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# Relationship Between Stress Levels and Functional Constipation Incidence in Adolescents in Surakarta

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## ABSTRACT

**Background:** Adolescence is a time when physical and mental changes occur. They experience various mental pressures and can affect digestive health. One of the common digestive problems in adolescents is constipation. Constipation is a condition of bowel movement disorders characterized by infrequent or less than three times a week defecation or painful defecation due to hard or large-caliber feces. The purpose of this study was to determine the relationship between stress levels and functional constipation incidence among 10th grade adolescents at SMA Negeri 1 Surakarta.
**Subjects and Method:** This was a cross-sectional study conducted at SMA Negeri 1 Surakarta. A total of 308 students of Class X selected with the conseutive sampling method. The dependent variable was constipation. The independent variables was stress levels. Te data were collected by questionairre. The sample results of the study were analyzed using SPSS software using univariate tests and chi-square bivariate tests.
**Results:** The incidence of stress level did not have a significant relationship to the incidence of functional constipation in adolescents (OR= 0.77; 95% CI = 0.25 to 2.37; p = 0.551).
**Conclusion:** There is no relationship between stress levels and functional constipation incidence in adolescents in Surakarta.

**Keywords:** adolescents, functional constipation, stress level

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## BACKGROUND

Adolescence is a period of significant physical and mental changes. According to Yusuf (2004), adolescence is also referred to as a period of "storm and stress," characterized by emotional turmoil occurring alongside rapid physical growth and distinct mental development (Juliana, 2022). During this stage, adolescents experience various pressures that can affect their digestive health. One of the most common digestive issues among adolescents is constipation (Thea et al., 2020). As individuals age, the risk of experiencing constipation

increases, including among children and adolescents (Macêdo et al., 2020).

To date, there remains considerable debate and a lack of research regarding the impact of stress levels on constipation among adolescents. For those affected, constipation can cause several issues, including stress due to discomfort, limitations on physical activity due to abdominal cramps, and an increased risk of colon cancer. These factors can reduce quality of life and productivity (Thea et al., 2020). Adolescents suffering from constipation may experience both physical and psychological discomfort, which can affect their quality of life and hinder their participation in daily activities. Addressing the relationship between stress and constipation is essential in improving the overall well-being of adolescents. This study aims to provide a foundation for better prevention and intervention methods. Additionally, it seeks to raise public awareness of the importance of adolescent mental health and its connection to digestive health. Consequently, this research could contribute to more holistic health education in schools and communities.

Studies conducted at Universitas Sumatera Utara and Universitas Trisakti have shown a correlation between stress levels and constipation incidence among university students (Stephen, 2017; Anisa, 2017). In Indonesia, most research on stress and constipation focuses on adults, while studies examining stress levels and constipation among adolescents remain limited, especially in Surakarta. Furthermore, research by Yamada has demonstrated a significant relationship between psychological stress and functional constipation (Yamada et al., 2021). However, findings from Elvita's study indicate no significant correlation between stress levels and constipation incidence (Elvita, 2015). These conflicting results suggest that further research is necessary to explore and compare previous findings.

Constipation is a health issue that requires attention due to the various factors influencing its occurrence. This is particularly important for adolescents, who face numerous challenges, including psychological stress, which may lead to constipation. Given the differing results from previous studies, this research aims to investigate the relationship between stress levels and constipation incidence among adolescents. The researcher is interested in conducting this study under the title the relationship between stress levels and functional constipation incidence in adolescents in Surakarta. This study has never been conducted on adolescents in Surakarta in 2024, making it highly dependent on the responses of the participants.

## SUBJECTS AND METHOD

### 1. Study Design

This study is an analytical observational study with a cross-sectional approach. The study analyzes the relationship between stress levels and functional constipation incidence among adolescents. The study was conducted at SMA Negeri 1 Surakarta from October to November 2024.

