ARTICLE INFO

AUTHOR'S AFFILIATIONS
Faculty of Medicine, Jember University, Jember, East Java, Indonesia[1]
Department of Psychiatry, Faculty of Medicine, Jember University, Jember, East Java, Indonesia[2]
Department of Histology, Faculty of Medicine, Jember University, Jember, East Java, Indonesia[3]

CORRESPONDING AUTHOR
Inke Kusumastuti
Department of Psychiatry, Faculty of Medicine, Jember University, Jember, East Java, Indonesia[2]
E-mail: inke@unej.ac.id

Article history

Received	15-07-2025
Revised	12-02-2026
Accepted	10-03-2026
Available online	31-03-2026

Please cite this article in APA 7th edition style as:
Ramadhanti, R. S., Kusumastuti, I., & Aziz, A. M. (2025). Analysis of stress and smoking behavior among medical students in Jember University. *Jurnal Ilmiah Kedokteran Wijaya Kusuma, 15(1), 17-23*

https://doi.org/10.30742/jikw.v15i1.4698

Analysis of stress and smoking behavior among medical students in Jember University

Rizka Savira Ramadhanti[1], Inke Kusumastuti[2], Ayu Munawaroh Aziz[3]*

Abstract

Background: Prolonged stress commonly induces specific coping strategies, including the adaptive problem-focused and the less adaptive emotion-focused coping. One example of emotion-focused coping is smoking. Objective: This study aimed to characterize the stress experienced by medical students and how they correlate with smoking behaviors. **Methods**: This descriptive research employed the Depression, Anxiety, Stress Scale – Stress Domain (DASS-S) and Silvan-Tomkin's smoking behavior questionnaires as guides for semi-structured interviews. Five all-male medical students aged 19-22 years who were regular smokers were interviewed. **Result**: One respondent admitted the presence of significant stress. Despite the absence of significant stress, other respondents admitted occasional tension due to academic stressors. Two respondents associated smoking with obtaining positive emotions, while three associated smoking with coping with negative emotions. **Conclusion**: There is no clear correlation between stress and smoking behavior Future research might benefit from obtaining data from a larger sample number and considering the timing of the occurrence of stress when inquiring about smoking behavior to better establish the characteristics of stress and its correlations with smoking behavior.

Keywords: DASS-S, Phenomenology, Stress, Smoking behavior

Original Research Article

INTRODUCTION

Medical students have higher rates of depression and stress than the general population (Rotenstein et al., 2016). Due to the academic load and demanding financial commitments, medical school is known as a challenging and stressful environment (Rafidah et al., 2018). Enrolling in medical school is frequently associated with various challenges, including the workload of courses, frequent assessments, high standards for grades, and competition among students. This might instigate stress that could cause different coping strategies (Melaku et al., 2015; Malathi et al., 1999). Coping strategies could be adaptive and maladaptive. Adaptive coping strategies are better correlated with psychological well-being. For example, after experiencing stress, with adaptive coping, individuals would usually try to solve problems, develop new skills, and improve their emotional control, which might contribute to a better quality of life. Conversely, maladaptive coping, as it is considered psychopathological, might manifest as anxiety, depression, avoidant behaviors, or detachment from

one's own emotions (Cortez et al., 2023; Chaaya et al., 2025). While problem-centered coping is deemed more adaptive, the less adaptive emotion-focused coping might involve the use of addictive substances, including smoking (Algorani & Gupta, 2023; Harun et al., 2025).

Indonesia ranked third for the largest number of smokers worldwide, and fifth for the largest cigarette consumer in 2007 (Ministry of Health of the Republic of Indonesia, 2018). Twenty-nine percent of Indonesians smoke, and this might include medical students too (Abu-elenin et al., 2017). Despite the awareness of the danger of smoking among medical workers and students, the 2009 Global Health Professional Survey stated that the smoking rate among medical students in Indonesia is estimated to be 19.8 (World Health Organization, 2011). Aside from the inherent adverse effects of smoking on health, medical personnel who smoke seem to be less likely to advise or help patients to stop smoking (Cattaruzza et al., 2013). One study reported that physicians who smoked were less likely to consider smoking as harmful when compared to their nonsmoking colleagues (Pipe et al., 2009). It is paramount to explore smoking characteristics among medical students and how stress might contribute to them, as it may affect the students' medical practice in the future.

