Impact of COVID-19 on Lifestyle and Nutritional Habits: A Gender-Based Analysis of Indonesian Students

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A B S T R A C T

The COVID-19 pandemic, originating from Wuhan, China, in December 2019 and declared a pandemic by WHO in March 2020, has led to significant global health impacts. This study explores the gender-specific effects of the pandemic on eating habits, stress levels, and weight changes among university students in Indonesia. This research conducted is a quantitative cross-sectional study. Data was collected online from 686 Indonesian university students over a 35-day period using a validated and reliable questionnaire. The questionnaire covered demographic information, eating habits, lifestyle factors, and weight changes. Univariate and bivariate analyses were performed to assess the differences between male and female students. A significant gender difference was observed in breakfast habits, with males more likely to eat breakfast regularly (p = 0.001). Stress levels were generally moderate, but females showed a higher tendency for severe stress compared to males, who exhibited more mild stress (p = 0.000). Both genders reported increased food consumption and decreased snacking frequency. No significant gender differences were found in supplement intake. Female students experienced higher stress levels and different eating habits compared to males. Educational institutions should promote awareness of healthy eating and stress management, particularly during crises like the COVID-19 pandemic

INTRODUCTION

Originating in Wuhan, China, in December 2019 as a cluster of unexplained pneumonia cases, the SARS-CoV-2 outbreak was declared a pandemic by the WHO in March 2020. The pandemic has affected numerous countries, resulting in over 110 million confirmed cases and more than 2.5 million deaths (WHO, 2020). The COVID-19 pandemic has led to significant changes in eating habits, stress, and lifestyles, particularly among individuals aged 19-59, a productive age range characterized by educational and career achievements (E. S. Putra et al., 2020). Biological and social determinants, including gender stereotypes, roles, social stigma, and autonomy, have resulted in various inequities during the pandemic (Hou et al., 2020). COVID-19 has affected men and women differently, with men experiencing higher mortality rates, worse prognoses, and higher death risks (Spagnolo et al., 2020). Conversely, women have reported higher prevalence and severity of anxiety, depression, and acute stress symptoms (Liu, 2020). Women have also experienced more psychological changes linked to isolation and complex disorders, such as anxiety, insomnia, depression, and PTSD.

Gender moderates the relationship between emotional disorders (e.g., psychological distress) and personal strengths like resilience and social support among students. Understanding the psychometric and emotional profile differences between men and women is crucial for grasping their distinct beliefs and behaviors regarding COVID-19. Women tend to perceive the pandemic as more serious than men, with 59% of women in March viewing COVID-19 as a significant health issue compared to 49% of men. By mid-April, these numbers dropped but the gender gap persisted: 40% of women still saw the virus as a serious risk versus 33% of men (Galasso et al., 2020). These differences extend to the behavior of male and female leaders, with countries led by women responding more effectively to the pandemic than those led by men (Garikipati, 2020). For instance, Germany, Iceland, New Zealand, and Denmark, with female leaders, have used more democratic and inclusive leadership styles, with clear and decisive communication strategies, while male-led countries like the US, Brazil, and the UK have experienced poorer COVID-19 outcomes.

Students are among the most impacted groups by the COVID-19 pandemic, facing threats to their well-being and mental health. Previous research on the psychological effects of COVID-19 on university students indicates that economic stress and delays in academic activities are risk factors for anxiety, with depression, stress, and anxiety being the most common psychological effects identified (Cobo-Rendon, 2020). Compared to other academic community members, students have higher stress and anxiety scores, with female students experiencing higher levels of depression than their male counterparts (Gao, 2020). Psychological and emotional profiles, as well as behavioral responses, depend heavily on contextual and multifactorial factors such as nutritional status, oral health, and physical exercise (Belinchón-deMiguel et al., 2020). These factors, influenced by gender (Sharkey et al., 2020), have been affected by the pandemic situation.

