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Association between Online Study Stress in COVID-19 Pandemic with Constipation

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ABSTRAK

Background: Constipation is common and affects 15% of population worldwide. Constipation can decrease the quality of life of the patients and may be affected by many factors, including stress. Stress too, is general, especially in students, causing higher rates in suicidal tendency and impairments from various aspects. Today, in COVID-19 pandemic, stress is more common due to numerous causes. One of the causes is online studying in COVID-19 pandemic, which might trigger stress in students. **Objectives:** To determine the relationship between online study stress in COVID-19 pandemic with constipation in the year 2018 medical students of USU in 2021. **Method:** This study is an analytical observational study using a cross-sectional design. Samples in this study were 112-year 2018 medical students of USU who satisfied the inclusion criteria and gathered by using a consecutive sampling method. Primary data were acquired by using an online- shared questionnaire in the google form and submitted by the respondents. Then, univariate, and bivariate analyses were performed on the data using SPSS, with the latter using fisher's exact test. **Results:** In this study, 78 students (69,6%) were stressed and 8 students (7,1%) were constipated.The analysis between the two variables using fisher's exact test shown the p value about 0,431, which can be interpreted as no association found between online study stress in COVID-19 pandemic with constipation. **Conclusion:** Online study stress in COVID-19 pandemic is not associated with constipation.

Keywords: Constipation, Pandemic, Online study, Stress

ABSTRACT

Latar Belakang: Konstipasi sering terjadi dan mempengaruhi 15% populasi di seluruh dunia. Konstipasi dapat menurunkan kualitas hidup pasien dan dapat dipengaruhi oleh banyak faktor, termasuk stres. Stres juga umum, terutama pada siswa, menyebabkan tingkat kecenderungan bunuh diri yang lebih tinggi dan gangguan dari berbagai aspek. Saat ini, di masa pandemi COVID-19, stres lebih sering terjadi karena berbagai penyebab. Salah satu penyebabnya adalah belajar online di masa pandemi COVID-19. **Tujuan**: Untuk mengetahui hubungan antara stres belajar online pada masa pandemi COVID-19 dengan konstipasi pada mahasiswa kedokteran USU angkatan 2018 tahun 2021. **Metode**: Penelitian ini merupakan penelitian observasional analitik dengan desain *cross sectional*. Sampel dalam penelitian ini adalah 112 mahasiswa kedokteran USU angkatan 2018 yang memenuhi kriteria inklusi dan dikumpulkan dengan menggunakan metode *consecutive sampling*. Data primer diperoleh dengan menggunakan kuesioner *online-shared* di *google form* dan diajukan oleh responden. Kemudian dilakukan analisis univariat dan bivariat pada data menggunakan SPSS, yang terakhir menggunakan Fisher's Exact Test. **Hasil**: Pada penelitian ini 78 siswa (69,6%) mengalami stres dan 8 siswa (7,1%) mengalami konstipasi. Analisis antara kedua variabel menggunakan Fisher's Exact Test menunjukkan nilai p sebesar 0,431, yang dapat diartikan tidak ada hubungan antara stres belajar online pada pandemi COVID-19 dengan konstipasi. **Kesimpulan**: Stres belajar online pada pandemi COVID-19 tidak terkait dengan sembelit.

Kata kunci: Sembelit, Pandemi, Studi Online, Stres
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INTRODUCTION

Constipation is general andcommonly found daily. This problem affects about 15% of the population and still being the most numerous functional gastrointestinal disorder found worldwide.[1,2] In Indonesia, constipation ranked second place from five major functional gastrointestinal disorders with numbers shown 3,5%.[2] Increasing prevalence is noticeable in recent years with several risk factors play important role, such as age increment, female gender, and physical activity.[3] Likewise, a poor economic status too would increase the susceptibility of having constipation.[4]

Mainly, constipation might decrease the patient's quality of life regardless of the race and the residence. It is caused by the negative effects from the disturbance, as instance, pain or any general problems occurred, a great number of costs needed for diagnosis and treatments.[5,6] This decreasing quality of life of the patient might be compared to one with diabetes mellitus, asthma, and osteoarthritis.[7,8] Thus, constipation is not a trivial problem, where it might affect school and work activities.[6]

