

## Research Paper

## Differences in Eating Habits, Stress, and Weight Changes Among Indonesian Generations Y and Z Students During the COVID-19 Pandemic

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## ABSTRACT

**Background:** The COVID-19 pandemic has significantly impacted society and students from various generations. Generations are a group of people who have the same age, traits, and experiences. Not all generations can overcome the impact of the pandemic on themselves, which is the cause of various problems in each generation, influencing on eating habits, behaviors, and stress. Generations Z and Y have reacted greatly to the COVID-19 pandemic. Generation Z is instantaneous, sophisticated, and adaptable to the digital world, while Generation Y is a transitional generation between conventional and digital. The latter is more patient in facing challenges. This study analyzes the differences in eating habits, stress, and lifestyle because of the COVID-19 pandemic in these two generations.

**Methods:** This research was conducted on Indonesian students, divided into groups in terms of Generations Z and Y with a cross-sectional design. The research data was collected online from 237 Indonesian students in April 2021. We used the snowball method for sampling. The analysis of differences was carried out using the independent t-test.

**Results:** The results showed differences in changes in eating habits and stress between the two generations ( $P < 0.05$ ). Generation Y experienced more changes in eating habits compared to generation Z during the pandemic. Additionally, generation Z experienced more stress compared to Generation Y. For weight changes, no difference was observed between the two generations. Each generation experienced weight changes, but it was not significant.

**Conclusion:** Generation Y can better control stress because of the COVID-19 pandemic compared to generation Z. However, with changes in eating habits, generation Y has experienced more changes. Both generations experienced an increase in body weight. There needs to be education and motivation for various generations to face the new normal to not get easily stressed, which can result in changes in eating habits and weight.

**Keywords:** Generation Z and Y, Pandemic impact, Eating habits, Stress, Weight changes

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## 1. Introduction

Many people, especially those in the age range of 19-59 years are experiencing changes in eating habits, stress, and lifestyle because of the COVID-19 pandemic. This age is known as the productive age, characterized by educational achievements, career success, and life establishment [1]. The results of research conducted on students in the United States in 2021 stated that the impact of the pandemic included increasing sedentary lifestyles, alcohol consumption, snack consumption habits, and reduced fruit consumption habits [2].

Generation is a social construct consisting of people of the same age and experience. The habits of each generation have their characteristics according to the times [3]. For example, generation Y, known as the millennial generation, has innovative features, is informative, and is interested in specific fields and productivity through technological advances [3]. While generation Z is the original generation of the digital era, from an early age, this generation has been exposed to the internet and mobile phones [4, 5]. The pandemic has had an impact on various generations and aspects, starting from health, social, economic, and security influences [6]. The effects of the pandemic will cause various problems that are different for each generation. This study grouped the age range based on generations Y and Z.

The COVID-19 pandemic has significantly impacted public health, leading to sudden lifestyle changes. The emergence of the COVID-19 pandemic has greatly affected individuals from all walks of life [7]. Generations Y and Z were also affected by the pandemic. There are two main influences in changing eating habits as follows: 1) activities at home, and 2) hoarding food because of the restrictions on grocery shopping activities. In addition, it generates boredom so that it vents through foods high in sugar and fat, ultimately leading to greater energy intake [8].

In addition to lethargy, listening to or constantly reading about COVID-19 from the media can cause stress. Stress causes people to overeat, especially foods that are high in sugar and can calm the mood [9]. During the COVID-19 pandemic, eating behaviors, such as breakfast habits, daily consumption variations, animal protein consumption habits, supplements, and spices significantly increased compared to before the pandemic [10]. Adults who were stressed because of the pandemic have caused teenagers and school-aged children to feel anxious and stressed. This is reflected in many families in various regions of the country. They are more at home and pay attention to people's behavior at home [11].

Not many studies have discussed the impact of the pandemic on various generations, such as generation Y and generation Z. Generations Y and Z certainly have different adaptations and reactions in the face of the pandemic and have had other impacts as well. This study is interested in analyzing differences in eating habits, stress, and lifestyle because of the COVID-19 pandemic in the two generations. It will be known what problems are caused and which alternative solutions can be found so that they do not have a prolonged impact.