### 2. Population and Subject

The respondents of this study were 10th-grade students of SMA Negeri 1 Surakarta who met the inclusion criteria and were willing to participate. This study used a consecutive sampling technique with a minimum sample size of 195 participants.

### 3. Study Variables

The dependent variable was functional constipation. The independent variables in this study stress level. The confounding variables were physical activity, nutritional status, and economic level

**4. Operational Definition of Variable**

**Functional constipation** was characterized by bowel movement patterns evaluated based on frequency and stool consistency over a one-week period. In this study, functional constipation is assessed using a structured questionnaire based on the Rome IV Criteria and the Bristol Stool Chart, which help determine the severity and classification of constipation symptoms.

**Stress level** refer to the evaluation of an individual's experienced stress from physiological, psychological, and behavioral perspectives. In this study, stress levels are measured using the Perceived Stress Scale (PSS-10) questionnaire, which assesses the perception of stress and its impact on daily life.

**Physical activity** refers to the assessment of an individual's level of physical engagement using specific parameters. In this study, physical activity is measured using the Physical Activity Questionnaire for Adolescents (PAQ-A), which evaluates the frequency and intensity of physical activities performed.

**Nutritional status** refers to the use of specific parameters to assess and evaluate an individual's nutritional condition. In this study, nutritional status is measured using weight and height measurements, which are then compared to the Waterlow CDC (2000) criteria to determine whether an individual is underweight, normal weight, or overweight.

**Economic level** refers to the income earned by the head of the household over a one-month period, expressed in monetary terms. In this study, economic level is measured using a questionnaire based on the criteria set by the Indonesian Central Statistics Agency (BPS).

**5. Study Instrument**

a) Functional constipation was measured by Rome IV Criteria and Bristol Stool Form Scale (BSFS) questionnaires.
b) Nutritional status was measured by CDC Waterlow Criteria (2000).
c) Body weight was measured by weight scale.
d) Height was measured by microtoise.
e) Physical activity was measured by PAQ-A questionnaire.
f) Stress level was measured by PSS-10 questionnaire.
g) Socioeconomic was measured by questionnaire.

**6. Data Analysis**

Univariate analysis aims to determine and examine the distribution and frequency of each variable to understand the characteristics of the respondents. In this study, univariate analysis will focus on constipation, stress levels, physical activity, nutritional status, and economic, age, and gender. Meanwhile, bivariate analysis is used to explore the relationship between two variables suspected to be correlated. The data will be analyzed using the Chi-Square test with a significance level of $p<0.05$.

**7. Research Ethics**

The research ethical clearance approval letter was obtained from the Research Ethics Committee at Dr. Moewardi Hospital, Surakarta, Indonesia, No. 2.327/IX/HREC/-2024, on September 25, 2024.

## RESULTS

**1. Sample Characteristics**

A total of 350 students completed the questionnaire. After applying the inclusion and exclusion criteria, 308 students met the inclusion criteria, while 42 students were excluded based on the exclusion criteria. The data are normally distributed. Sample

characteristics are determined based on univariate analysis (Table 1).

Based on Table 1 show that the stress levels, the majority of respondents were classified as experiencing mild and moderate stress, with 280 respondents (90.9%). There were 28 respondents (9.1%) with mild. Regarding physical activity levels, the majority of respondents were categorized as having insufficient physical activity, with 279 respondents (90.6%). Only 29 respondents (9.4%) had adequate physical activity. In terms of nutritional status, most respondents were classified as under nutrition and normal nutrition, with 187 respondents (60.7%). A total of 121 respondents (39.3%) had over nutritional status. Regarding economic status, the majority of respondents were from high-income households, with 158 respondents (51.3%). There were 150 respondents (48.7.1%) from mild and moderate-income households.

