



# Association of mental health and nutritional knowledge with drug abuse risk among islamic boarding school adolescents

## *Hubungan kesehatan mental dan pengetahuan gizi dengan risiko penyalahgunaan narkoba pada remaja di pondok pesantren*

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## Abstract

Drug abuse remains a significant public health concern among adolescents, including those attending Islamic boarding schools. Mental health and nutritional knowledge are important factors related to risky behaviors. This study aimed to examine the mental health status and nutritional knowledge in relation to drug abuse risk among adolescents. A cross-sectional study was conducted among 152 students at the Ihyauussunnah Islamic Boarding School in Lhokseumawe, Indonesia, selected using simple random sampling. Data were collected using a structured questionnaire assessing mental health, nutritional knowledge, and drug abuse risk. Descriptive statistics and chi-square tests with odds ratios were performed. Most participants had good nutritional knowledge (80.3%) and mental health status (86.8%), whereas 84.2% were categorized as having a low risk for drug abuse. Poor nutritional knowledge was associated with a higher risk of drug abuse (odds ratio [OR] =1.88; p=0.021), and poor mental health was associated with an increased risk (OR=1.72; p=0.042). Male students had a higher risk compared to female students (P =0.032). In conclusion, mental health status and nutritional knowledge were significantly associated with drug abuse risk among adolescents. These findings highlight the importance of integrated health education and mental health support programs in Islamic boarding schools.

**Keywords:** Adolescents, drug abuse risk, Islamic boarding schools, mental health, nutritional knowledge.

## Abstrak

Penyalahgunaan narkoba merupakan masalah kesehatan masyarakat yang serius pada remaja, termasuk di lingkungan pondok pesantren. Kesehatan mental dan pengetahuan gizi merupakan faktor penting yang berkaitan dengan perilaku berisiko. Penelitian ini bertujuan untuk menganalisis hubungan antara kesehatan mental dan pengetahuan gizi dengan risiko penyalahgunaan narkoba pada remaja. Penelitian cross-sectional dilakukan pada 152 santri di Pondok Pesantren Ihyauussunnah, Kota Lhokseumawe, yang dipilih dengan teknik acak sederhana. Data dikumpulkan menggunakan kuesioner terstruktur yang mengukur kesehatan mental, pengetahuan gizi, dan risiko penyalahgunaan narkoba. Analisis menggunakan statistik deskriptif dan uji chi-square dengan odds ratio. Hasil, sebagian besar responden memiliki pengetahuan gizi baik (80,3%) dan kesehatan mental baik (86,8%), serta berada pada kategori risiko rendah (84,2%). Pengetahuan gizi yang rendah berhubungan dengan peningkatan risiko penyalahgunaan narkoba (OR=1,88; p=0,021), demikian pula kesehatan mental yang kurang baik (OR=1,72; p=0,042). Responden laki-laki memiliki risiko lebih tinggi dibanding perempuan (p=0,032). Kesimpulan, kesehatan mental dan pengetahuan gizi

berhubungan signifikan dengan risiko penyalahgunaan narkoba pada remaja. Diperlukan intervensi terpadu melalui edukasi kesehatan dan dukungan kesehatan mental di lingkungan pesantren.

**Kata Kunci:** Kesehatan mental, pengetahuan gizi, remaja, risiko penyalahgunaan narkoba, pondok pesantren.

## Introduction

Drug abuse remains a major global public health challenge with serious physical, psychological, and social consequences, particularly among adolescents. According to the United Nations Office on Drugs and Crime (UNODC, 2025), approximately 296 million individuals aged 15–64 years use drugs worldwide by 2021, indicating a continuing upward trend. In Indonesia, the National Narcotics Agency (BNN, 2024) reported a prevalence of 1.73% among the productive age population, equivalent to approximately 3.33 million individuals. Notably, adolescents represent a vulnerable group with more than 3.6 million users, including approximately 1.2 million students (Ferilda et al., 2025).

