

CROSS-SECTIONAL STUDY: ASSOCIATION BETWEEN ANXIETY DISORDERS AND PARACETAMOL CONSUMPTION AMONG YOUNG ADULTS AGED 18–25 YEARS IN INDONESIA

Studi Cross-Sectional: Hubungan Gangguan Kecemasan Dengan Konsumsi Parasetamol Pada Usia 18 – 25 Tahun Di Indonesia

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ABSTRACT

Background: Adolescents aged 18–25 years are vulnerable to anxiety disorders. Paracetamol, a first-line analgesic widely used for self-medication, is suspected to influence psychological processes. **Purpose:** to analyze the association between anxiety disorders and paracetamol consumption among adolescents aged 18–25 years in West Jakarta, Indonesia, a metropolitan area with a relatively high prevalence of emotional mental disorders and easy access to over-the-counter paracetamol. **Methods:** Cross-sectional study included 274 Faculty of Dentistry students at Universitas Trisakti, selected via consecutive sampling. Anxiety was measured using Hamilton Anxiety Rating Scale, and paracetamol consumption in the previous month with validated questionnaire. Data were analyzed using chi-square test. **Results:** Most respondents were aged 18–21 years (61.7%) and female (70.4%). Mild anxiety was most common (38.0%), and 31.0% had consumed paracetamol. Age and sex were not significantly associated with paracetamol consumption ($p > 0.05$). Anxiety level was significantly associated with paracetamol consumption ($p < 0.001$), highest in moderate anxiety (75.0%). **Conclusion:** Anxiety disorders are significantly associated with paracetamol consumption among adolescents, although causality cannot be inferred. Early anxiety screening, education on rational paracetamol use, and longitudinal studies assessing dose and frequency are recommended.

Keywords: anxiety disorders, paracetamol, adolescents, self-medication

ABSTRAK

Latar Belakang: Remaja usia 18–25 tahun rentan mengalami gangguan kecemasan. Parasetamol, analgesik lini pertama yang banyak digunakan untuk swamedikasi, diduga memengaruhi proses psikologis. **Tujuan:** menganalisis hubungan antara gangguan kecemasan dan konsumsi parasetamol pada remaja usia 18–25 tahun di Jakarta Barat, Indonesia, kawasan metropolitan dengan prevalensi gangguan mental emosional yang relatif tinggi dan akses mudah terhadap parasetamol sebagai obat bebas. **Metode:** Penelitian cross-sectional melibatkan 274 mahasiswa Fakultas Kedokteran Gigi Universitas Trisakti dipilih dengan consecutive sampling. Kecemasan diukur dengan Hamilton Anxiety Rating Scale, dan konsumsi parasetamol sebulan terakhir dengan kuesioner valid-reliabel. Data dianalisis dengan uji chi-square. **Hasil:** Sebagian besar responden berusia 18–21 tahun (61,7%) dan perempuan (70,4%). Kecemasan ringan paling banyak (38,0%), dan 31,0% responden telah mengonsumsi parasetamol. Usia dan jenis kelamin tidak berhubungan signifikan dengan konsumsi parasetamol ($p > 0,05$). Tingkat kecemasan berhubungan signifikan dengan konsumsi parasetamol ($p < 0,001$), tertinggi pada kecemasan sedang (75,0%). **Kesimpulan:** Gangguan kecemasan berhubungan signifikan dengan konsumsi parasetamol pada remaja, meskipun hubungan kausal belum dapat disimpulkan. Skrining dini kecemasan, edukasi penggunaan parasetamol secara rasional, dan penelitian longitudinal yang menilai dosis dan frekuensi direkomendasikan.