## 2. Methods

### Research design

This research is the result of a collaboration with the "S1 Nutrition Study Program" at Thamrin University, Indonesia. This is a quantitative analytical study, thereby analyzing differences in eating habits, stress, and weight changes between generations Y and Z because of the impact of the pandemic on Indonesian students. We used a cross-sectional design where operationalized factors become independent variables that are statistically related to health problems, and dependent variables were collected and found simultaneously.

### Study participants

This research was conducted with an online survey of all Indonesian students studying in Indonesia. The preliminary research was carried out from April to November 2021 on Indonesian students. The samples in the study were chosen using the snowball sampling technique, with an effect size of 0.4. Based on sample calculations, the minimum number of samples obtained in this study equaled 381.05 college students. To round the number, the minimum sample was considered 382 students from 1180 respondents. This research is a follow-up study starting in July 2022. In this study, further analysis of the baseline data was carried out to obtain differences in eating habits, stress, and weight changes between generation Y and generation Z because of the pandemic on students in Indonesia. Of 1180 respondents, a sample was then taken that met the research criteria using the purposive sampling method.

The inclusion criteria were being from generation Y (born 1980-1994) and generation Z (born 1995-2010), willingness to participate in the research, and being Indonesian students. The exclusion criteria were not fully completing the questionnaire. Based on these criteria, respondents obtained as many as 237 Indonesian students.

### Data collection

The initial data were collected from April to November 2021. The process was carried out by the research team assisted by several student enumerators at the time of data collection. Before the data collection, the research instruments were carried out with validity and reliability tests. The instrument used in this study was an online questionnaire using Google Forms which consisted of 60 questions, including respondents' characteristics, consumption factors (changes in eating behavior, snack habits, breakfast habits, consumption of vitamins and supplements), lifestyle factors (exercise habits, sedentary behavior, stress), and weight changes (weight gain and regular weighing).

### Data analysis

Further research was conducted only on the variables of eating habits, stress, and weight changes in two generations, namely generation Y and generation Z. For the eating consumption data, a change in food consumption was experienced by respondents as a result of the pandemic. The eating consumption variable was measured through a change in eating behavior questionnaire consisting of 12 questions, where each answer was given a score of 0 if it did not change, 1 if it changed a few, and 2 if it changed meaningfully. If the total score was  $<12$ , the respondent did not experience a change in food consumption; however, a total score of  $\geq 12$  meant that the respondent experienced a change in food consumption.

For the stress variables in this study, we used a perceived stress scale questionnaire consisting of 10 questions with scores ranging from 0 to 4; accordingly option 1=score 3, option 2=score 2, option 3=score 1, and option 4=score 0. The categorization of stress scores is as follows: 0 to 13 demonstrates mild stress, 14 to 26 shows moderate stress, and 27 to 40 represents severe stress. Meanwhile, the variable of weight change was measured through a questionnaire consisting of 3 questions that investigated the perception of changes in respondents' weight because of the pandemic. The an-

swer is given a score of 0 if it does not change and 1 if it changes; accordingly, if the score is  $<2$ , the respondent has no change in body weight while a score of  $\geq 2$  means that the respondent has a change in body weight.

For the data analysis, we used an independent t-test to compare the two groups in the absence of intervention because the data was normally distributed with interval confidence of 95%. This test is used to determine the difference in the average value between one group ( $X^1$ ) and another group ( $X^2$ ), where one group and the other are not interconnected and each group has a different Standard Deviation (SD).

### 3. Results

This research was conducted on Indonesian students who were grouped in terms of their generation. According to the results (Table 1), of 237 respondents, 124(52.4%) were generation Z and 113(47.7%) were generation Y; hence, more participants were from generation Z compared to generation Y. Most of the respondents had a diploma or were undergraduate students. In contrast, for Generation Y, apart from undergraduate students, there were also master's and doctoral students. The respondents who entered the generation Z group were born from 1995 to 2010, while individuals in the generation Y group were born from 1980 to 1994. The following table presents the distribution of the respondents by generation:

The results also showed that generation Y's average eating habit score (Mean $\pm$ SD) was 13.98 $\pm$ 3.53, while generation Z had a lower average. This indicates a change in the habit of eating in both generations. However, based on these results, generation Y is more affected by changes in eating habits. Based on the results provided in Table 2, generations Z and Y have not experienced alterations in eating habits because of the pandemic, with a minimum score of 4 and 5. Accordingly, the pandemic has not changed the eating habits of some Indonesian students. Nonetheless, the two generations have been dominated by changes in eating habits after the pandemic.