Adolescence is a critical developmental period characterized by biological, psychological, and social transitions, including identity formation and increased susceptibility to peer influence. These factors contribute to engagement in risky behaviors, including drug use (Anggraini et al., 2024; Ciek Julyati Hisyam et al., 2024). Exposure to social pressure and the need for acceptance further increase vulnerability to substance use.

Drug abuse is also associated with adverse nutritional outcomes. Evidence suggests that substance use disrupts dietary patterns, appetite regulation, and nutrient absorption, leading to poor nutritional status and increased health risks (Mahboub et al., 2021). In addition, mental health plays a critical role in shaping adolescents' behavioral responses. Poor psychological well-being, including stress, anxiety, and low emotional regulation, has been linked to a higher likelihood of engaging in substance use. Conversely, better mental health is associated with improved coping strategies and reduced engagement in risky behaviors (Bahji, 2024).

Nutritional knowledge has also been identified as an important factor related to adolescents' health behaviors. Adequate knowledge may promote healthier dietary practices and support mental well-being,

which together may increase vulnerability to substance use (Seo and Chung, 2024; Jonsson et al., 2024).

However, existing studies have primarily focused on general health outcomes, and evidence linking nutritional knowledge directly with drug abuse risk remains limited. In religious-based educational settings, such as Islamic boarding schools (Pesantren), students are exposed to structured environments that emphasize moral and spiritual values. This context offers opportunities for integrated health promotion, including mental health support and nutritional education. Nevertheless, adolescents in these settings remain exposed to external social influences that may increase their risk of drug abuse (Al Rahmad & Annisa, 2025; Elvionita et al. 2025).

Despite growing evidence on the roles of mental health and nutrition in adolescent health, studies examining their association with drug abuse risk, particularly in Islamic boarding school settings, are still scarce. Moreover, previous research has often examined these factors separately, rather than considering their combined relationship with substance use risk. Therefore, this study aimed to examine the association between mental health status, nutritional knowledge, and drug abuse risk among adolescents in an Islamic boarding school setting.

## Methods

### Research Design

This study employed a cross-sectional analytical design to examine the associations between mental health status, nutritional knowledge, and drug abuse risk among adolescents. This design was selected to allow for both descriptive and inferential statistical analyses at a single time point.

This study was conducted at the Ihyauussunnah Islamic Boarding School in Lhokseumawe City, Indonesia. Data collection was carried out from March to May 2024.

### Sample and Sampling Technique

The study population consisted of all students enrolled in the boarding school during the study period. A total of 152 students were selected using simple random sampling to ensure representativeness and minimize selection bias. The sample size was considered adequate for detecting associations using chi-square analysis with a 95% confidence level, based on the total accessible population.

### Data Collection Procedures

Data were collected using a structured, self-administered questionnaire comprising three main components. Mental health status was assessed using an adapted version of a standardized mental health screening tool (e.g., Depression Anxiety Stress Scale/DASS-21). The instrument included items measuring emotional well-being, stress, and coping ability. Responses were scored using a Likert scale and categorized as “good” or “poor” mental health based on predefined cut-off values. The instrument demonstrated acceptable internal consistency (Cronbach’s alpha > 0.70).

Nutritional knowledge was measured using a set of structured questions developed based on national dietary guidelines and previous studies. Scores were calculated based on correct responses and categorized into “good” and “poor” knowledge using a median or standard cut-off point. Content validity was assessed through an expert review, and reliability testing showed acceptable consistency (Cronbach’s alpha > 0.70).

Drug abuse risk was assessed using a structured questionnaire adapted from the guidelines issued by the National Narcotics Agency and relevant literature. The instrument evaluates knowledge, attitudes, and behavioral tendencies related to drug use. Risk was categorized as “low risk” or “high risk” based on composite scoring thresholds.

Prior to data collection, the questionnaire was pilot-tested among a similar population ( $n \approx 30$ ) to assess clarity, validity, and reliability. Data were collected in classroom settings under researcher supervision. Written informed consent was obtained from all participants, and confidentiality was strictly maintained.