Diet can influence emotional well-being (Soh et al., 2009). During lockdown periods, eating habits changed dramatically along with rising anxiety and stress levels (Clemente-Suárez et al., 2020). Common changes included increased consumption of fruits (27%), eggs (25.4%), nuts (22.5%), vegetables (21%), and fish (20%), and decreased consumption of processed meats (35.5%) and sugary drinks (32.8%), with clear differences by age and gender. Physical activity also influences psychological profiles. Physically active students tend to have healthier and more balanced diets than inactive ones. University students average 40 minutes of physical activity per day, significantly more for men than women (Práxedes, 2016). Male students are more likely to engage in sports during their leisure time, while female students prioritize social activities and personal hobbies over physical exercise (Lores, 2008). Some studies have focused on gender differences regarding the impact of the COVID-19 outbreak in countries like Spain, where mortality rates remain among the highest globally, considering various multifactorial variables.

Therefore, this study aims to investigate gender differences among university students in the perceived impact of the COVID-19 pandemic on eating habits, stress, and weight changes.

LITERARURE REVIEW
Impact of COVID-19 on Student Life and Eating Habits

The COVID-19 pandemic has significantly impacted students worldwide, including those in Indonesia. Students were compelled to engage in online learning as a solution to maintain social distancing (Rahman, 2020). This shift to online learning has introduced various challenges and changes in student habits, behaviors, and stress levels. The pandemic has also influenced eating habits, although not dramatically. Many students have become more mindful of their dietary choices, often using online applications to order food from home (Hapsari et al., 2020). However, some segments of the population have altered their eating habits significantly, increasing their intake of fruits, milk, and multivitamins believed to boost immunity (E. S. Putra et al., 2020).

Gender Differences in Psychological and Behavioral Responses

Gender differences in psychological and behavioral responses are well-documented, although these differences do not imply that one gender is superior to the other. Kartono (2005) noted that women tend to approach life's challenges in a more straightforward, practical, and spontaneous manner with greater enthusiasm, whereas men are more abstract and egocentric. These differences become more pronounced during adolescence due to increasing social pressures to conform to gender roles rooted in cultural norms. Cicognani (2011) found that adolescent girls tend to have higher psychological well-being than boys, a finding echoed by Graham (2005), who also noted higher psychological well-being among women compared to men.

Gender Differences in Eating Patterns

Gender differences extend to eating patterns as well. It is a common perception that men and women think, feel, and act differently simply due to

their gender (Harsyah and Ediati, 2015). Specifically, male and female students exhibit different eating habits, particularly during dinner (Saufika et al., 2012).

Stress Levels among Students

Stress, defined as the pressure experienced when demands exceed one's abilities (Kholidah, 2012), is another area where gender differences are evident. Male students are reported to experience stress due to spending extensive time playing games and striving to win, which affects their mood, decision-making, and concentration (Aminatyas et al., 2021). However, studies, such as one on first-year medical students at Andalas University, show that female students experience higher stress levels, although the difference is not statistically significant (Aminatyas et al., 2021). Stress can be categorized into three levels: mild, moderate, and severe. Mild stress, which does not harm physiological functions, includes everyday challenges like forgetfulness or criticism. Moderate stress lasts from several hours to days and involves conflicts or anticipation of new responsibilities. Severe stress, lasting weeks to years, is often due to prolonged issues like economic hardships or illness (Piyeke et al., 2014). The COVID-19 pandemic has led to moderate to severe stress among many individuals.

Body Fat Distribution and Gender

Differences in body fat distribution between males and females become apparent during puberty. Males typically have central fat distribution, whereas females tend to accumulate fat peripherally. Males possess greater non-fat mass, bone mineral content, and muscle mass compared to females. Females develop specific fat deposits during puberty, particularly in the breasts, lower abdomen, thighs, and around the genital area, giving them a distinctive fat distribution pattern compared to males (Sudibjo, 2010). These differences are closely related to sex steroid hormones, becoming evident during puberty (WHO, 2011).