In general, constipation is divided into two groups, primary constipation and secondary constipation. In primary constipation, the underlying mechanisms might be affected by other factors, as well as sleep, wake, foods, physical and emotional stressors, gender, aging, and any other regional factors.[1] This kind of stressor which leads to stress, will affect the relationship between central nervous system and gastrointestinal system, causing colonic abnormality, such as prolonged transit of the colon. On the other hand, stress might result in the rigidity of the skeletal muscles and leads to dyssynergic defecation.[9] In secondary constipation, a progressive chronic stress which leads to psychological disorders as depression and anxiety, is considered as cause for secondary constipation since it is not directly related to the primary mechanisms and affecting systemically.[9-12] However, overall, it has been shown that theoretically and clinically that stress might affect gastrointestinal motility.[13]

Stress is one of the psychological and mental disorder that is generally found in society. According to World Health Organization (WHO), in Ambarwati [14], stress affects 350 million people globally. This, is more commonly found throughout college students, where this has been shown with number 38-71% worldwide and 39,6-61,3% in Asia. In addition, this is supported by another study which shown 34,5% of the population with stress-related symptoms in San Jorge University, Spain. [15] In Jakarta, students categorized in extremely severe stress group are prominent compared to mild, moderate,and severe groups. [16]

Then, another epidemiological study shown about 12-50% of the college students at least met one diagnostic criterion of mental disorder. [17] Stress in college students, mainly caused by increasing academical demands, new environment, changes in social life, and tight competition between the students. [18] The detrimental effects might be shown as suicidal tendencies, social life problems, working disturbance, and another negative effects. [19] Other than that, physical health might be endangered significantly. [20] Nowadays, in COVID-19pandemic, stress is surging up due to various causes. [21]

About a year ago, the whole world, including Indonesia, were panicked due to COVID-19 pandemic outbreak.

Every government in each nations searched for considerable solutions, such as isolation and quarantine [22]. In Indonesia itself, in order to limit the spread of the virus, new regulations were applied for daily living with online study learning and working from home [23].

In this COVID-19 pandemic era, the pattern of citizen's activities surely shifted compared to the one before, including the online study in college students.[21,24] This online study, especially in Indonesia, might cause stress due to several triggering factors, such as decreasing comprehension of the study and increasing workload and assignments.[23,25] Aside from that, the increasing hours in using devices for online study is associated with stress.[26] A research conducted by AlAteeq.[27]

It isconcluded that mostly students belonged to the moderate to high level stress group while doing online study in Saudi Arabia.

As the earlier problem mentioned as the background, the researchers developed interest to study and assess about the association between online study stress in COVID-19 pandemic with constipation in FK USU students year 2018 in 2021.

METHODS

Selection and Description of Participants

This study is an analytical observational study using cross-sectional design conducted in Faculty of Medicine Universitas Sumatera Utara (FK USU), North Sumatera, Indonesia within June 2021 – September 2021. Subjects gathered were 112 medical students in FK USU and were obtained by using consecutive sampling method following inclusion and exclusion criteria as described below.

1. Inclusion criteria: FK USU year 2018 active students who attend online study in COVID-19 pandemic, approved to be subjects, and submittedquestionnaire.
2. Exclusion criteria: students with IBS and those used opioids.

Technical Information

The main objective of this study was to determine the association between online study stress in COVID-19 pandemic with constipation. Another additional objectives were to measure the prevalence of stress and constipation of FK USU medical students year 2018. Primary data acquired by using questionnaires adapted from COVID-19 Student Stress Questionnaire (CSSQ) to measure stress [28] and ROME IV criteriato measure constipation.[29] The questionnaires were translated into Bahasa and modified in the scoring system, then distributed online by using social media in Google Form to the respondents. Results of the questionnaires submission were coded to prevent bias and simplify the analysis. Validity and reliability of the questionnaires were being tested to similar population and were showing valid results with $p < 0.05$ for all questions with cronbach's alpha value about 0.792 and 0.748 for stress and constipation questions respectively. All the data was kept in confidentiality with no involvement of the third party. An ethical clearance was approved by the university ethical committee as the proposal for the study had completed.

Statistics

The analysis of this study was using

univariate analysis and bivariate analysis, where the latter used fisher's exact test since it did not meet chi square requirements. A 95% CI was used with 10% degree of absolute precision. A p value < 0.05 was considered significant. Analysis performed by using version 26 SPSS program.