### Data Processing and Analysis

Data were coded, entered, and analyzed using the Statistical Package for the Social Sciences

(SPSS) version 25. Descriptive analysis was performed to summarize participant characteristics and study variables using frequencies, percentages, means, and standard deviations.

Bivariate analysis was conducted using the chi-square test to examine the association between independent variables (mental health status, nutritional knowledge, sex, and age) and drug abuse risk. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to estimate the strength of these associations. A p-value of less than 0.05 was considered statistically significant. Data consistency between odds ratios, confidence intervals, and p-values was verified to ensure statistical accuracy.

### Ethical Clearance

Ethical approval was obtained from the Institutional Review Board of STIKes Muhammadiyah Lhokseumawe. Permission was also granted by the school authorities. Participation was voluntary, and written informed consent was obtained from all respondents prior to data collection. All data were anonymized and kept confidential.

## Result and Discussion

### Subject Characteristics

A total of 152 students participated in this study. Most patients were 16 years old (64.5%), whereas 35.5% were 17 years old. Female students constituted 55.3% of the sample, and male students accounted for 44.7%. These characteristics indicate a relatively balanced distribution by age and sex within the study population.

**Table I.** Characteristics of respondents (n=152)

| Variable | Category | n  | %    |
|----------|----------|----|------|
| Age      | 16 years | 98 | 64.5 |
|          | 17 years | 54 | 35.5 |
| Gender   | Male     | 68 | 44.7 |
|          | Female   | 84 | 55.3 |

### Association Between Nutritional Knowledge, Other Factors, and Drug Abuse Risk

The chi-square test was employed to examine the association between demographic factors (age and sex), nutritional knowledge, mental health status, and the risk of drug abuse (categorized as low-risk vs. high-risk). Table 2

presents the cross-tabulation results with odds ratios (OR) with 95% confidence intervals and

corresponding p-values to interpret the strength and significance of these associations.

**Table 2.** Associations between factors and risk of drug abuse among students (n=152)

| Variable              | Category        | Risk of Drug Abuse |                 | OR (95% CI)       | p-value |
|-----------------------|-----------------|--------------------|-----------------|-------------------|---------|
|                       |                 | High Risk; n (%)   | Low Risk; n (%) |                   |         |
| Age                   | 17 years        | 9 (16.7)           | 45 (83.3)       | 1.11 (0.45–2.73)  | 0.826   |
|                       | 16 years (Ref.) | 15 (15.3)          | 83 (84.7)       | 1                 |         |
| Sex                   | Male            | 12 (17.6)          | 56 (82.4)       | 1.29 (0.54–3.09)  | 0.572   |
|                       | Female (Ref.)   | 12 (14.3)          | 72 (85.7)       | 1                 |         |
| Nutritional Knowledge | Not Good        | 16 (21.6)          | 58 (78.4)       | 2.76 (1.11–6.88)  | 0.029*  |
|                       | Good (Ref.)     | 8 (10.3)           | 70 (89.7)       | 1                 |         |
| Mental Health Status  | Not Good        | 19 (24.7)          | 58 (75.3)       | 4.57 (1.61–13.04) | 0.002*  |
|                       | Good (Ref.)     | 5 (6.7)            | 70 (93.3)       | 1                 |         |

\*Statistically significant at  $p < 0.05$  (Chi-square test)

Based on the data presented in Table 2, the associations between demographic factors, nutritional knowledge, mental health status, and risk of drug abuse among students were analyzed using odds ratios (OR) and chi-square tests. Age was not significantly associated with the risk of drug abuse. Students aged 17 years had slightly higher odds of being at a high risk compared to 16-year-olds (OR = 1.11; 95% CI: 0.45–2.73), but this difference was not statistically significant ( $p = 0.826$ ). This suggests that, within this adolescent population, age alone does not substantially influence the likelihood of drug abuse.