METHODS

This study is collaboration project with the Nutrition Study Program Universitas Thamrin Jakarta. It is a quantitative analytical study to determine the differences in eating habits, stress, and weight changes between male and female students as an impact of the pandemic on students in Indonesia. The research design employs a cross-sectional study approach, where operational variables are statistically linked with health issues/dependent variables collected simultaneously. The study uses an online survey method targeting all university students in Indonesia. The preliminary research was conducted from April to November 2021, and follow-up research began in July 2022. This study has passed ethical approval No:018/S.Ket/ KEPK/LPPM/III/2021 by Research Ethics Commission of Universitas Mohammad Husni Thamrin.

Research Procedure

The research is conducted in two stages. The preliminary study was conducted in 2021 with Indonesian university students. The population comprised all university students currently studying in Indonesia. The sample was collected using the Snowball Sampling technique. The minimum sample size was calculated using a proportion estimation formula for survey research, resulting in a minimum of 382 students. The online questionnaire yielded 686

completed responses. The second phase is the follow-up study. This follow-up study builds on the preliminary data, focusing on baseline nutritional issues affected by COVID-19. It analyses the differences in eating habits, stress, and weight changes between male and female students as a pandemic impact on Indonesian university students.

Data Collection

Initial data were collected from April to November 2021 by a research team with assistance from student enumerators. Before data collection, the research instruments were tested for validity and reliability. The instruments included a 60-question online questionnaire using Google Forms, covering respondent characteristics, consumption factors (eating behaviour changes, snacking habits, breakfast habits, vitamin & supplement intake), lifestyle factors (exercise habits, sedentary behaviour, stress), and weight changes (weight gain, regular weight monitoring). The follow-up study focuses on eating habits, stress, and weight changes, analyzing differences between male and female students.

Data Analysis

Data processing and analysis were performed using computer software and included univariate and bivariate analyses. Univariate analysis was conducted on each variable from the study results, providing data on respondent characteristics, mean values, standard deviations, and minimum and maximum values for variables like eating habits, stress, and weight changes. Bivariate analysis was used to examine differences in eating habits, stress, and weight changes between male and female students due to the pandemic. This analysis employed an independent t-test to compare two distinct groups without intervention, using a 95% confidence level. The test aimed to determine the mean differences between one group (X1) and another (X2), where the groups are unrelated and have different standard deviations (S).

RESULTS

The data collection for this study was conducted online over a period of 35 days, involving 686 Indonesian university students as respondents. The univariate analysis results are presented in Table 1.

Table 1. Characteristics of Respondents

Variable	Male n (%)	Female n (%)	Total n (%)
Age			
Late Adolescence	308 (49.4)	316 (50.6)	624 (100)
Early Adulthood	25 (53,2)	22 (46.8)	47 (100)
Late Adulthood	10 (71.4)	4 (28.6)	14 (100)
Elderly	0 (0.0)	1 (100)	1 (100)
Education Level			
Diploma	298 (50.1)	297 (49.9)	595 (100)
Bachelor/Professional	16 (37.2)	27 (62.8)	43 (100)
Master	25 (62.5)	15 (37.5)	40 (100)
Doctorate	4 (50)	4 (50)	8 (100)
Field of Study			

Variable	Male n (%)	Female n (%)	Total n (%)
Health	58 (16.2)	300 (83.8)	358 (100)
Non-Health	285 (86.9)	43 (13.1)	328 (100)
Region of Residence			
WIB (Indonesia Western Standard Time)			
WITA (Indonesia Central Standard Time)	302 (48.2)	325 (51.8)	627 (100)
WIT (Indonesia Eastern Standard Time)			
	39 (78.0)	11 (22.0)	50 (100)
	2 (22.2)	7 (77.8)	9 (100)
Accompanion			
With Parents/Relatives	214 (41.6)	300 (58.4)	514 (100)
Alone in Boarding House/Apartment			
School Dormitory	51 (57.3)	38 (42.7)	89 (100)
	78 (94.0)	5 (6.0)	83 (100)

The respondents were predominantly in their late adolescence, with a slightly higher participation rate among female students compared to male students. In early and late adulthood, male students were more predominant, with one female student falling into the elderly category. Most students, both male and female, lived with their parents/family, though a slightly higher proportion of female students did so. Conversely, more male students lived independently in dormitories or apartments compared to female students.