Kata Kunci: gangguan kecemasan, parasetamol, dewasa muda, swamedikasi

INTRODUCTION

Adolescents, aged 18 to 25, are in a crucial transitional phase in the life cycle. During this stage, individuals experience significant biological, social, and psychological changes. This makes them vulnerable to mental and emotional stress, which can impact both physical and psychological well-being (Wood *et al.*, 2017). Global meta-analytic evidence indicates that about 62.5% of individuals with a mental disorder experience its onset before the age of 25 (Solmi *et al.*, 2022). Various studies have shown that to address emerging physical and emotional complaints, this age group tends to choose readily accessible medications, one of which is paracetamol, as a form of self-medication (Jonassen *et al.*, 2021). Self-medication is also highly prevalent among university students, with a pooled worldwide prevalence of 70.1% (Behzadifar *et al.*, 2020).

Paracetamol is one of the most widely used analgesics and antipyretic drugs. Despite its relative safety with mild side effects, it remains recommended as first-line therapy in various pain management guidelines (Freo *et al.*, 2021). The high prevalence of paracetamol use is also evident in Indonesia, particularly in Denpasar, where a 2020 study showed that approximately 56.4% of the population used paracetamol to treat pain. (Lydy *et al.*, 2020).

On the other hand, anxiety disorders are an affective disorder characterized by feelings of excessive and continuous worry about the possibility of bad things happening (Marsidi *et al.*, 2022). Mild levels of anxiety are a normal response to certain situations, such as presentations, career demands, or changes in economic conditions. (Marsidi *et al.*, 2022) However, if anxiety becomes excessive and persistent, this condition can interfere with a person's social, academic and work functioning (Marsidi *et al.*, 2022).

Epidemiological data show that DKI Jakarta Province is an area with a high rate of emotional mental disorders, where in 2023, 10.1% of respondents experienced emotional mental disorders, reflecting the high pressure of life in urban areas (Marsidi *et al.*, 2022).

These conditions are often associated with various physical complaints such as headaches and muscle aches, prompting people to self-medicate with analgesics. Paracetamol is one of the most commonly used analgesics in practice due to its widespread availability and easy access without a prescription. This is supported by research showing high sales volumes of paracetamol-containing combination medications on pharmaceutical e-commerce platforms in Java, where products such as Farsifen Plus® and Neo Rheumacyl® were recorded as selling 984,050 tablets and 1,100,060 tablets, respectively, with DKI Jakarta and West Java being the largest markets due to their population density and high internet penetration (Simanullang *et al.*, 2025). These findings indicate that the use of paracetamol-containing analgesics is quite dominant in urban communities, making DKI Jakarta a relevant area for research on paracetamol consumption.

Several studies have shown that in addition to its role in reducing pain and fever, paracetamol is also suspected of influencing affect processing through central mechanisms in the central nervous system (Durso *et al.*, 2015). Several experimental studies have reported that paracetamol can modulate the perception of emotional stimuli and reduce sensitivity to negative affect, possibly through its effects on serotonergic pathways, the endocannabinoid system, and modulation of activity in brain areas involved in pain and emotion processing (Gharavi & Mischkowski, 2025). However, these findings do not directly indicate that paracetamol causes changes in anxiety levels,

as the relationship between analgesic use and psychological conditions can be influenced by various other factors, such as the presence of pain complaints or underlying psychological distress. Moreover, a randomized placebo-controlled EEG study in undergraduate students reported that a standard 1,000 mg dose of acetaminophen did not reliably alter neural indicators of emotional or feedback processing (Garrison *et al.*, 2021), indicating that the evidence remains inconsistent. Clinically, paracetamol is a relatively safe drug when used at the recommended therapeutic dose, which is a maximum of 4,000 mg per day in adults. However, high or prolonged use is known to be associated with a risk of hepatotoxicity rather than psychological effects (Freo *et al.*, 2021).