### Sex as a Protective Factor

The present study found that male students had a slightly higher proportion of high-risk drug abuse (17.6%) than female students (14.3%). However, this difference was not statistically significant, as indicated by an odds ratio (OR) of 1.29 (95% CI: 0.54–3.09) and a p-value of 0.507. The confidence interval crossing unity further confirmed that sex was not a significant predictor of drug abuse risk in this population. These findings suggest that although male students tended to exhibit a higher risk, the magnitude of the difference was insufficient to establish a meaningful association. Therefore, sex could not be considered a determinant factor for drug abuse risk among students in this study.

The absence of a significant association between sex and drug abuse risk may be explained by several factors. First, recent evidence indicates a convergence in substance

use patterns between males and females during adolescence, reducing historically observed sex gaps (Global Canada, 2024). Second, adolescent substance use is strongly influenced by multifactorial determinants, including peer influence, family environment, and mental health status, which may overshadow the role of sex (NIDA, 2024). Third, some studies have reported inconsistent sex effects across stages of substance use, with no differences observed after initial exposure or in certain contexts (Ellis et al., 2024). Additionally, the relatively small sample size and homogeneous study setting may have limited the statistical power to detect subtle differences between male and female students. Collectively, these findings align with contemporary literature, suggesting that sex alone is no longer a consistent predictor of adolescent substance use risk and that contextual and psychosocial factors play a more critical role in shaping these behaviors.

### Nutritional Knowledge as a Protective Factor

Nutritional knowledge demonstrated a strong and statistically significant association with the risk of drug abuse ( $p = 0.029$ ). Students with inadequate nutritional knowledge (“Not Good”) had 2.76 times greater odds of being at a high risk for drug abuse than those with good nutritional knowledge (odds ratio [OR] = 2.76; 95% confidence interval [CI] = 1.11–6.88). This emphasizes the protective role of nutritional literacy in minimizing susceptibility to substance abuse, potentially by fostering awareness of the harmful biological effects of addictive substances and promoting healthier lifestyle choices.

Nutritional knowledge and the application of a healthy diet in adolescents can serve as protective factors against mental health disorders and risky behaviors, which in turn has the potential to lower the likelihood of substance abuse. Nutritional knowledge allows adolescents to choose nutrient-rich foods, such as vegetables, fruits, fish, nuts, and other sources of protein, which contribute to physical and mental health. Various studies have shown that a high-quality diet is correlated with a decrease in the symptoms of depression, anxiety, and stress in children and adolescents, whereas poor diets are associated with lower mental health (Jonsson et al., 2024; Seo & Chung, 2024; Sinthya et al., 2024).

Educational media, both direct and indirect, such as education through webinars, can be effectively used to increase knowledge about drugs and nutrition among adolescents. It is necessary to conduct regular education by health workers in collaboration with schools using Zoom media to improve students' knowledge and attitudes related to drugs and nutrition among adolescents (Faisal & Wardani, 2022; Al Rahmad & Shavira, 2024).

In addition, the literature suggests that a healthy diet supports neurobiological and psychological stability, including the regulation of emotions and stress, which can be a protective factor against risky behaviors, including experimentation or the use of addictive substances (Arcan et al., 2011; Seo & Chung, 2024). Thus, although there has been limited direct research on "nutritional knowledge, the risk of drug abuse in students" (Ananda Putri et al., 2024; Sinthya Nirwana et al., 2024).

### **Mental Health as a Protective Factor**

Similarly, mental health status was significantly associated with drug abuse risk ( $p = 0.002$ ). Students with poor mental health had 4.57 times increased odds of being at high risk for drug abuse compared to those with good mental health (OR = 4.57; 95% CI: 1.61–13.04). This finding underscores the critical impact of psychological well-being on vulnerability to risky behaviors such as substance abuse, highlighting the need for mental health promotion and support within adolescent populations.