RESULTS

In this study, 112 eligible samples were gathered. Table 1 shows the demographic characteristics of the subjects.

Table 1. Demographic characteristics of studysubjects

Demographic Characteristics	Frequency	Percentage (%)
Gender		
Male	50	44.6
Female	62	55.4
Total	**112**	**100**
Age		
19	1	0.9
20	40	35.7
21	58	51.8
22	10	8.9
24	2	1.8
25	1	0.9
Total	**112**	**100**

From Table 1, most participants were female as many as 62 students. Meanwhile, in terms of age, most participants were aged 21 with percentage 51.8%. The prevalence of stress and constipation are being shown in Table 2 and Table 3 in sequence.

Table 2. Distribution frequency of study subjectsbased on stress event

Stress	Frequency	Percentage (%)
Yes	78	69.6
No	34	30.4
Total	**112**	**100**

Table 3. Distribution frequency of study subjectsbased on constipation event

Constipation	Frequency	Percentage (%)
Yes	8	7.1
No	104	92.9
Total	**112**	**100**

Based on Table 2, stress occupied about two third of the participants, where 78 students belong to the stress group. On the other hand, 34 students are not stressed. In Table 3, an opposite trend is notable, where participants with constipation are less commonly found, only 8 students suffer from constipation. Table 4 shows bivariate analysis between the two variables in this study.

According to Table 4, the analysis using fisher's exact test shows p value as number 0.431. This is interpreted as no association found between online study stress in COVID-19 pandemic with constipation.

Table 4. Bivariate analysis between stress andconstipation

Stress	Constipation				Total		P value
	Yes		No				
	n	%	n	%	n	%	
Yes	7	6.3	71	63.4	78	69.6	
No	1	0.9	33	29.5	34	30.4	0.431
Total	**8**	**7.1**	**104**	**92.9**	**112**	**100**	

DISCUSSION

In this study, most subjects experience stress. This study supports a statement by Adamson who showed that there were increasing stress event in

COVID-19 pandemic globally.[21] This is also found by Son in United States, where 71% of the students reported an increase in stress and anxiety in COVID- 19 pandemic.[30] Stress causes, in this pandemic, for students are financial state, exhausting online studying, and social limitation that inhibits many essential activities. Poor internet connection, prolonged study duration, and heavy assignment workloads cause stress in online study too.[31,32] Another underlying reason for this prominent stress are that the subjects are medical students in their last year and are grouped as young adults, where young adults usually are vulnerable to stress due to external factors, such as family, income, works, and another factors.[33-35] In addition, in this COVID-19 pandemic, this age group may be stressed because limited communication with lecturers and peers when studying online.[36]

Our study found a less number of constipation. This result shows lower number than another study which concluded that constipation affects 15-16% of the population worldwide.[1,11,37] Also this study shows lower number compared to studies conducted by another researchers, where their studies showed a prevalence of 11%.[2,4] Nevertheless, in general, the result still lies in range of constipation prevalence in Asia with number 3.9-28.4% and outside of Asia 2-28%.[1,37,38] In Indonesia, however, there is no concrete evidence that shows a real constipation prevalence nationally. But, a research conducted in a hospital in Jakarta in 1998-2005 showed 9% of the patients came and reported constipation themselves.[39] This study supports another similar studies, where constipation is almost always found with various numbers. Constipation prevalence is widely variable, depends to constipation definition and differences in population characteristic factors.[38, 40]

In this research, we concluded that there was no association found between online study stress in COVID-19 pandemic with constipation. A p value found by using fisher's exact test is 0.431. Theoretically and clinically, stress might affect colonic motility which can lead to constipation. A stress perception will enhance colonic motility, but if this is prolonged, colonic motility will decrease. This mechanism is based on theinteraction between HPA and SAM axis and another complex hormonal activities [13,41,42]. Other experimental research too, showed that there was association between stress and constipation.[43] In contrast, this study showed a different result. A probable reason is that the ROME IV criteria used as constipation diagnosis might limiting and narrowing the definition of constipation, so that the result do not show any association.[29,40] Differences in the population characteristics too cause the number of the patients constipated.[38]

This study has several limitations. First, there was no research which elaborates the direct association between online study stress in COVID-19 pandemic with constipation as references. Then, questions in stress questionnaire isn't directly heading to online study questions since online study might be affected by various external factors. The diagnosis using ROME IV criteria made constipation determination was not flexible. Furthermore, this study is too simple to determine such association, because it does not consider the timely factor of constipation risk factors and constipation itself. In addition, lastly, this study does not measure another

factors affecting constipation while studying online.