**Table 1.** Frequency distribution of respondents by generation

Teenage Age Group	No. (%)
Generation Z	124(52.4)
Generation Y	113(47.7)
Total	237(100)



**Table 2.** Distribution of independent variables by generation

Independent Variables	Mean±SD	Min-Max	Mean±SD	Min-Max
	Generation Z		Generation Y	
Eating habits	12.73±2.91	4-20	13.98±3.53	5-21
Stress	19.60±5.35	6-36	17.63±6.12	1-34
Weight changes	2.12±0.87	1-3	2.11±0.89	1-3

SD: Standard deviation; Min: Minimum; Max: Maximum.



In addition to changes in eating habits, the stress variable was also analyzed in this study. According to the survey results, generation Z experienced stress with an average of 19.60±5.35. In contrast, generation Y experienced stress with an average of 17.63±6.12, i.e., the average respondent experiences moderate stress. In terms of stress, based on these results, generation Y can better control this status compared to generation Z. In addition to being more mature, students in generation Y were also more patient and diligent.

The changes related to the pandemic that has occurred in society are improvements in nutritional status. One of the most important indicators is weight gain. Changes in body weight because of the pandemic will directly affect a person's nutritional status. In contrast to eating habits and stress, the weight changes between the two generations show an average that is not too different, namely the score for generation Z was 2.12±0.87. For generation Y, the score was 2.11±0.89. Generation Z and generation Y are experiencing weight changes. While judging the results, generation Z has experienced slightly more weight changes compared to generation Y.

Each variable was grouped into more detailed categories. Eating habits were categorized into two, namely unchanged (score<12) and changed (score ≥ 12). The stress variable was divided into three groups, namely mild stress (scores 0 to 13), moderate stress (scores 14 to 26), and severe stress (scores 27 to 40). The change in body weight was categorized into two groups, namely not changing and changing; accordingly, the score of <2 means that the respondent has not experienced a change in body weight and scores of ≥ 2 showed that the respondent has a change in their body weight. The results of categorizing eating habits, stress, and weight changes in each generation are provided in Table 3.

Generations Z and Y have vastly experienced alterations in eating habits because of the pandemic. In Generation Z, 86(36.3%) experienced changes in eating habits, while in generation Y, a total of 88(37.1%) experienced alterations in eating habits. The COVID-19 pandemic also influenced stress levels in students. Most of the generation Z participants experienced moderate stress because of the pandemic (101[42.6%]), while the number in generation Y was 76(32.1%). In each generation, some participants experienced stress severely, namely

**Table 3.** Frequency distribution of independent variables by generation

Variables	Independent Variables	No. (%)	
		Generation Z	Generation Y
Eating Habits	Unchanged	28(16)	25(10.5)
	Change	86(36.3)	88(37.1)
Stress	Mild stress	14(5.9)	27(11.4)
	Moderate stress	101(42.6)	76(32.1)
	Severe stress	9(3.8)	10(4.2)
Weight changes	Unchanged	40(16.9)	39(16.5)
	Change	84(35.4)	74(31.2)



generation Z by 9(3.8%) students and generation Y by 10(4.2%) students. For weight changes, most of the participants in each generation underwent weight changes. In generation Z, there was a change in body weight in 84(35.4%) participants, and 74(31.2%) subjects in generation Y experienced a change in body weight. The subsequent analysis was performed with an independent t-test. The results of the research are presented in Table 4.