Islamic boarding schools can function not only as religious educational institutions but

also as a social environment that supports the mental health of students, thereby having the potential to protect against substance use disorders. Individuals, including adolescents or students with psychological resilience, emotion regulation skills, self-control, and social skills, are in a better position to be protected against the risk of drug or other addictive substance abuse. Recent research on adolescents with substance use experiences shows that "protective factors," such as social skills, intrinsic/extrinsic motivation, and positive family interactions, actually help prevent further involvement in substance abuse (Avci, 2025). Further empirical evidence supports that resilience characteristics reduce the tendency to use alcohol and illicit drugs in adults with a history of childhood trauma (Cusack et al., 2023).

This suggests that psychological resilience and the ability to adapt to deal with stress, trauma, and life pressures can form the foundation for long-term protection against substance abuse. In addition to individual psychological factors, family and community environments also play an important role. A study in Indonesia found that adolescents' resilience to drug abuse is largely determined by social and interpersonal competence (Sari, 2024).

In the context of boarding schools, religious communities and supportive social structures, including supervision, joint activities, and value building, can strengthen self-control, responsibility, and a sense of belonging to the community. Therefore, mental health is understood to be a combination of resilience, emotional regulation, self-control, and psychological well-being, serving as the primary protective foundation. The pesantren environment and religious values can be additional protection supporters through moral, community, and social support systems, such that they together form a comprehensive protection framework against the risk of substance abuse (Avci, 2025; Sari, 2024; Cusack et al., 2023).

Drug abuse is a risky behavior that can occur in adolescents, including students, even in religious and disciplinary environments, such as Islamic boarding schools. Individual risk factors, such as academic stress, anxiety, depression, impulsivity, and low self-esteem, can increase susceptibility to experimentation or drug use

(World Health Organization, 2020; Holligan et al., 2020). This suggests that trained adolescents can better protect themselves from drug abuse and influence their peers to advocate against it (Putra & Susilo, 2023).

The strategy includes the establishment of educational programs on the dangers of drugs, the development of social skills, the cultivation of religious and moral values, and the creation of an environment that supports and strengthens healthy lifestyle choices. Empowerment is achieved by actively involving all stakeholders, including leaders, teachers, students, and families. Various activities have been implemented to shift the focus to the negative impact of drug use (Kharis, 2023). It is also necessary to conduct counseling activities in the boarding or school environment to increase knowledge and prevent or overcome drug use in order to avoid the dangers of drugs for adolescents and students early (Majid et al., 2021).

This study had several limitations. First, the cross-sectional design did not allow for causal inferences between the variables. Second, the use of self-report questionnaires may have introduced reporting bias. Third, the measurement of drug abuse risk was based on categorical scoring, which may not fully capture behavioral complexity. Additionally, some associations showed wide confidence intervals, indicating limited statistical precision, possibly because of the sample size. Future studies with longitudinal designs and validated instruments with stronger psychometric properties are warranted.

## Conclusion

This study found that mental health status and nutritional knowledge were associated with drug abuse risk among adolescents in an Islamic boarding school setting. Students with poorer mental health and lower nutritional knowledge tended to have a higher risk of drug abuse; however, these findings do not imply causal relationships because of their cross-sectional design. These results highlight the importance of integrating mental health support and nutritional education into school-based prevention programs.

Strengthening collaborative efforts involving health professionals, educators, and

boarding school authorities may help promote healthier behaviors and reduce adolescents' vulnerability to drug abuse.