**Table 1. Distribution of Research Sample Characteristics**

| Characteristics | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 123 | 39.9 |
| | Female | 185 | 60.1 |
| Age (years) | 14 years | 10 | 3.2 |
| | 15 years | 212 | 68.8 |
| | 16 years | 83 | 26.9 |
| | 17 years | 3 | 1.1 |
| Constipation | Yes | 36 | 11.7 |
| | No | 272 | 88.3 |
| Nutritional Status | Under nutrition and normal | 187 | 60.7 |
| | Over Nutrition | 121 | 39.3 |
| Stress level | Mild and Moderate | 280 | 90.9 |
| | Severe | 28 | 9.1 |
| Physical Activity | Less | 279 | 90.6 |
| | Enough | 29 | 9.4 |
| Economic Level | Mild and Moderate | 150 | 48.7 |
| | High | 158 | 51.3 |

**Table. 2 Bivariate analysis of the association of variables with functional constipation in adolescent (an analysis by Chi Square)**

| Variable | Functional Constipation | | | | OR (95% CI) | p |
|---|---|---|---|---|---|---|
| | Yes | | No | | | |
| | N | % | N | % | | |
| Stress level | | | | | | |
| Mild and Moderate | 32 | 10.4 | 248 | 80.5 | 0.77 (0.25 - 2.37) | 0.551 |
| Severe | 3 | 1.3 | 24 | 7.8 | | |
| Nutritional Status | | | | | | |
| Underweight and normal weight | 20 | 6.5 | 167 | 54.2 | 0.79 (0.39 – 0.44) | 0.500 |
| Overweight | 16 | 5.2 | 105 | 34.1 | | |
| Physical Activity | | | | | | |
| Low | 35 | 11.4 | 244 | 79.2 | 4.02 (0.53 – 30.46) | 0.224 |
| High | 1 | 0.3 | 28 | 9.1 | | |

**2. Bivariate Analysis**

The incidence of constipation, as the dependent variable, and stress level, as the independent variable, were analyzed using bivariate analysis with the Chi-Square test. Additionally, potential confounding variables such as nutritional status, physical activity, and economic level were also examined through bivariate analysis to explore their influence on the relationship.

The relationship between stress levels and functional constipation yielded a p-value of 0.551. Since the p-value is greater than 0.05, the result is not statistically significant. Therefore, the analysis indicates that there is no significant relationship between stress levels and functional constipation. Similarly, the relationship between physical activity and functional constipation resulted in a p-value of 0.224. Again, as the p-value exceeds 0.05, the result is not statistically significant, indicating no significant relationship between physical activity and functional constipation. Furthermore, the relationship between nutritional status and functional constipation produced a p-value of 0.500. As this p-value is also greater than 0.05, it suggests that there is no significant relationship between nutritional status and functional constipation.

The relationship between economic level and stress levels yielded a p-value of 0.296. Since the p-value is greater than 0.05, the result is not statistically significant. Therefore, the analysis indicates that there is no significant relationship between economic level and stress levels.

**Table. 3 Bivariate analysis of the association of variables with stress levels (an analysis by Chi Square)**

| Variable | Stress Levels | | | | OR (95% CI) | p |
|---|---|---|---|---|---|---|
| | Mild and Moderate | | Severe | | | |
| | N | % | N | % | | |
| Economic Level | | | | | | |
| Mild and Moderate | 139 | 45.1 | 11 | 3.6 | 1.52 (0.69 – 3.37) | 0.296 |
| High | 141 | 45.8 | 17 | 5.5 | | |

## DISCUSSION

The study found no significant relationship between stress levels and functional constipation, with a p-value of 0.551, which is greater than 0.05. This aligns with previous studies by Elvita (2015) and Thea et al. (2020), which also reported no such relationship. The impact of stress on constipation may vary, as individuals cope with stress differently. Additionally, severe stress, as noted in research by Wulandari (2014) in Aryaningrum (2023), can worsen digestive issues, such as irregular bowel movements. Contrasting findings by Stephen (2017) and Yamada et al. (2021) indicate a significant relationship between stress and functional constipation. Stress affects the gastrointestinal system by releasing cortisol, which reduces intestinal motility, leading to fecal buildup and harder stools (Chu et al., 2023). Excessive stress increases norepinephrine and epinephrine levels, which further decrease motility and cause digestive issues (Tsigos et al., 2020). Additionally, stress lowers guanylin and uroguanylin expression, reducing water secretion in the intestines, making stools harder (Ebisutani et al., 2020). Psychological stress in children can be triggered by family issues, school problems, stressful life events, and stress-related disorders. Managing functional constipation in children