CONCLUSION

In conclusion, there is no association between online study stress in COVID-19 pandemic with constipation. The prevalence of stress and constipation is 69.6% and 7.1% respectively. To make a clear correlation between the two variables, another similar studies should be conducted in the near future to prevent students from stress and constipation.

REFERENCES

[1] S. S. C. Rao and M. Camilleri, "Approach to the patient with constipation," in *Yamada's Textbook of Gastroenterology*, 6th ed., D. K. Podolsky, M. Camilleri, J. G. Fitz, A. N. Kalloo, F. Shanahan, and T. C. Wang, Eds. West Sussex: John Wiley & Sons, Ltd, 2016, pp. 757–780.

[2] A. D. Sperber *et al.*, "Worldwide Prevalence and Burden of Functional Gastrointestinal Disorders, Results of Rome Foundation Global Study," *Gastroenterology*, vol. 160, no. 1, pp. 99-114.e3, 2021, doi: 10.1053/j.gastro.2020.04.014.

[3] G. Yurtdaş *et al.*, "Risk Factors for Constipation in Adults: A Cross-Sectional Study," *Journal of the American College of Nutrition*, vol. 39, no. 8, pp. 713–719, 2020, doi: 10.1080/07315724.2020.1727380.

[4] N. C. Suares and A. C. Ford, "Prevalence of, and risk factors for, chronic idiopathic constipation in the community: Systematic review and meta-analysis," *American Journal of Gastroenterology*, vol. 106, no. 9, pp. 1582–1591, 2011, doi: 10.1038/ajg.2011.164.

[5] M. A. Gonzalez-Martinez, N. X. Ortiz-Olvera, and J. Mendez-Navarro, "Novel pharmacological therapies for management of chronic constipation," *Journal of Clinical Gastroenterology*, vol. 48, no. 1, pp. 21–28, 2014, doi: 10.1097/01.mcg.0000436440.05887.02.

[6] M. C. Ruiz-López and E. Coss-Adame, "Quality of life in patients with different constipation subtypes based on the Rome III criteria," *Revista de Gastroenterología de México (English Edition)*, vol. 80, no. 1, pp. 13–20, 2015, doi: 10.1016/j.rgmxen.2015.03.001.

[7] L. Leung, T. Riutta, J. Kotecha, and W. Rosser, "Chronic constipation: An evidence-based review," *Journal of the American Board of Family Medicine*, vol. 24, no. 4, pp. 436– 451, 2011, doi: 10.3122/jabfm.2011.04.100272.

[8] L. W. C. Liu, "Chronic constipation: Current treatment options," *Canadian Journal of Gastroenterology*, vol. 25, no. SUPPL.B, pp. 22–29, 2011, doi: 10.1155/2011/360463.

[9] J. Heidelbaugh, N. M. De

Andino, D. Pineles, and D. M. Poppers, "Diagnosing Constipation Spectrum Disorders in a Primary Care Setting," pp. 1–15, 2021.

[10] M. T. Davis, S. E. Holmes, R. H. Pietrzak, and I. Esterlis, "Neurobiology of Chronic Stress- Related Psychiatric Disorders: Evidence from Molecular Imaging Studies," 2017, doi: 10.1177/2470547017710916.

[11] M. Forootan, N. Bagheri, and M. Darvishi, "Chronic constipation," *Medicine (United States)*, vol. 97, no. 20, 2018, doi:10.1097/MD.0000000000010631.

[12] C. N. Andrews and M. Storr, "Thepathophysiology of chronic constipation," vol. 25, no. October,pp. 16–21, 2011.

[13] Y.-M. Chang, M. El-Zaatari, and J. Y. Kao, "Does stress induce bowel dysfunction?," *Expert Review of Gastroenterology & Hepatology*, vol. 8, no. 6, pp. 583–585, Aug. 2014, doi: 10.1586/17474124.2014.911659.

[14] P. D. Ambarwati, S. S. Pinilih, and R. T. Astuti, "Gambaran Tingkat Stres Mahasiswa," *Jurnal Keperawatan Jiwa*, vol. 5, no. 1, p. 40, 2019, doi: 10.26714/jkj.5.1.2017.40-47.