Most previous studies have focused on evaluating the effects of paracetamol on emotional blunting in controlled experimental settings or simply examining trends in over-the-counter analgesic use on psychological distress in adolescents in general without specifically measuring anxiety. Few studies, particularly in Indonesia, have specifically mapped the relationship between levels of anxiety disorders and the tendency for daily paracetamol consumption. Therefore, the novelty of this study lies in its observational approach in a real-world setting that examines the relationship between levels of anxiety disorders, measured objectively using a standardized instrument (the Hamilton Anxiety Rating Scale/HAM-A), and paracetamol self-medication behavior in a specific population, namely adolescents (aged 18–25 years) in urban areas who are vulnerable to academic and social pressures. Based on this background, this study of the relationship between paracetamol consumption and anxiety aims to analyze the relationship between anxiety disorders and paracetamol consumption in adolescents

aged 18–25 years. The study population was limited to undergraduate dentistry students because they represent a relatively homogeneous group of adolescents (18–25 years) who are exposed to similar academic workloads, clinical training, and examination-related stressors. This population is considered at increased risk of experiencing anxiety symptoms due to demanding academic and clinical responsibilities.

Furthermore, dentistry students possess adequate knowledge of medications and have easy access to over-the-counter analgesics, including paracetamol, making them an appropriate population for investigating the association between anxiety symptoms and paracetamol consumption while minimizing variability related to age, educational background, and occupation. Compared with students in non-clinical fields of study, dentistry students undergo a distinctive combination of theoretical coursework, pre-clinical training, and early clinical exposure involving direct patient care and competency-based practical examinations. This workload profile differs from that of students in most other disciplines and may place them at particular risk of anxiety. Focusing on a single, relatively homogeneous faculty, rather than a mixed sample drawn from multiple disciplines, further helped limit confounding from differences in curriculum structure and stress exposure across fields of study. Therefore, this study aimed to analyze the relationship between anxiety disorders and paracetamol consumption in 18–25-year-olds.

METHOD

Design, Time, and Place

This study was an observational, cross-sectional study. The study was conducted at the Faculty of Dentistry,

Universitas Trisakti, from August to November 2025.

Population and Sample

The population used is students of the Faculty of Dentistry aged 18 to 25 years. The study population consisted of approximately 600 active undergraduate students of the Faculty of Dentistry, Universitas Trisakti, aged 18 – 25 years, based on the average number of students from 2019 – 2024. The final sample consisted of 274 respondents. Among the respondents, 193 (70,4%) were female, and 81 (29.6%) were male, indicating that female students predominated in the study population sample. The required sample is 274 subjects, which is calculated using the finite population formula ($N = 600$, which is the average number of students in the Faculty of Dentistry class of 2019–2024, with an additional 15% to anticipate the possibility of dropping out). The sampling technique used is consecutive sampling from the total student data for the 2019 – 2024 intake, provided by the university and the class president. Students who met the following inclusion criteria were approached during data collection:

- 1) Active students of the Faculty of Dentistry at Universitas Trisakti.
- 2) Aged 18–25 years.

Exclusion criteria included:

- 1) Having a mental health disorder other than an anxiety disorder (ICD-10 Code: F4).
- 2) Respondents taking drugs other than antidepressants and paracetamol.

We assessed the exclusion criteria through a self-reported screening questionnaire administered before enrollment. Respondents were asked whether they had ever received a physician- or psychiatrist-confirmed diagnosis of a mental disorder other than anxiety and whether they were currently receiving treatment. Those

reporting such conditions were excluded from the study.

Instruments and Data Collection

The independent variable, anxiety symptoms, was measured using the Hamilton Anxiety Rating Scale (HAM-A), which consists of 14 clinician-rated items scored on a 5-point scale (0–4). The total score ranges from 0 to 56 and was categorized as follows: <14 = no anxiety, $14–20$ = mild anxiety, $21–27$ = moderate anxiety, $28–41$ = severe anxiety, and $42–56$ = very severe anxiety. The dependent variable, paracetamol consumption, was assessed using a researcher-developed questionnaire that asked respondents whether they had consumed paracetamol during the previous month period (Yes/No). The questionnaire was tested for validity using Pearson's product-moment correlation and for reliability using Cronbach's alpha, with $\alpha \geq 0.70$ considered acceptable.