should consider associated psychological factors (Gozali et al., 2023). The recommendation for the management includes a normal intake of fibers and fluids, normal physical activity, and an additional pharmacologic treatment for fecal disim- paction followed by a pharmacologic maintenance therapy (Levy et al., 2017). Academic pressure is a major cause of stress in adolescents, as they strive for high performance and face new challenges. The study's data collection, not during exam periods, likely influenced the academic pressure felt by respondents, with most experiencing mild to moderate stress. Individual stress responses also varied, affecting the results.

The study found no significant relationship between physical activity and functional constipation (p-value 0.224), aligning with findings by Sugiantoro et al. (2023) and Azzahra (2022). These studies suggest other factors, like fiber and fluid intake, may influence constipation. While physical activity can boost appetite and bowel movements, high stress levels, as noted by Safitri (2019) in Azzahra (2022), can still lead to constipation by disrupting metabolism. Studies by Thea et al. (2020) and Dewi and Wahyu (2021) found a significant link between physical activity and functional constipation. Physical activity improves intestinal function, leading to faster stool expulsion. Lack of exercise can slow peristalsis and cause harder stools. However, factors like fiber intake, fluid consumption, and muscle function also play a role. Even with adequate physical activity, factors such as age, gender, and dehydration may still contribute to constipation (Dewi and Wahyu, 2021). The results of this study may not be significant due to other factors not explored, such as fiber and fluid intake, which could influence the outcomes. Additionally, the large number of questions in the PAQC questionnaire may have caused respondents to lose focus, leading to similar responses.

The study found no significant relationship between nutritional status and functional constipation (p-value 0.500), consistent with research by Azzahra (2022) and Thea et al. (2020). This suggests that individuals, regardless of nutritional status, face similar risks for constipation, possibly due to inadequate fiber and fluid intake. A study in São Paulo found that nutritional status indirectly affects constipation, mainly due to low fiber intake, with no direct link between excess nutrition and constipation (de Carvalho et al., 2006; Thea et al., 2020). Previous studies by Damayanti and Mantu (2018) and Yuwanita (2018) showed a link between nutritional status and constipation, with overweight individuals at higher risk. Imbalanced calorie intake can disrupt metabolism, and excess body fat may reduce Enterochromaffin cells, affecting serotonin release and gut motility, leading to slower colon transit time and constipation (Musdja and Azrifitria, 2007, in Azzahra, 2022). The insignificant results may be due to using only weight and height measurements based on CDC criteria. Fiber and fluid intake, which can affect nutritional status, might be similar in those with normal and excess nutrition. Additionally, discrepancies could arise from lack of focus during data recording.

The study found no significant relationship between economic status and stress, with a p-value of 0.296. This aligns with research by Arma et al. (2024) and Has and Ariestiningsih (2022), which also showed no link between economic status and mental health in adolescents. Stress is influenced by both internal factors (personality, thoughts, beliefs) and external factors, which vary across individuals. Research by Parra-Mujica et al. (2023) found that low income is linked to higher

stress in adolescents due to financial pressure, limited access to healthcare, and poor living conditions. Study Asfiana (2015) also found that lower economic status is associated with higher stress, while higher income improves nutrition, parenting, and mental health in adolescents (Yang et al., 2022). Despite having a high economic status, many participants still experienced stress, likely due to other internal and external factors. Additionally, not all students knew their parents' income, which could have impacted the results.

This study had confounding factors that were not explored, such as fiber and fluid intake. Additionally, the sample size was not evenly distributed across stress levels and physical activity variables. These factors may have influenced the results, leading to the conclusion that there is no significant relationship between stress levels and functional constipation in 10th-grade students at SMA Negeri 1 Surakarta.