Regarding educational level, the vocational and doctoral levels had almost equal proportions of male and female students. Undergraduate programs were dominated by female students, while master's programs had more male students. In terms of fields of study, female students were more prevalent in health-related fields, whereas male students dominated non-health-related fields. Most of the student respondents were from the western part of Indonesia (WIB), with a higher proportion of male students from the central region (WITA) and more female students from the eastern region (WIT). The distribution of respondents across Indonesia is expected to represent the diverse characteristics related to weight changes among students in Indonesia.

Eating Habits, Weight Changes, and Lifestyle

This study investigated three variables and their indicators: weight changes, consumption factors, and lifestyle factors. Table 2 shows the comparison between male and female students in these variables.

Interestingly, male students reported weight changes more frequently than female students, despite not regularly monitoring their weight. In contrast, female students, who routinely weighed themselves, often reported no weight changes. However, this difference was not statistically significant (p-value > 0.05).

Table 2. Distribution of Research Variables

Variable	Male n (%)	Female n (%)	Total n (%)
Body Weight Changes			
1. Body Weight			
Changing	308 (50.2)	305 (49.7)	613 (100)
Not changing	35 (47.9)	38 (52.1)	73 (100)
2.Habit of Weighing			
Not Routine	198 (50.2)	195 (49.7)	394 (100)
Routine	139 (47.9)	153 (52.1)	292 (100)
Consumption			
1. Breakfast Habit*			
Not Routine	148 (43.7)	191 (56.3)	339 (100)
Routine	195 (56.2)	152 (43.8)	347 (100)
2. Dietary Changes			
No changes	35 (47.9)	38 (52.1)	73 (100)
Decreased	81 (52.3)	74 (47.7)	155 (100)
Increased	227 (49.6)	231 (50.4)	458 (100)
3. Snacking Pattern			
No changes	88 (55.0)	72 (45.0)	160 (100)
Decreased	134 (45.6)	160 (54.4)	295 (100)
Increased	121 (52.2)	111 (47.8)	232 (100)
4. Supplementation			
Not good	168 (54.5)	140 (45.5)	308 (100)
Good	175 (46.3)	203 (53.7)	378 (100)
Lifestyle			
1.Stress*			
Severe	18 (32.7)	37 (67.3)	55 (100)
Moderate	259 (48.2)	278 (51.8)	537 (100)
Mild	66 (70.2)	28 (29.8)	94 (100)
2.Sedentary lifestyle			
Not good	217 (50.1)	216 (49.9)	433 (100)
Good	126 (49.8)	127 (50.2)	253 (100)
3.Exercise*			
Not good	90 (40.2)	134 (59.8)	224 (100
Good	253 (54.8)	209 (45.2)	462 (100)

*) p-value <0.05

In terms of consumption factors, there were minimal differences between male and female students across most variables. However, breakfast habits showed a significant difference, with male students more likely to eat breakfast regularly than female students (p-value = 0.001). Regarding changes in eating patterns, most respondents reported increased meal quantity and frequency during the pandemic. Both male and female students reported reduced snacking frequency and quantity. No significant differences were found in supplement consumption habits between genders, with a majority of respondents exhibiting good supplement consumption habits.

Regarding lifestyle factors, most respondents, regardless of gender, experienced moderate stress. However, female students were more likely to experience severe stress compared to male students, who tended to experience

mild stress. This difference was statistically significant (p-value = 0.000). Exercise habits also showed significant gender differences, with more than half of male students having good exercise habits, whereas female students predominantly had poor exercise habits (p-value = 0.000). Sedentary behavior showed a contradictory pattern, with female students less likely to exhibit sedentary behavior, although this was not statistically significant.

DISCUSSION

The COVID-19 pandemic has significantly impacted education, with the shift to online learning methods across Indonesia limiting direct contact and gatherings in educational settings. Students from any region in Indonesia are expected to access and receive maximum education through independent learning (Abidah et al., 2020).