[15] E. Ramón-Arbués, V. Gea-Caballero, J. M. Granada-López, R. Juárez-Vela, B. Pellicer-García, and I. Antón-Solanas, "The prevalence of depression, anxiety and stress and their associated factors in college students," *International Journal of Environmental Research and Public Health*, vol. 17, no. 19, pp. 1–15, 2020, doi: 10.3390/ijerph17197001.

[16] H. J. El-Matury, F. Lestari, and Besral, "Depression, anxiety and stress among undergraduate students in jakarta: Examining scores of the depression anxiety and stress scale according to origin and residency," *Indian Journal of Public Health Research and Development*, vol. 9, no. 2, pp.–295, 2018, doi: 10.5958/09765506.2018.00135.3.

[17] R. Bruffaerts *et al.*, "Mental health problems in college freshmen: Prevalence and academic functioning," *Journal of Affective Disorders*, vol. 225, pp. 97–103, 2018, doi: 10.1016/j.jad.2017.07.044.

[18] N. Kumaraswamy, "Academic stress, anxiety and depression among college students-A brief review," *International Review of Social Sciences and Humanities*, vol. 5, no. 1, pp. 135–143, 2013.

[19] C. K. Teh, C. W. Ngo, R. A. binti Zulkifli, R. Vellasamy, and K. Suresh, "Depression, Anxiety and Stress among Undergraduate Students: A Cross Sectional Study," *Open Journal of Epidemiology*, vol. 05, no. 04, pp. 260–268, 2015, doi: 10.4236/ojepi.2015.54030.

[20] S. Musabiq and I. Karimah, "Gambaran Stress dan

Dampaknya Pada Mahasiswa," *Insight: Jurnal Ilmiah Psikologi*, vol. 20, no. 2, p. 74, 2018, doi: 10.26486/psikologi.v20i2.240.

[21] M. M. Adamson *et al.*, "International prevalence and correlates of psychological stress during the global COVID-19 pandemic," *International Journal of Environmental Research and Public Health*, vol. 17, no. 24, pp. 1–16, 2020, doi: 10.3390/ijerph17249248.

[22] A. A. Balkhair, "Covid-19 pandemic: A new chapter in the history of infectious diseases," *Oman Medical Journal*, vol. 35, no. 2, pp. 2–3, 2020, doi: 10.5001/OMJ.2020.41.

[23] F. Andiarna and E. Kusumawati, "Pengaruh Pembelajaran Daring terhadap Stres Akademik Mahasiswa Selama Pandemi Covid-19," *Jurnal Psikologi*, vol. 16, no. 2, p. 139, 2020, doi: 10.24014/jp.v16i2.10395.

[24] L. PH, M. F. Mubin, and Y. Basthomi, "'Tugas Pembelajaran' Penyebab Stres Mahasiswa Selama Pandemi Covid-19," *Jurnsl Ilmu Keperawatan Jiwa*, vol. 3, no. 2, pp. 203–208, 2020.

[25] N. B. Argaheni, "Sistematik Review: Dampak Perkuliahan Daring Saat Pandemi COVID-19 Terhadap Mahasiswa Indonesia," *PLACENTUM: Jurnal Ilmiah Kesehatan dan Aplikasinya*, vol. 8, no. 2, p. 99, 2020, doi: 10.20961/placentum.v8i2.43008.

[26] N. Mheidly, M. Y. Fares, and J. Fares, "Coping With Stress and Burnout Associated With Telecommunication and Online Learning," *Frontiers in Public Health*, vol. 8, no. November, 2020, doi: 10.3389/fpubh.2020.574969.

[27] D. A. AlAteeq, S. Aljhani, and D. AlEesa, "Perceived stress among students in virtual classrooms during the COVID-19 outbreak in KSA," *Journal of Taibah University Medical Sciences*, vol. 15, no. 5, pp. 398–403, 2020, doi: 10.1016/j.jtumed.2020.07.004.

[28] M. C. Zurlo, M. F. Cattaneo Della Volta, and F. Vallone, "COVID-19 Student Stress Questionnaire: Development and Validation of a Questionnaire to Evaluate Students' Stressors Related to the Coronavirus Pandemic Lockdown," *Frontiers in Psychology*, vol. 11, no. October, 2020, doi: 10.3389/fpsyg.2020.576758.