Data were collected by the principal researcher; the HAM-A was administered through a structured interview conducted by the researcher, while the paracetamol consumption questionnaire and sociodemographic items were self-administered by respondents online via Google Forms, the same platform used to obtain informed consent. In addition to the primary variables, sociodemographic characteristics were collected as covariates, including age and sex. Age was self-reported in years and categorized into 18–21 years and 22–25 years. Sex was self-reported as male or female. These variables were included because they may influence both anxiety symptoms and patterns of paracetamol consumption and were therefore considered potential confounding factors.

Data Analysis

Data were analyzed using SPSS version 30.0 software. Descriptive statistics

were used to summarize respondents' characteristics. Categorical variables, including sex, age group, anxiety level, and paracetamol consumption, were presented as frequencies and percentages. Bivariate analysis was performed to examine the association between each independent variable (sex, age group, and anxiety level) and the dependent variable (paracetamol consumption). Since all variables were categorical, the Pearson chi-square test was used to compare the distribution of paracetamol consumption across categories. A two-sided p-value of <0.05 was considered statistically significant.

Ethical Clearance

This study has received ethical approval from the Ethics and Research Commission of the Faculty of Medicine, Trisakti University (No. 016/KER/FK/08/2025). Confidentiality of participant data was guaranteed, and participation was voluntary; respondents provided written informed consent via a Google Form before participating in the study.

RESULT

Respondent Characteristics

This study involved 274 individuals who completed the HARS (Hamilton Anxiety Rating Scale) questionnaire and met the inclusion criteria. As shown in Table 1, most respondents were female (193; 70.4%)

compared with males (81; 29.6%). The majority were aged 18-21 years (169; 61.7%), while the remainder were aged 22-25 years (105; 38.3%). Regarding anxiety status, mild anxiety was the most frequently observed category (104; 38.0%), followed by no anxiety (69; 25.2%), severe anxiety (40; 14.6%), moderate anxiety (36; 13.1%), and panic-level anxiety (25; 9.1%). Overall, 85 respondents (31.0%) reported consuming paracetamol, while 189 (69.0%) did not.

Bivariate analysis showed that age and gender were not significantly associated with paracetamol consumption among young adult respondents. The Chi-Square test showed no significant association between age and paracetamol consumption ($p = 0.145$), with the 18–21 and 22–25 age groups exhibiting relatively similar consumption patterns. Similarly, no significant relationship was found between gender and paracetamol consumption ($p = 0.803$), although descriptively, consumption was more common among female respondents.

Conversely, there was a significant relationship between anxiety disorders and paracetamol consumption ($p < 0.001$). Respondents with anxiety disorders, especially moderate symptoms, showed a higher proportion of paracetamol consumption than respondents without anxiety disorders, indicating that increasing levels of anxiety are associated with an increased tendency to consume paracetamol in adolescents.

Table 1. Respondent Characteristics

Characteristics		Frequency	Percentage (%)
Gender	Male	81	29.6
	Female	193	70.4
Age (years)	18 – 21	169	61.7
	22 – 25	105	38.3
Anxiety Disorders	No anxiety	69	25.2
	Mild	104	38.0
	Moderate	36	13.1
	Severe	40	14.6
	Panic	25	9.1
Paracetamol Consumption	Yes	85	31.0
	No	189	69.0

Relationship between Gender and Paracetamol Consumption

Based on the statistical analysis using the chi-square test, the p-value was 0.886. Therefore, it can be concluded that there is no significant relationship between gender and paracetamol consumption in 18- 25-year-olds. Descriptively, paracetamol consumption was reported by 59 of 193 female respondents (30,6%) and 26 of 81 male respondents (32,1%) (Table 2).

Relationship between Age and Paracetamol Consumption

Based on statistical analysis using the chi-square test in Table 2, a p-value of 0.179 was obtained, exceeding the p-value <0.05. Therefore, there is no significant relationship between age and paracetamol consumption in 18–25-year-olds. This indicates that within the young adult age range reported by 47 of 169 respondents aged 18 – 21 years (27,8%) and 38 of 105 respondents aged 22 – 25 years (36,2%), age is not yet a major determinant of paracetamol consumption behavior.