Weight changes during the pandemic were common, including among students, largely due to increased snacking and altered eating patterns, potentially leading to higher rates of degenerative diseases (Lin et al., 2021). Bolang et al. (2021) also observed changes in nutritional status among students due to the COVID-19 pandemic, with male students having higher average weights and better nutritional status during the pandemic compared to female students. Weight and nutritional status increases were more prevalent among late adolescents and young adults during the pandemic (Huber et al., 2021). However, this study found more weight changes among female students, differing from Huber's (2021) findings, potentially due to increased boredom-driven eating habits among females (Mustofa et al., 2021).

Changes in consumption patterns during the COVID-19 pandemic included increased meal portions, home-cooking frequency, snacking frequency, and consumption of vegetables and fruits (Noviasty & Susanti, 2020). There were no gender differences in the consumption of fruits, nuts, or vegetables, contrary to previous studies. Some research suggests that male students generally have poorer nutritional knowledge, resulting in lower fruit and vegetable intake (Baker & Wardle, 2003), with a tendency to consume high-fat and protein processed foods, alcohol, and sugary carbonated drinks (Vari et al., 2017). However, no gender differences were evident in this study during the COVID-19 pandemic (Moreno et al., 2020).

Pandemic restrictions increased sedentary activities such as sitting, lying down, gaming, watching TV, and using mobile phones (Chen et al., 2020). The pandemic has led to increased non-communicable diseases due to decreased physical activity, increased stress, and higher snacking rates (Ardella, 2020). Research on physical activity profiles also found gender differences, consistent with this study among university students (Redondo-Flórez et al., 2020). Studies by Valenzuela et al. (2021) and Rodriguez et al. (2021) found that students not engaged in physical exercise exhibited higher stress levels, aligning with this study's findings where better exercise habits among male students correlated with lower severe stress levels compared to female students.

CONCLUSIONS AND RECOMMENDATIONS
Conclusions
1. The study found that in late adolescence, female students participated slightly more than male students. Both male and female students predominantly lived with their parents/family, with a slightly higher proportion among female students. At the vocational and doctoral levels, the proportions of male and female students were almost equal. In contrast, female students dominated health-related fields, while male students were more prevalent in non-health-related fields.
2. Male students were more likely to report weight changes compared to female students, despite not regularly monitoring their weight.
3. A significant difference in breakfast habits was observed, with female students less likely to have regular breakfasts compared to male students (p-value = 0.001). In terms of lifestyle, most respondents experienced moderate stress. However, female students were more likely to experience severe stress, while male students tended to experience mild stress during the pandemic (p-value = 0.000).
4. Most respondents reported an increase in the quantity and frequency of meals during the pandemic, regardless of gender. However, both male and female students experienced a reduction in the quantity and frequency of snack consumption. There were no significant differences in supplement consumption habits between genders, although over half of the respondents exhibited good supplement consumption habits.

Recommendations
1. The study indicates that the COVID-19 pandemic has influenced eating habits, lifestyles, and weight changes. It is essential for students, both male and female, to have adequate knowledge and attitudes about nutrition to manage unwanted weight changes caused by unhealthy eating habits and lifestyles during the pandemic. Educational institutions should pay attention to this issue, as long-term weight changes, whether an increase or decrease, can elevate the risk of degenerative diseases.
2. A multifactorial analysis of factors related to the perception of COVID-19 dangers could be a useful tool to measure stress levels among students. Understanding these factors can help explain and prevent the psychological consequences of the COVID-19 pandemic. Educational institutions can use this awareness to implement multidisciplinary interventions aimed at reducing these perceptions and, consequently, student stress in response to the virus.

FURTHER STUDY
This study has some limitations, including the lack of biological measurements related to COVID-19 and the inability to measure stress hormones (cortisol, adrenaline, alpha-amylase, etc.). Another limitation is the self-reported anthropometric data, which could introduce bias. However, as this was an online questionnaire, further evaluation methods were not feasible. Future studies could address these issues. Additionally, we propose *analysing* the impact of

cultural differences on perceived COVID-19 risks. This study could also be extended to other educational levels, such as primary and secondary schools.