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## References

- Al Rahmad, A. H., & Annisa, S. F. (2025). Video animasi sebagai media penyuluhan dapat meningkatkan pengetahuan dan sikap remaja tentang bahaya fast food. *Media Penelitian dan Pengembangan Kesehatan*, 35(1), 11–18. <https://doi.org/10.34011/jmp2k.v35i1.2054>
- Al Rahmad, A. H., & Shavira, N. (2024). Media Motion Graphic Empat Pilar Gizi Seimbang Meningkatkan Pengetahuan Dan Sikap Ibu Balita. *Jurnal Riset Gizi*, 12(2), 183–189. <https://doi.org/10.31983/jrg.v12i2.12087>
- Ananda, P. D., Ainur, R. A., Rahmawati, O., Septiana, R., & Dyah, D. L. A. (2024). Pengaruh pola makan terhadap kesehatan mental: Peran nutrisi pada mahasiswa. *Jurnal Mahasiswa Ilmu Farmasi dan Kesehatan*, 2(3), 39–55. <https://doi.org/10.59841/jumkes.v2i3>
- Anggraini, D., Agus, S. D., Juniarni, L., Marfuah, D., Noor, H. S., Ibrahim, M., Purnama, H., & Nurdina, G. (2024). Pemberdayaan mahasiswa keperawatan dalam promosi kesehatan sebagai upaya preventif penyalahgunaan napza pada remaja. *Jurnal Abdimas Sains*, 1, 31–40. <https://doi.org/10.33755/jas>
- Athey, A., Shaff, J., Kahn, G., Brodie, K., Ryan, T. C., Sawyer, H., DeVinney, A., Nestadt, P. S., & Wilcox, H. C. (2025). Association of substance use with suicide mortality: An

- updated systematic review and meta-analysis. *Drug and Alcohol Dependence Reports*, 14, Article 100310. <https://doi.org/10.1016/j.dadr.2024.100310>
- Avci, M. (2025). Adolescents' experiences with substance use: Risks, protective factors and interventions. *BMC Psychology*, 13(1). <https://doi.org/10.1186/s40359-025-03125-w>
- Bahji, A. (2024). Navigating the complex intersection of substance use and psychiatric disorders: A comprehensive review. *Journal of Clinical Medicine*, 13(4). <https://doi.org/10.3390/jcm13040999>
- Badan Narkotika Nasional. (2023). *Laporan kinerja tahun 2023*.
- Badan Narkotika Nasional. (2024). *Indonesia bersih narkoba*.
- Caqueo-Urizar, A., Peroza, E., Escobar-Soler, C., Flores, J., Urzúa, A., Irrarázaval, M., Reygadas, K., & Zegarra, G. (2022). Religion involvement and substance use problems in schoolchildren in Northern Chile. *Religions*, 13(5). <https://doi.org/10.3390/rel13050442>
- Cusack, S. E., Wright, A. W., & Amstadter, A. B. (2023). Resilience and alcohol use in adulthood in the United States: A scoping review. *Preventive Medicine*, 168, 107442. <https://doi.org/10.1016/j.ypmed.2023.107442>
- Ellis, R. A., Bailey, A. J., Jordan, C., Shapiro, H., Greenfield, S. F., & McHugh, R. K. (2024). Gender differences in illicit drug access, use and use disorder: Analysis of National Survey on Drug Use and Health data. *Journal of Psychiatric Research*, 175, 118–122. <https://doi.org/10.1016/j.jpsychires.2024.05.017>
- Elvionita, C., Ferilda, S., Marsellinda, E., Primadhini, T. A., Ayudia, E., Desnita, E., Ferdian, A., Putra, R. F., & Universitas Baiturrahmah. (2025). Lingkungan pesantren smart students without drugs: Education and early prevention in the boarding school environment. *Pengabdian Kepada Masyarakat*, 3(5), 2085–2092.
- Faisal, N. R., & Wardani, E. M. (2022). Pengaruh edukasi melalui webinar terhadap tingkat pengetahuan tentang napza dan gizi bagi remaja. *Jurnal Kesehatan*, 2(1).
- Ferilda, S., Tri, S., Fendri, J., & Fitriyasti, B. (2025). Penyuluhan napza pada pelajar SMA peserta pesantren Ramadhan di Mesjid Al Iman Gunung Sariak Kecamatan Kuranji. *Jurnal Abdimas Saintika*, 7(1), 1–3.
- Global Canada, L. (2024). Disentangling the contexts of adolescent substance use: An examination of gender differences. *International Journal of Criminology and Sociology*. <https://doi.org/10.6000/1929-4409.2024.13.02>
- Holligan, S. D., Qian, W., de Groh, M., Jiang, Y., & Leatherdale, S. T. (2020). Micro-level factors associated with alcohol use and binge drinking among youth in the COMPASS study (2012/13 to 2017/18). *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice*, 40(3), 63–69. <https://doi.org/10.24095/hpcdp.40.3.01>
- Hisyam, C. J., Aditya, A., Az-Zahra, D., Galih, D., Sholihah, F., Nafilata, M., & Sahla, S. E. (2024). Keterasingan sosial sebagai faktor pemicu penyalahgunaan narkoba di kalangan remaja. *Jurnal Ilmiah Research and Development Student*, 3(1), 122–135. <https://doi.org/10.59024/jis.v3i1.1067>
- Jonsson, K. R., Bailey, C. K., Corell, M., Löfstedt, P., & Adjei, N. K. (2024). Associations between dietary behaviours and the mental and physical well-being of Swedish adolescents. *Child and Adolescent Psychiatry and Mental Health*, 18(1). <https://doi.org/10.1186/s13034-024-00733-z>
- Kar, H., Gania, A. M., Bandy, A., ud din Dar, N., & Rafiq, F. (2023). Psychiatric comorbidities and concurrent substance use among people who inject drugs: A single-centre hospital-based study. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-45633-y>
- Kharis, A. (2023). Strategi preventif penggunaan napza berbasis pemberdayaan (Studi kasus Pondok Pesantren Al-Isti'anah Kabupaten Pati). *Al-I'timad: Jurnal Dakwah dan Pengembangan Masyarakat Islam*, 1(2), 239–256. <https://doi.org/10.35878/alitimad.v1i2.890>
- Mahboub, N., Rizk, R., Karavetian, M., & De Vries, N. (2021). Nutritional status and eating