The Relationship Between Anxiety Disorders and Paracetamol Consumption

Based on statistical analysis using the chi-square test, a relationship was obtained between anxiety disorders and paracetamol consumption, indicating a significant association between anxiety disorders and paracetamol consumption in those aged 18–25. Table 2 shows that the proportion of respondents who consumed paracetamol was highest among those with moderate anxiety (27 of 36; 75.0%), followed by those with no anxiety (29 of 69; 42.0%), severe anxiety (9 of 40; 22.5%), and panic-level anxiety (4 of 25; 16.0%), and lowest among those with mild anxiety (16 of 104; 15.4%). However, this finding should be interpreted with caution as the study did not specifically assess the frequency, dosage, or duration of paracetamol consumption among respondents. Therefore, the results indicate an association only, not a causal relationship. Mild anxiety was the most frequently observed anxiety category overall (104 respondents; 38.0%).

Table 2. Bivariate Analysis of the Association between paracetamol consumption and demographics and anxiety

Variable	Paracetamol Consumption				p
	Yes		No		
	n	%	n	%	
Gender					
Female	59	30,6	134	69,4	0.886
Male	26	32,1	55	67,9	
Age (year)					
18 – 21	47	27,8	122	72,2	0.179
22 - 25	38	36,2	67	63,8	
Anxiety disorder					
No anxiety	29	42,0	40	58,0	<0.001*
Mild	16	15,4	88	84,6	
Moderate	27	75,0	9	25,0	
Severe	9	22,5	31	77,5	
Panic	4	16,0	21	84,0	

*Chi-Square test (P-Value <0,05)

DISCUSSION

This study shows that in adolescents aged 18–25 years, paracetamol consumption was not significantly associated with age or gender but was significantly associated with anxiety disorders. This finding indicates that

paracetamol consumption patterns in adolescents tend to be homogeneous and are not influenced by basic demographic characteristics but rather are more related to psychological conditions. These results align with previous research that suggests that the

use of over-the-counter analgesics such as paracetamol is quite high among adolescents due to easy access and perceived safety (Jonassen *et al.*, 2021).

The link between anxiety disorders and paracetamol consumption is also consistent with several studies reporting that individuals with psychological distress or anxiety are more likely to use over-the-counter analgesics. This suggests that analgesic use is not only related to physical pain but can also serve as a form of self-medication or a coping mechanism for emotional distress (Jonassen *et al.*, 2021).

When viewed from the perspective of anxiety as measured using the Hamilton Anxiety Rating Scale (HARS), anxiety consists of two main dimensions: psychic anxiety and somatic anxiety. Psychological anxiety encompasses symptoms such as feelings of anxiety, emotional tension, fear, difficulty concentrating, and sleep disturbances. Individuals with high levels of psychic anxiety tend to experience increased sensitivity to emotional distress and subjective discomfort, making it easier to perceive bodily sensations as disturbing. This condition can lead individuals to use analgesics to alleviate discomfort (Anindyajati *et al.*, 2021).

Apart from psychological aspects, HARS also assesses somatic anxiety, which is characterized by the appearance of various physical symptoms such as muscle pain, headaches, gastrointestinal disorders, palpitations, shortness of breath, and other autonomic symptoms. The somatic manifestations of this anxiety often resemble complaints of pain or bodily discomfort, so individuals tend to use analgesic drugs to relieve these symptoms. Previous research shows that psychological factors such as anxiety, depression, and pain catastrophizing act as important predictors of analgesic

consumption in individuals experiencing pain (Tapar *et al.*, 2022).

Theoretically, paracetamol is known to work through central mechanisms in the central nervous system that influence pain perception and the processing of negative affect. Several studies have shown that paracetamol not only acts as an analgesic but can also modulate emotional responses to unpleasant experiences. This explains the possibility that individuals with higher levels of anxiety use paracetamol to reduce subjective sensations of discomfort, whether arising from physical pain or emotional distress (Adly *et al.*, 2020).