MATERIALS AND METHODS

The study was conducted from March to July 2020. This study was initially planned to use a quantitative research design, with inclusion criteria being male and female students of the Faculty of Medicine, University of Jember aged 18 years or older, smokers, and willing to participate. Respondent recruitment occurred in two stages. First, interested students completed an online form containing their data, including name, sex, semester, telephone number, current smoking status, and whether the subject experienced stressors within the previous week. Two hundred eighty-two students completed the form, but only fifteen admitted to being current smokers. The fifteen respondents then completed the Depression, Anxiety, Stress Scale (DASS) questionnaire of 42 items that measures three dimensions, namely depression (D), anxiety (A), and stress (S) for early detection of psychological disorders (Nada et al., 2022). Ten respondents with abnormal results for the depression and anxiety domains of the scales were excluded. The research design was then changed to a descriptive study due to the limited number of samples that met the inclusion and exclusion criteria. The remaining five respondents, who happened to be all male respondents, then underwent semi-structured interviews to obtain data regarding the characteristics of stress and its possible correlation to their smoking behavior. Interviews were conducted using the DASS-S questionnaire and a scale prepared based on Silvan Tomkins' theory as guides. In his theory, Silvan Tomkins (1966) classifies the types of smoking behavior into four categories, namely (1) habitual smoking, (2) positive affect smoking, (3) negative affect smoking, and (4) addictive smoking. This study has received ethical approval from the Research Ethics Commission of the Faculty of Medicine, Jember University, with ethical clearance statement number No.1.436/H25.1.11/KE/2020.

RESULTS

The characteristics of respondents are presented in Table 1. All were males, 60% were in the 8th semester, and 80% were more than 20 years old. The DASS-S score revealed the presence of stress in 1 subject and its absence in four others.

Table 1. Respondents' characteristics

Respondent Characteristics	*N*	*Percentage*
Semester		
2	*2*	*40%*
4	*0*	*0%*
6	*0*	*0%*
8	*3*	*60%*
Age		
≥20	*4*	*80%*
<20	*1*	*20%*
DASS-S Interpretation		
Stress	1	20%
Non-stress	4	80%
Total	*5*	*100%*

A scale prepared based on Silvan Tomkins' theory was used as the guide for determining the dominant type of the respondents' smoking behavior, and the summary of this assessment is presented in Table 2. The percentage of each type of smoking behavior was calculated according to the formula below:

Percentage = *S/N* x 100%

S: Score from completing the questionnaire

N: The maximum total score of the type

Table 2. Characteristics of respondents' smoking behavior

Respondent Number	Positive		Negative		Addiction		Habitual		Total Score
	S	%	S	%	S	%	S	%	
22	27	75%	58	72.5%	8	50%	12	60%	112
31	26	69%	51	63.75%	8	50%	10	50%	101
104	32	72.2%	76	95%	10	62.5%	18	90%	89
240	25	66.6%	56	70%	6	33.3%	11	55%	105
275	32	88.8%	76	95%	10	52.5%	18	90%	142

DISCUSSION

All respondents in this study were males. This complies with data from the Ministry of Health of the Republic of Indonesia, mentioning that most smokers (66%) among the population aged over 15 years were males (RISKERDAS, 2018). A study in Saudi Arabia also explained that among prospective health experts, men were more likely to smoke compared to women (Wali, 2011).

Three respondents were from the eighth semester, while two were in the second semester. A study in China endorsed this finding, stating that the number of smokers among medical students increased with the increase in years of education at the medical faculty. Increased stress in studying medicine might have led to an increased risk of tobacco use among medical students. This might explain the similar prevalence of smoking between medical and non-medical students despite the better knowledge about tobacco-related diseases and smoking behavior among medical students (Han et al., 2011).