The analysis showed significant differences in eating habits in terms of generation ( $P=0.004$ ), with the average of generation Y in eating consumption score being higher than generation Z. The percentage of research results showed that generation Y experienced more changes in eating habits compared to generation Z. The difference in eating habits between the two generations is about 1.25 points. Generation Y has experienced more changes in consuming snacks while eating more frequently during the pandemic. They tend to cook their food more during the pandemic; therefore, their food availability is guaranteed.

In addition, the stress variable significantly differs between generation Z and generation Y ( $P=0.009$ ). Generation Z's stress is higher than generation Y. Meanwhile, generation Z, who are used to living in an instant and comfortable situation, are confused when they have to adapt to the new normal. Additionally, the change in body weight between the two generations does not show any difference ( $P=0.897$ ), where each generation has a score not much different, namely for generation Z, the score is 2.12, while the score for generation Y equals 2.11. Generation Z and Y have experienced weight changes because of the COVID-19 pandemic.

#### 4. Discussion

This study aimed to analyze differences in eating habits, stress, and body weight changes because of the pandemic on university students in Indonesia. Changes in eating habits are more prevalent in generation Y. The increase in consumption in generation Y is the use of processed home foods. They consume more and eat

more frequently than usual. A similar study conducted on adolescents and adults in Indonesia stated that during the pandemic, people were asked to do activities at home, thereby reducing the frequency of buying food from outside. They were more careful and worried about their health to limit their food and snack intake even if they are at home. Better eating habits during a pandemic can boost the immune system and is very important for people. According to the results of the study conducted by Mardiyah et al. (2022), changes in eating habits in Indonesian students include changes in fast food consumption, sugary foods and drinks consumption, vegetables and fruit consumption, and breakfast habits. As for the consumption of animal and vegetable side dishes, the rate tends not to change [12]. The COVID-19 pandemic changed students' habits in eating main foods and snacks compared to before the pandemic [13].

The results of previous studies show differences in knowledge and attitudes regarding nutrition between generation Y and generation Z. The average knowledge and attitudes of generation Z are higher compared to generation Y, namely 58.25 for knowledge and 86.83 for perspectives, respectively [14]. Each generation's knowledge affects their eating habits, stress-related self-control, and ability to control weight changes. The COVID-19 pandemic has impacted all students worldwide, including Indonesian students. Students are forced to carry out lectures online as a solution to the implementation of studies for social restrictions [15]. In addition, in this case, students use many online applications to order food from home during the Pandemic [16]. However, in some people, the COVID-19 pandemic can change eating habits, especially fruit, milk, and multivitamins, which are considered to increase the body's immune system [1].

People are accustomed to cooking their food, especially in adulthood [17]. Meanwhile, generation Z is changing its eating habits by buying an abundance of snacks online. The theory reinforces that generation Y can multitask and has high fighting power. Meanwhile, this generation

**Table 4.** Differences in eating consumption, stress, and weight changes by generation

Independent Variables	Mean $\pm$ SD		P
	Generation Z	Generation Y	
Eating habits	12.73 $\pm$ 2.91	13.98 $\pm$ 3.53	0.004*
Stress	19.60 $\pm$ 5.35	17.63 $\pm$ 6.12	0.009*
Weight changes	2.12 $\pm$ 0.87	2.11 $\pm$ 0.89	0.897

\*Significant at 0.05.





is more patient compared to generation Z who are used to living with high technology, online, and fast-paced lifestyle [18]. Other factors that influence changes in snack behavior online are social factors and personal factors. Social factors include prioritizing trends, product quality, and advertising on social media. In addition, influential social factors are supported by technological developments. Both generations pay enough attention to social factors; however, the difference lies in personal factors. For generation Y, the price is one of the influences in deciding to buy something, but this is not true for generation Z [19].

The Covid-19 pandemic is causing stress for students of different generations [20]. However, the study shows that stress is more experienced in generation Z. The stress experienced by generation Z is academic stress. Generation Y also experiences this stress; however, Generation Z has difficulties managing the stress. Academic stress is a response that arises because of too many demands and tasks that students have to do. Stressful conditions are caused by pressure to show achievement and excellence in conditions of increasing academic competition; therefore, they are increasingly burdened by various forces and demands [20]. In addition, generation Z is easier to trust with information packaged by individuals. This condition allows hoaxes to spread quickly among generation Z, thereby increasing panic, anxiety, and uncertainty [21].