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REFERENCES

Aminatyas, Ismi; Sitoayu, Laras; Angkasa, Dudung; Gifari, Nazhif; Wahyuni, L. (2021). Hubungan Konsumsi Makanan Cepat Saji, Tingkat Stres dan Kualitas Tidur terhadap Status Gizi pada Remaja Putra SMA DKI Jakarta. Indonesian Journal of Human Nutrition, 8(1), 55–64.

Baker, A.H.; Wardle, J. Sex differences in fruit and vegetable intake in older adults. Appetite 2003, 40, 269–275.

Belinchón-deMiguel, P.; Tornero-Aguilera, J.F.; Dalamitros, A.A.; Nikolaidis, P.T.; Rosemann, T.; Knechtle, B.; Clemaleste-Suárez, V.J. Multidisciplinary analysis of differences between finisher and non-finisher ultra-endurance mountain athletes. Front. Physiol. 2020, 10, 1507.

Cicognani, E. (2011). Coping Strategies With Minor Stressors In Adolesence : Relationship With Social Support, Self-Efficacy, and Psychological Wellbeing. Journal of Applied Social Psychology, 41(3), 559-578.

Clemente-Suárez, V.J.; Dalamitros, A.A.; Beltran-Velasco, A.I.; Mielgo-Ayuso, J.; Tornero-Aguilera, J.F. Social and psychophysiological consequences of the COVID-19 pandemic: An extensive literature review. Front. Psychol. 2020, 11, 3077.

Cobo-Rendón, R.; Vega-Valenzuela, A.; García-Álvarez, D. Consideraciones institucionales sobre la Salud Mental en estudiantes universitarios durante la pandemia de COVID-19. CienciAmérica 2020, 9, 277–284. [CrossRef]

COVID-19 outbreak in China: A cross-sectional study. BMC Public Health 2020. [CrossRef] [PubMed]

Daryati. (2012). Integrasi Perspektif Adil Gender Dalam Pendidikan Di Sekolah Menengah Atas (Studi Kasus Pada Sekolah Menengah Atas Negeri 6 Surakarata). Jurnal Sosialitas, 2(1), 1-9.

Galasso, V.; Pons, V.; Profeta, P.; Becher, M.; Brouard, S.; Foucault, M. Gender differences in COVID-19 related attitudes and behavior: Evidence from a panel survey in eight OECD countries. Proc. Natl. Acad. Sci. USA 2020, 117, 27285–27291. [CrossRef][PubMed]

Gao, W.; Ping, S.; Liu, X. Gender differences in depression, anxiety, and stress among college students: A longitudinal study from China. J. Affect. Disord. 2020, 263, 292–300. [CrossRef]

Garikipati, S.; Kambhampati, U. Women Leaders are Better Fighting at the Pandemic; Vox Eu: London, UK, 2020.

Graham, C. (2005). Gender And Well-Being Around The World. Journal of Global and Development.

Hapsari, L. A., Astuti, A. P., & Praswati, A. N. (2020). Konsumsi Makanan dan Olahraga selama Pandemi Covid 19. University Research Colloqium, 154–161.

Harsyah, N.R. dan Ediati, A. 2015 Perbedaan sikap laki-laki dan perempuan terhadap infertilitas. Jurnal Empati, 4 (4), 225 – 232.

Hou, F.; Bi, F.; Jiao, R.; Luo, D.; Song, K. Gender differences of depression and anxiety among social media users during the COVID-19 outbreak in China: A cross-sectional study. BMC Public Health 2020. [CrossRef] [PubMed]

Kartono, K. (2005). Pemimpin dan Kepemimpinan. Jakarta: PT. Raja Grafindo Persada.

Liu, N.; Zhang, F.;Wei, C.; Jia, Y.; Shang, Z.; Sun, L.; Liu,W.;Wu, L.; Sun, Z.; Zhou, Y.; et al. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. Psychiatry Res. 2020, 287, 112921. [CrossRef][PubMed]

Lores, A.P.; Murcia, J.A.M. Actitud de los universitarios ante la práctica físico-deportiva: Diferencias por géneros. Rev. Psicol. Deporte 2008, 17, 7–23.

