanent teeth (DMF-T) score in Indonesia of 4.6 and a DMF-T in South Sumatra of 5.3. Meanwhile, the results of the 2018 Riskesdas found that the score for damaged/cavity teeth in Indonesia was 45.3%, the score for missing teeth being removed/dated itself was 19.0%. And the score for teeth that have been filled because of cavities in Indonesia is 4.1%. Based on Indonesian Basic Health Research (2018) the proportion of habitual consumption of sweets ≥1 time per day in Indonesia is around 40.1% [37]. The proportion of consumption of sweet drinks ≥1 time per day in Indonesia is around 61.27%. Incorrect eating patterns and some community behaviors as well as respondents who prefer sweet, less fibrous and easily sticky foods and drinks which cause dental caries, as well as the behavior of frequently consuming sweet-tasting snacks such as chocolate, milk, ice cream, candy, sweet cakes, and sweet chips, more than 2-3 times a day. This type of food is highly cariogenic and has the potential to cause dental caries [37]. One of the risk

factors for the emergence of non-communicable diseases is smoking, where smoking habits can also cause failure to benefit from oral health care, and more dynamic tooth decay, which causes pain and even tooth loss [38]. In line with previous research which said that non-communicable diseases also have a relationship related to oral health, found a negative relationship between oral health knowledge and poor self-rated oral health (SROH), this study found a positive relationship, namely the possibility of an epidemiological transition from communicable diseases to non-communicable diseases [39]. In addition, Overall, 13.6% of participants reported poor self-rated oral health, and 78.5% on average or poor SROH, oral conditions (teeth loss, cavities, bleeding gums, and teeth sensitive to heat or cold), knowledge better oral health, dental care, and skipping breakfast were associated with poor self-rated oral health [40].

Oral diseases have been associated with major conditions like five types of cancer, diabetes mellitus, cardiovascular diseases, depression, neurodegen- erative conditions, rheumatic diseases, inflammatory bowel disease, gastric helicobacter pylori, obesity, and asthmaand there are several risk factors that oral diseases share with these conditions (such as sugar consumption, smoking), which suggests that modeling the health and economic benefits to promote oral health can be useful [41], [42]. Additionally, in another study, school-based interventions are found to be particularly effective at reducing the burden of oral diseases among primary school children, including skills-based education, teacher training, access to oral health services, and parental involvement. Primary school-based interventions to improve oral health need further research to be proven effective [43]. From a study conducted in Saudi Arabia on dental students showed that the existence of public dental health and preventive dentistry courses had a significant and positive impact on the knowledge, attitudes and behavior of undergraduate students. after an analysis using The Hiroshima University Dental Behaviour Inventory (HU-DBI) score shows that male students do not show a significant relationship and have a low HU-DBI score on oral health behavior, this is related to the large number of students who smoke tobacco, drink alcohol, and use bad internet. Additionally, dental students' average HU-DBI scores are weakly correlated with the economic rankings of the countries where they live/study [44].

According to research in the Longhua district of Shenzhen, 27.6% of participants had never been to a dentist before, along with knowledge and education. Moderate and severe caries risk factors include Angle Class II malocclusion, brushing sometimes or never, flossing, having experienced a toothache within the past 12 months, a high level of knowledge attitude, a moderate level of knowledge attitude, and a high level of knowledge attitude. So, it is necessary to increase dental and oral health education as well as good dental and oral hygiene habits [45]. Oral disease is caused by a variety of modifiable risk factors common to many non-communicable diseases (NCDs), including sugar consumption, tobacco use, alcohol use and poor hygiene, as well as underlying social and commercial factors [46]. Global Oral Health Status Report (2022) reported that non-communicable diseases such as mouth disease, heart disease, cancer, diabetes, chronic respiratory disease and mental illness are generally caused by risk factors [47]. All forms of tobacco use, harmful use of alcohol, unhealthy diet, physical activity, environmental pollution [47]. Most oral diseases and conditions share modifiable risk factors such as tobacco use, alcohol consumption, and an unhealthy diet high in free sugars which are common in the four major NCDs (cardiovascular disease, cancer, chronic respiratory disease, and diabetes). In addition, diabetes has been reciprocally associated with the development and progression of periodontal disease. There is also a causal relationship between high consumption of sugar and diabetes, obesity and dental caries [46], [48].

4. CONCLUSION

Risky health behaviors in college students that can lead to non-communicable diseases and dental and mouth problems, respectively, are excessive consumption of salty foods (87.65%), lack of physical activity (87.65%), consumption of sweet foods (87.06%), lack of consumption of fruits and vegetables (85.29%), oily foods (81.76%), foods containing seasonings or MSG (80.59%), and excessive consumption of instant noodles (57.65%). NCD's events, such as hypertension, diabetes mellitus, heart disease, chronic kidney failure where all students have no symptoms or no doctor's diagnosis results. However, students have problems with oral and dental health, including dental caries (36.97%), teeth extracted (15.15%), swollen gums and/or abscesses (15.15%), gums bleed easily (15.15%), recurrent canker sores (14.55%) and loose teeth (12.12%) in the last 12 months.

This research revealed that poor diet related to food consumption and lack of physical activity is the most important risk behavior according to NCD. Furthermore, oral disease problems show no symptoms or diagnosis from doctors, but they had experienced oral health within 12 months. Therefore, from this study, we suggest that all students have to maintain with a healthy diet, as well as increase physical activity, and also they should maintain oral hygiene. Those behaviors are important reduce the risk of NCD and oral diseases.

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