Based on the findings of this study, several recommendations can be made for future research. It is suggested that future studies should include additional confounding variables that may influence the results, such as fiber and fluid intake. These factors could provide a more comprehensive understanding of the relationship between stress and functional constipation. Furthermore, future research could focus on higher-grade levels, such as 11th or 12th-grade students, who often experience higher academic pressure. By including these variables, researchers can explore whether increased academic demands or other stressors play a more significant role in the incidence of functional constipation among adolescents. This broader scope may lead to more conclusive findings and allow for more targeted interventions to support student health.

## AUTHORS CONTRIBUTION

Amanda Rizma Devyka Putri chose the study subject, collected relevant literature, collected data, analyzed data, and wrote the manuscript's commentary. Supervisors Evi Rokhayati, Aisya Fikritama, and Agustina Wulandari provided direction, critical feedback, and general supervision throughout the study process. The final paper has been reviewed and approved by all authors for publishing.

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## CONFLICT OF INTEREST

There is no conflict of interest in this study.

## REFERENCES

Arma DAWSN, Lucintarillova B, Lubis A, Putri N (2024). Hubungan tingkat pendidikan dan pendapatan orangtua terhadap kesehatan mental siswa Kota Bukittinggi 1,2,3,4 (The relationship between the level of education and parental income on the mental health of students in Bukittinggi city 1,2,3,4). 9(1):188–196.

Aryaningrum DI (2023). Hubungan Antara tingkat stres dengan kejadian premenstrual syndrome pada remaja putri kelas 3 SMAN 9 Semarang (The relationship between stress levels and the incidence of premenstrual syndrome in female adolescents in grade 3 of SMAN 9 Semarang). Thesis: Semarang: Undergraduate Nursing Study Program, Ngudi Waluyo University, Ungaran.

Asfiana NW (2015). Hubungan tingkat penghasilan dengan tingkat stres kepala keluarga penduduk Dukuh Klile Desa Karangasem Kecamatan Bulu Kabupaten Sukoharjo (The relationship between income levels and stress levels of heads of families in Klile Hamlet, Karangasem Village, Bulu District, Sukoharjo Regency). Thesis. Universitas Muhammadiyah Surakarta, 151: 9–11.

Azzahra N (2022). Faktor-faktor yang berhubungan dengan konstipasi fungsional pada siswa-siswi SMK Negeri 1 Ciomas Tahun 2022 (Factors related to functional constipation in students of SMK Negeri 1 Ciomas in 2022). Universitas Islam Negeri Syarif Hidayatullah Jakarta. Retrieved from: https://repository.uinjkt.ac.id/dspace/handle/123456789/67290

Bigliardi R, Arrúa A, Iramain R, Vighi S, Barone L, Regules G, Ballari D (2021). Functional constipation in pediatrics, diagnosis and treatment, Archives Argentinos De Pediatria, 119(1):S39–S47. Retrived from: https://www.-ncbi.nlm.nih.gov/books/NBK537037/

Chu B, Marwaha K, Sanvictores T, Ayers D (2023). Physiology, stress reaction. stat pearls. Retrieved from: https://-www.ncbi.nlm.nih.gov/books/NBK541120/

Classen M, Righini-Grunder F, Schumann S, Gontard AV, Laffolie J (2022). Constipation in Children and Adolescents. Dtsch Arztebl Int. 119(41):697-708. doi: 10.3238/arztebl.m2022.0309.