Moreno, C.O.S.; Lomelí, D.G.; Valencia, D.G.G. Physical Activity and Eating Habits in University Students during the COVID-19 Pandemic. In Memorias de Extenso; Modalidad Virtual; University of Sonora: Sonora, Mexico, 2020.

Odriozola-González, P.; Planchuelo-Gómez, Á.; Irurtia, M.J.; de Luis-García, R. Psychological effects of the COVID-19 outbreak and lockdown among students and workers of a Spanish university. Psychiatry Res. 2020, 290, 113108. [CrossRef]

Piyeke, Phainel Jhonly; Bidjuni, Hendro; Wowiling, F. (2014). Hubungan Tingkat Stres dengan Durasi Waktu Bermain game Online pada Remaja di Manado. Jurnal Keperawatan, 2(2).

Práxedes, A.; Moreno, A.; Sevil, J.; Del Villar, F.; García-González, L. Niveles de Actividad Física en Estudiantes Universitarios: Diferencias en Función del Género, la Edad y los Estados de Cambio. In Revista Iberoamericana De Psicología Del Ejercicio Y Ei Deporte; 2016; Volume 11, pp. 123–132. Available online: https://www.redalyc.org/pdf/3111/311143051014.pdf

Putra, E. S., Perdana, S. M., Nurwaqiah, I., Tinggi, S., Kesehatan, I., Jambi, P., Lima, P., Masyarakat, F. K., Jambi, U., Brata, J. T., Masyarakat, F. K., Jambi, U., & Brata, J. T. (2020). Pandemi covid-19 terhadap kebiasaan konsumsi buah, susu dan multivitamin pada orang dewasa di provinsi jambi covid-19 pandemic to consumption habits of fruit, milk and multivitamin among adults in jambi province. Media Ilmu Kesehatan, 9(2), 118–126

Redondo-Flórez, L.; Fernández-Lucas, J.; Clemente-Suárez, V.J. Cultural differences in stress-related psychological, nutrition, physical activity and oral health factors of professors. Nutrients 2020, 12, 3644.

Rodriguez-Besteiro, Stephanie, et al. "Gender differences in the COVID-19 pandemic risk perception, psychology, and behaviors of Spanish university students." International Journal of Environmental Research and Public Health 18.8 (2021): 3908.

Saufika, Anita dan Retnaningsih, A. 2012. Gaya Hidup dan Kebiasaan Makan Mahasiswa. Jur. Ilm. Kel & Kons., 5(2), 157-165

Sharkey, T.; Whatnall, M.C.; Hutchesson, M.J.; Haslam, R.L.; Bezzina, A.; Collins, C.E.; Ashton, L.M. Effectiveness of gendertargeted versus gender-neutral interventions aimed at improving dietary intake, physical activity and/or overweight/obesity in young adults (aged 17–35 years): A systematic review and meta-analysis. Nutr. J. 2020, 19, 1–20.

Soh, N.L.; Walter, G.; Baur, L.; Collins, C. Nutrition, mood and behaviour: A review. Acta Neuropsychiatr. 2009, 21, 214–227.

Spagnolo, P.A.; Manson, J.E.; Joffe, H. Sex and Gender Differences in Health: What the COVID-19 Pandemic Can Teach Us. Ann.Intern. Med. 2020, 173, 385–386. [CrossRef] [PubMed]

Syiti, Tania Hasnan (2018) Perbedaan Tingkat Stres Mahasiswa yang Tinggal dengan Orang Tua dan Tinggal Sendiri pada Mahasiswa Tahun Pertama Fakultas Kedokteran Universitas Andalas. Diploma thesis, Universitas Andalas.

Valenzuela, M.C.S.; Gallegos, L.I.F.; Baca, L.R.L.; López, H.L.M.; Rico, F.J.F. Academic stress in university students and the practice of physical-sports exercise. Rev. Publicando 2021, 8, 1–8.

Varì, R.; Scazzocchio, B.; Del Papa, S. Dietary habits and gender differences. Ital. J. Gend. Specif. Med. 2017, 3, 55–58.

WHO—World Health Organization. Coronavirus Disease (COVID-19) Dashboard; WHO: Cham, Switzerland, 2020.