Furthermore, daily pain can also drive analgesic use in adolescents, such as pain associated with certain conditions like dysmenorrhea in women. Previous research has shown that adolescents often rely on pain medication as a primary strategy for managing pain that interferes with daily activities (Wati *et al.*, 2024).

The findings of this study also have important policy implications. Given the significant association between anxiety symptoms and paracetamol consumption, higher education institutions should strengthen mental health promotion programs, including routine screening for anxiety symptoms, accessible psychological counseling services, and stress management interventions for students. In addition, educational campaigns promoting the rational use of over-the-counter analgesics should be integrated into student health programs to minimize inappropriate self-medication practices. These measures may help address both psychological well-being and responsible medication use among adolescents. Given that the study found a significant association between anxiety and paracetamol use, with roughly one in three respondents overall (31.0%) reporting paracetamol consumption, these findings also

point to a role for pharmacy-level measures, such as pharmacist counseling at the point of sale and clearer labeling on appropriate paracetamol use, to help reduce inappropriate self-medication linked to unaddressed psychological distress. At the institutional level, integrating anxiety screening into existing student health services, rather than establishing an entirely separate program, may be a more feasible starting point for universities with limited resources.

However, this study has several limitations. The cross-sectional design does not allow for the determination of a causal relationship between anxiety disorders and paracetamol consumption. Furthermore, the use of self-report data potentially introduces recall bias, and the lack of detailed assessment of paracetamol dosage and duration, which could influence the interpretation of the results.

This study has several strengths. First, anxiety symptoms were assessed using the validated Hamilton Anxiety Rating Scale (HAM-A), ensuring standardized measurement. Second, the inclusion of 274 participants provided sufficient statistical power to examine the association between anxiety symptoms and paracetamol consumption. Although this study was conducted at a single educational institution, thus limiting the generalizability of the results, these findings nevertheless provide a preliminary understanding of the relationship between anxiety disorders and analgesic consumption behavior in adolescents. Future research is recommended to use longitudinal or experimental designs to evaluate the causal relationship and clinical implications of paracetamol use on mental health in adolescents.

CONCLUSION AND SUGGESTION

This study showed no significant correlation between age and gender and

paracetamol consumption in adolescents aged 18–25 years. However, a significant association was found between anxiety disorders and paracetamol consumption ($p < 0.001$). Education regarding the rational use of analgesics in adolescents with anxiety disorders is needed. Future research is recommended to use a longitudinal design and assess the dose and frequency of paracetamol consumption.

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AUTHOR CONTRIBUTION

Author Kezia Ghalyva Syalillam as data collection, data analysis, manuscript writing, literature review, references. Author Nany Hairunisa as research design, data collection and supervision, data analysis, manuscript revision and translation.

CONFLICT OF INTEREST

The authors declare there is no conflict of interest with any party.

DECLARATION OF ARTIFICIAL INTELLIGENCE (AI)

The authors acknowledge the use of ChatGPT for language refinement and data summarization in preparing this manuscript. All AI-generated content has been rigorously reviewed, edited, and validated to ensure accuracy and originality. Full responsibility for the final content of the manuscript rests with the authors.