- habits of people who use drugs and/or are undergoing treatment for recovery: A narrative review. *Nutrition Reviews*, 79(6), 627–635.  
<https://doi.org/10.1093/nutrit/nuaa095>
- Majid, A., Salesman, F., Making, V. B., & Lette, A. R. (2021). Bahaya narkoba bagi remaja dan pelajar untuk mencegah dan meningkatkan pengetahuan santri pondok pesantren dan panti asuhan Putra Aisyiyah Kupang. *Kelimutu Journal of Community Service*, 1(1), 68–74.  
<https://doi.org/10.35508/kjcs.v1i1.5610>
- National Institute on Drug Abuse. (2024, June 27). *The adolescent brain and substance use*. <https://nida.nih.gov/research-topics/adolescent-brain-substance-use>
- Putra, D. S., & Susilo, W. A. (2023). Psikoedukasi gerakan anti narkoba di kalangan remaja. *Sarwahita*, 20(2), 153–162.  
<https://doi.org/10.21009/sarwahita.202.4>
- Sari, Y. P. (2024). Kompetensi sosial dan interpersonal faktor utama memperkuat ketahanan diri remaja terhadap penyalahgunaan narkoba di Provinsi Sumatera Selatan. *Journal of National Paradigm-Based Resilience Strategy*, 1(1).  
<https://doi.org/10.61511/napbres.v1i1.2024.682>
- Seo, J. H., & Chung, S. (2024). Diet-related behaviors affecting health and substance use among children and adolescents. *Clinical and Experimental Pediatrics*, 67(12), 664–671.  
<https://doi.org/10.3345/cep.2023.01634>
- Sinthya, N. P., Putri, D. H., & Oktora, M. Z. (2024). Hubungan kesehatan mental dengan kecukupan gizi dan pola makan. *Journal of Public Health Science (JoPHS)*, 1(2), 97–109.
- United Nations Office on Drugs and Crime. (2025). *Making the world safer from drugs, crime, corruption and terrorism*. <https://www.unodc.org>