Generation Z, also known as IGeneration, is the first global generation. The survey results on 49 000 generation Z children in North and South America proved that this generation is very familiar with technology, considers technology a part of their lives, and has a sophisticated, ambitious, and knowledgeable thinking orientation [18]. Simultaneously, generation Y has a unique character based on the region and social-economic conditions. This generation's main features are the increased use and familiarity with communication, media, and digital technologies. This generation has innovative and informative characteristics along with good productivity [22]. They have grown up in the age of the internet boom. This generation uses many instant communication technologies, such as email, SMS, instant messaging, and social media apps, including Facebook and Twitter [23].

If grouped, generations Z and Y are numerous in the moderate stress group. Moderate stress occurs more extended than a few hours to a few days, such as a dispute, expecting a new job, family problems, and so on [24]. The COVID-19 pandemic and the change in learning methods to online caused it to be more tiring and boring as there was no direct interaction with either lecturers or friends. In addition, with online learning, more dead-

lines for tasks must be completed, causing students to feel depressed and stressed. It is not uncommon for students to vent their stress to food consumption, which impacts weight changes. Students tend to have a stress level because they spend a lot of time playing games and trying to win. In addition, they also experience a change of heart and difficulty in making decisions and concentrating [25].

One of the impacts of the COVID-19 pandemic is causing students to take longer to do assignments online. The length of time working on tasks is related to over-nutrition in students [26]. Students who do online assignments tend to consume snacks, thereby increasing the accumulation of body fat and becoming one of the causes of weight changes before and after the pandemic in students (78%). This is in line with the results of studies that showed a change in body weight in both generations, although it did not differ significantly. The cause of the weight change that occurred because of the pandemic for college students was an increase in stress during the pandemic. The stress experienced during the pandemic by students has an impact on increasing appetite as an outlet for the boredom of doing activities at home, which ultimately leads to weight changes [27].

Previous research has proven that the COVID-19 pandemic causes 2.5 to 5 kg of weight gain. They experience this weight gain by making food an outlet for boredom and stress because they have to stay quiet and do a lot of activities at home [28]. The results of a similar study also stated that there was weight gain during the COVID-19 pandemic in medical students with the highest weight gain rate of 1 kg [29]. Indonesian students experienced weight changes because of the COVID-19 pandemic [30]. The increase in weight due to the pandemic caused a rise in the nutritional status of students. This is due to changes in eating habits, stress, and decreased physical activity [31].

### Study limitations

The limitation of this study includes measuring changes in body weight only with the perception of respondents, not measuring the variable directly. Then, changes in eating habits and stress were not measured before the pandemic. Only estimated changes that have occurred as a result of the impact of the pandemic have been considered. However, the researcher has tried to make questions on a questionnaire that can describe changes in the research variables. Future research can consider direct measurement to see changes because of the pandemic. You can also take other variables, such as physical activity, consuming snacks purchased online, and so on.

## 5. Conclusion

The COVID-19 pandemic has impacted Indonesian students, especially generation Z and generation Y. Changes in eating habits occur in both generations. Still, generation Y is more affected by changes compared to generation Z. Conversely, in the stress experienced, generation Z found it more challenging to overcome the stress caused by the pandemic. As for weight changes, both generations experienced weight changes, although there was no significant difference.

## Ethical Considerations

### Compliance with ethical guidelines

This study has been approved by the Research Ethics Committee of Universitas Mohammad Husni Thamrin (Code:018/S.Ket/KEPK/LPPM/III/2021).

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### Authors' contributions

Conceptualization and supervision: Laras Sitoayu; Methodology: Laras Sitoayu; Investigation, writing-original draft, and writing-review & editing: Laras Sitoayu and Lintang Purwara Dewanti; Data collection: All authors; Data analysis: Laras Sitoayu and Vitria Melani; Funding acquisition and resources: Laras Sitoayu, Lintang Purwara Dewanti, and Vitria Melani.

### Conflict of interest

The authors declared no conflict of interest.

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