[29] B. E. Lacy *et al.*, "Bowel disorders," *Gastroenterology*, vol. 150, no. 6, pp. 1393-1407.e5, 2016, doi: 10.1053/j.gastro.2016.02.031.

[30] C. Son, S. Hegde, A. Smith, X. Wang, and F. Sasangohar, "Effects of COVID-19 on college students' mental health in the United States: Interview survey study," *Journal of Medical Internet Research*, vol.

22, no. 9, pp. 1–14, 2020, doi: 10.2196/21279.

[31] S. Sundarasen *et al.*, "Psychological impact of covid-19 and lockdown among university students in malaysia: Implications and policy recommendations," *International Journal of Environmental Research and Public Health*, vol. 17, no. 17, pp. 1–13, 2020, doi: 10.3390/ijerph17176206.

[32] C. Yang, A. Chen, and Y. Chen, "College students' stress and health in the COVID-19 pandemic: The role of academic workload, separation from school, and fears of contagion," *PLoS ONE*, vol. 16, no. 2 February, pp. 1–16, 2021, doi: 10.1371/journal.pone.0246676.

[33] I. L. D. Moutinho *et al.*, "Depression, stress and anxiety in medical students: A cross-sectional comparison between students from different semesters," *Revista da Associacao Medica Brasileira*, vol. 63, no. 1, pp. 21–28, 2017, doi: 10.1590/1806-9282.63.01.21.

[34] B. Kumar, M. A. A. Shah, R. Kumari, A. Kumar, J. Kumar, and A. Tahir, "Depression, Anxiety, and Stress Among Final-year Medical Students," *Cureus*, vol. 11, no. 3, 2019, doi: 10.7759/cureus.4257.

[35] A. R. Stefaniak, J. M. Blaxton, and C. S. Bergeman, "Age Differences in Types and Perceptions of Daily Stress," *International Journal of Aging and Human Development*, 2021, doi: 10.1177/00914150211001588.

[36] X. Li, P. Fu, C. Fan, M. Zhu, and M. Li, "COVID-19 stress and mental health of students in locked-down colleges, "*International Journal of Environmental Research and PublicHealth*, vol. 18, no. 2, pp. 1–12, 2021, doi: 10.3390/ijerph18020771.

[37] Y. J. Lim, J. Rosita, J. Y. Chieng, and A. S. Hazizi, "The prevalence and symptoms characteristic of functional constipation using Rome III diagnostic criteria among tertiary education students," *PLoS ONE*, vol. 11, no. 12, pp. 1–14, 2016, doi: 10.1371/journal.pone.0167243.

[38] B. Werth, "Epidemiology of constipation in adults: Why estimates of prevalence differ," *Journal of Epidemiological Research*, vol. 5, no. 1, p. 37, 2019,doi: 10.5430/jer.v5n1p37.

[39] S. Bardosono, I. S. Handoko, R. A. Alexander, D. Sunardi, A. Devina, and A. Korespondensi, "Asupan Serat Pangan dan Hubungannya dengan Keluhan Konstipasi pada Kelompok Dewasa Muda di Indonesia," *Cermin Dunia Kedokteran*, vol. 47, no. 10, pp. 773–777, 2020.

[40] B. L. Werth, K. A. Williams, M. J. Fisher, and L. G. Pont, "Defining constipation to estimate its prevalence in the community: Results from a national survey," *BMC Gastroenterology*, vol. 19, no.1,

pp. 1–7, 2019, doi: 10.1186/s12876-019-0994-0.

[41] L. D. Godoy, M. T. Rossignoli, P. Delfino-Pereira, N. Garcia-Cairasco, and E. H. de L. Umeoka, "A comprehensive overview on stress neurobiology: Basic concepts and clinical implications," *Frontiers in Behavioral Neuroscience*, vol. 12, no. July, pp. 1–23, 2018, doi: 10.3389/fnbeh.2018.00127.

[42] C. Tsigos, I. Kyrou, E. Kassi, and G. P. Chrousos, "Stress, Endocrine Physiology and Pathophysiology," *Endotext*, pp. 1–46, 2020.

[43] M. A. Yildirim et al., "Lifestyle and Chronic Constipation in Medical Students, "*Gastroenterology Research and Practice"*, vol. 2021, pp. 15–18, 2021, doi: 10.1155/2021/47