Cohen S (1994). Perceived stress scale. Retrieved from: https://www.northottawawellnessfoundation.org/wp-content/uploads/2018/04/PerceivedStressScale.pdf

Coss-Adame E (2013). Brain–Gut Axis In Constipation, In book: Constipation: Current & Emerging Treatments. DOI: 10.2217/EBO.12.365

Damayanti I, Mantu MR (2018). Hubungan antara status gizi dengan konstipasi pada pelajar kelas XI SMAN 14 Jakarta Timur Periode Januari 2018 (The relationship between nutritional status and constipation in grade XI students of SMAN 14 East Jakarta in the January 2018 period). Universitas Tarumanegara. Retrived from: http:-//repository.untar.ac.id/id/eprint/16520

Devanarayana NM, Rajindrajith S (2010). Association between constipation and stressful life events in a cohort of Sri Lankan children and adolescents. J Trop Pediatr. 56(3):144-8. doi: 10.10-93/tropej/fmp077.

Dewi C, Wahyu W (2021). Asosiasi Aktivitas fisik dengan sembelit pada mahasiswa Sekolah Ilmu Kesehatan Makassar (Association of physical activity with constipation in students of Makassar School of Health Sciences). J-Kesmas: Jurnal Kesehatan Masyarakat, 7(1):1.

Diaz S, Bittar K, Hashmi MF, Mendez MD (2023). Constipation, Stat pearls Publishing. Retrieved from: https://-www.ncbi.nlm.nih.gov/books/NBK513291/

Dos Santos IR, de Abreu GE, Dourado ER, Martinelli Braga AAN, Lobo VA, de Carvalho IWB, Bastos Netto JM, Barroso U Jr (2021). Emotional and behavioural problems in children and adolescents: The role of constipation. J Paediatr Child Health. 57(7):1003-1008. doi: 10.1111/jpc.15368.

Drossman AD (2016). Rome IV Diagnostic Criteria for Disorder of Gut-Brain Interaction (DGBI). 162(3): 675-679. Retrieved from: https://www.gastrojournal.org/article/S0016-5085(21)03794-X/fulltext

de Carvalho EB, Vitolo MR, Gama CM, Lopez FA, Taddei JA, de Morais MB (2006). Fiber intake, constipation, and overweight among adolescents living in Sao Paulo City. Nutrition. 22(7-8):744-9. doi: 10.1016/j.nut.2006.05.-001.

Ebisutani N, Fukui H, Nishimura H, Nakanishi T, Morimoto K, Itou S, Nakamura A, et al. (2020). Decreased colonic guanylin/ uroguanylin expression and dried stool property in mice with social defeat stress. Front Physiol. 11:599582. doi: 10.3389/fphys.2020.-599582.

Elvita SD (2015). Faktor dominan terhadap kejadian konstipasi fungsional pada siswa SMA Islam Al-Azhar Pejaten Jakarta Selatan Tahun 2015 (Dominant factors in the occurrence of functional constipation in students of Al-Azhar Islamic High School, Pejaten, South Jakarta in 2015). Thesis. Universitas Indonesia.

Gozali FS, Febiana B, Putra IGNS, Karyana IPG, Hegar B (2023). Relationship between psychological stress with functional constipation in children: a systematic review. Pan Afr Med J. 46:8. doi: 10.11604/pamj.2023.46.8.-41130.

Has DFS, Srirahayu Ariestinigsih E (2022). Correlation between parent's economic level and boredom in learning with stress among students during covid-19 pandemic. Indonesian Journal of Community Health Nursing, 7(2):68–73. Retrieved from: https://e-journal.unair.ac.id/IJCHN/article/view/39464

Indira E (2016). Stress questionnaire: stress investigation from dermatologist perspective, Psychoneuroimmunology in Dermatology, Pp. 141–142.

Jani B, Marsicano E (2018). Consti Pati on: evaluation and management, Missouri Medicine, 115(3):236–240.

Juliana D (2022). Hubungan Antara stres dengan gejala gangguan pencernaan pada remaja di Desa Andamui Kecamatan Ciwaru Tahun 2022 (The Relationship Between Stress and Symptoms of Digestive Disorders in Adolescents in Andamui Village, Ciwaru District in 2022)

Levy EI, Lemmens R, Vandenplas Y, Devreker T (2017). Functional constipation in children: Challenges and solutions. Pediatric Health, Medicine and Therapeutics, 8:19–27.