REFERENCES

- Adly, M., Adly, A., Alreshidi, S., Alotaibi, A., Alreshidi, M., & Adly, A. (2020). Can paracetamol lower stress and anxiety by blunting emotions during and after computer guided dental implant surgeries?. *Journal of Dental Sciences*, 16, 1–8. <https://doi.org/10.1016/j.jds.2020.05.026>
- Anindyajati, G., Wiguna, T., Murtani, B. J., Christian, H., Wigantara, N. A., Putra, A. A., Hanafi, E., Minayati, K., Ismail, R. I., Kaligis, F., Savitri, A. I., Uiterwaal, C. S. P. M., & Diatri, H. (2021). Anxiety and its associated factors during the initial phase of the COVID-19 pandemic in Indonesia. *Frontiers in Psychiatry*, 12, 634585. <https://doi.org/10.3389/fpsy.2021.634585>
- Behzadifar, M., Behzadifar, M., Aryankhesal, A., Ravaghi, H., Baradaran, H. R., Sajadi, H. S., Khaksarian, M., & Bragazzi, N. L. (2020). Prevalence of self-medication in university students: systematic review and meta-analysis. *Eastern Mediterranean Health Journal*, 26(7), 846–857. <https://doi.org/10.26719/emhj.20.052>
- Durso, G. R. O., Luttrell, A., & Way, B. M. (2015). Over-the-counter relief from pains and pleasures alike: acetaminophen blunts evaluation sensitivity to both negative and positive stimuli. *Psychological Science*, 26(6), 750–758. <https://doi.org/10.1177/0956797615570366>
- Freo, U., Ruocco, C., Valerio, A., & others. (2021). Paracetamol: a review of guideline recommendations. *Journal of Clinical Medicine*, 10. <https://doi.org/10.3390/jcm10153420>
- Garrison, K. E., McDonald, J. B., Crowell, A. L., Kelley, N. J., & Schmeichel, B. J. (2021). Electrocortical effects of acetaminophen during emotional picture viewing, cognitive control, and negative feedback. *Cognitive, Affective, & Behavioral Neuroscience*, 21(2), 390–400. <https://doi.org/10.3758/s13415-021-00866-0>
- Gharavi, E., & Mischkowski, D. (2025). On the role of psychological and social factors in pharmacological analgesia: a psychosocial moderation hypothesis. *Psychological Review*, 133(1), 197–220. <https://doi.org/10.1037/rev0000536>
- Jonassen, R., Hilland, E., Harmer, C. J., & others. (2021). Over-the-counter analgesics use is associated with pain and psychological distress among adolescents: a mixed effects approach in cross-sectional survey data from Norway. *BMC Public Health*, 21, 2030. <https://doi.org/10.1186/s12889-021-12054-3>
- Lydia, N. P., Putu, N., Suryaningsih, A., & others. (2020). Gambaran tingkat pengetahuan penggunaan swamedikasi analgesik di kota Denpasar. *Lombok Journal of Science*, 2(2). <https://e-journal.unizar.ac.id/index.php/mathscience/article/view/270>
- Marsidi, S. R., Yaqiin, A. A., Amsyar, A., & others. (2022). Gambaran kecemasan individu dewasa di JABETANG (Jakarta, Bekasi, dan Tangerang): gejala dan penyebab. *Jurnal Psikologi Terapan*, 5(1). <https://doi.org/10.29103/jpt.v5i1.8150>
- Simanullang, I. A. A., Soegiantoro, D. H., Kurniawaty, A. Y., & Kristiyani, A.

- (2025). Analisis penjualan obat kombinasi parasetamol dan ibuprofen di platform Shopee berdasarkan strategi harga, kemasan, dan distribusi wilayah. *Jurnal Penelitian Inovatif*, 5(3), 2131–2142. <https://doi.org/10.54082/jupin.1680>
- Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Shin, J. I., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2022). Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*, 27(1), 281–295. <https://doi.org/10.1038/s41380-021-01161-7>
- Tapar, H., Özsoy, Z., Gürler Balta, M., Da\csiran, F., Genç Tapar, G., & Karaman, T. (2022). Associations between postoperative analgesic consumption and distress tolerance, anxiety, depression, and pain catastrophizing: a prospective observational study. *Brazilian Journal of Anesthesiology*, 72(5), 567–573. <https://doi.org/10.1016/j.bjane.2021.07.007>
- Wati, A. S., Tampubolon, M. M., & Utami, S. (2024). Gambaran pengalaman mengatasi dismenorea pada remaja putri. *Innovative: Journal of Social Science Research*, 4(6), 4297–4315. <https://j-innovative.org/index.php/Innovative/article/view/16782>
- Wood, D., Crapnell, T., Lau, L., & others. (2017). Emerging adulthood as a critical stage in the life course. *Handbook of Life Course Health Development*, 123–143. https://doi.org/10.1007/978-3-319-47143-3_7