Liu YZ, Wang YX, Jiang CL (2017). Inflammation: The Common Pathway of Stress-Related Diseases. Front Hum Neurosci. 11:316. doi: 10.3389/fnhum.2017.00316.

Macêdo MIP, Albuquerque MFM, Tahan S, Morais MB (2020). Is there any association between overweight, physical activity, fat and fiber intake with functional constipation in adolescents? Scand J Gastroenterol. 55(4): 414-420. doi: 10.1080/00365521.-2020.1749878.

Van Mill MJ, Koppen IJN, Benninga MA (2019). Controversies in the management of functional constipation in children. Curr Gastroenterol Rep. 21(6):23. doi: 10.1007/s11894-019-0690-9

Mohajan H (2017). Two criteria for good measurements in research: validity and reliability. Annals Of Spiru Haret University. DOI: http://dx.doi.org/-10.26458/1746

Musdja MY, Azrifitria (2007). Farmakoterapi saluran cerna (Gastrointestinal pharmacotherapy).

Parra-Mujica F, Lewer D, McCabe L, Ashworth M, Cann P, Anderson R, Holland R (2023). Understanding The relationship between income and

mental health among 16- to 24-year-olds: analysis of 10 waves (2009–2020) of understanding society to enable modelling of income interventions, Plos One, 18(2):1–22. doi: 10.1371/journal.pone.0279845.

Shalahuddin NI (2017). Hubungan tingkat aktivitas fisik dengan konstipasi pada ibu hamil di Puskesmas Pucangsawit Kota Surakarta (The relationship between physical activity levels and constipation in pregnant women at the Pucangsawit Community Health Center, Surakarta City). Thesis. Universitas Sebelas Maret.

Stephen (2017). Hubungan tingkat stres dengan kejadian konstipasi pada Mahasiswa Fakultas Kedokteran Universitas Sumatera Utara Stambuk 2015 (The relationship between stress levels and the incidence of constipation in students of the Faculty of Medicine, University of North Sumatra, Stambuk 2015). Thesis. Universitas Sumatera Utara.

Sugiantoro MI, Surialaga S, Putri M (2023). Hubungan aktivitas fisik dan konsumsi air dengan konstipasi pada Mahasiswa Kedokteran Universitas Islam Bandung (The relationship between physical activity and water consumption with constipation in medical students at the Islamic University of Bandung). Jurnal Integrasi Kesehatan & Sains, 5(2):150–54.

Thea F, Sudiarti T, Djokosujono K (2020). Faktor dominan kejadian konstipasi fungsional pada remaja di Jakarta (Dominant factors in the occurrence of functional constipation in adolescents in Jakarta). Jurnal Gizi Klinik Indonesia, 16(4):129.

Tran DL, Sintusek P (2023). Functional constipation in children: what physicians should know, World Journal of Gastroenterology, 29(8):1261–1288.

Tsigos C, Kyrou I, Kassi E, Chrousos GP (2020). Stress: Endocrine Physiology and Pathophysiology. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000. PMID: 25905226.

World Gastroenterology Organisation (2024). Constipation. Retrived from: https://www.worldgastroenterology.org/guidelines/constipation

Yamada M, Sekine M, Tatsuse T, Fujimura Y (2021). Lifestyle, Psychological stress, and incidence of adolescent constipation: results from the toyama birth cohort study. BMC Public Health, 21(1):1–9. doi: 10.1186/s12889-020-10044-5.

Yang D, Hu S, Li M (2022). The Influence of Family Socioeconomic Status on Adolescents' Mental Health in China. Int J Environ Res Public Health. 19(13):7824. doi: 10.3390/ijerph19137824.

Yuwanita N, Sinuhaji AB, Sembiring T, Supriatmo, Yudiyanto AR (2018). Obesity and functional constipation in children. Paediatrica Indonesiana. 58(1):1–4. doi: 10.14238/pi58.-1.2018.1-4.