Based on the DASS-S scale, one respondent in the higher semester was found to experience moderate stress. One previous study agreed with this finding, reporting that students in higher semesters had higher levels of stress compared to lower ones (Iqbal et al., 2010). All respondents cited the academic burden as the main source of stress. Burdens from the intra-campus extracurricular activities also contribute significantly, added to occasional relational problems with a girlfriend or

parents. This finding differs from other studies on the correlation between extracurricular activities and stress levels. Dinis et al. (2020) found that having extracurricular activities several times per week is associated with a lower prevalence of burnout. Other research by Almalki et al. (2017) found no significant association between extracurricular activity and burnout. Additionally, leading and organizing extracurricular activities might positively affect the student's level of stress and burnout. However, other studies agree with ours on the correlation of interpersonal problems with stress levels. Cui et al. (2025) found a strong positive correlation between medical students' interpersonal strain and stress. Personal problems, including family conditions, living environment, personal image, and daily stress, along with interaction with people or community stress, such as interaction with people where the academic activities occur, have a stronger correlation with the incidence of stress. One respondent said that he had sleep disorders and health problems that caused him stress. This is in line with the research by Vidović et al. (2025) in two medical faculties in Croatia, which revealed a strong correlation between sleep disorders and stress. While academic stress itself is a common stressor among students, high stress levels caused by exams, long hours of classes, and abundant learning materials to master in a short time might cause adaptation difficulties that lead to psychological tension and further problems in social life (Khan et al., 2013).

The respondents also completed a smoking behavior questionnaire using Silvan Tomkins' theory and underwent interviews. Table 2 showed that 2 respondents had more positive than negative smoking behavior, while 3 demonstrated the opposite. Specifically, respondent 240, who had more negative than positive smoking behavior, was the one who reported the presence of stress. This might indicate his reliance on smoking to reduce negative emotions. However, stress was absent in two other subjects with negative smoking behavior. This denies the direct correlation between respondents' stress levels and their smoking behavior in this study.

Despite the vague tendency of the correlation between stress and smoking behavior, the interview findings show that stress greatly influences the subjects' smoking behavior. Three respondents explained that stress usually increased the frequency of smoking per day. Respondent 22 admitted that he finished a pack of cigarettes in one day when experiencing high stress levels. Respondent 275 mentioned that when obliged to make important decisions in stressful situations, or when faced with the course exam, he would smoke more. Interestingly, instead of stressful situations, respondent 31 reported increased smoking when he felt full and had limited activities. Previous studies supported this study's notion, stating that stress is the main factor that triggers someone to start smoking (Wali, 2011). Additionally, a study found that a sedentary lifestyle might increase the risk of smoking behavior, while recreational activities might decrease that risk (Zhang et al., 2023). While research on smoking tendencies when feeling full has never been done, it might correlate to certain combinations of behaviors, such as having an established habit to smoke after a meal or coupling smoking with drinking coffee (Jarvis, 2004).

The stimulant effect of nicotine itself could become more intense with increasing the number of cigarettes and could persist for several hours. It is this stimulant effect of nicotine that may contribute to sleep problems and increase alertness (Tamaki et al., 2010). In this study, respondent 22 mentioned having sleep problems. This smoking-induced sleep problem itself might increase stress and continue the vicious cycle of stress and smoking.

Apart from smoking, respondents also mentioned several other stress-relieving activities, including playing games, doing sports, mountain climbing, and hanging out with their friends. Despite noting that hanging out with friends itself could relieve their stress, they mentioned the inevitability of smoking while hanging out. Four subjects added that hanging out relieved more stress when smoking was involved. The Mental Health Association of London supported this finding, stating that talking with friends helps individuals gain new perspectives. Additionally, alternating between conversing and laughter or smiles could stimulate the production of hormones that cause relaxation (Mental Health Foundation, 2018). Gathering with friends and talking about problems or stressors is a form of coping strategy frequently used by students, and it helps express negative emotions to

subsequently be validated and regulated (Brown et al., 2001). However, telling stories or venting might not always lead to problem solving, hence its occasional association with emotion-focused coping instead of problem-focused one. A study in China even mentioned a positive correlation between telling stories to friends and stress (Huang et al., 2013).

This research has several limitations. First, the questionnaires used as an interview guide are only valid for assessing symptoms of depression, anxiety, and stress that occurred one week before completing the questionnaire. Additionally, to assess smoking behavior in subjects, more detailed interviews should be conducted to better determine the exact timing of the behavior's appearance. This was not possible in this study because the scale used was derived solely from Silvan Tomkins' theory. Second, the samples that met the inclusion and exclusion criteria in this study were all male, so the results are less representative of women and cannot be compared or generalized.

CONCLUSION

No clear correlation between stress and smoking behavior was evident. Future researchers should consider conducting more detailed interviews with a larger sample size and broader sample characteristics to better define its correlation with stress.

CONFLICT OF INTEREST

All authors have no conflict of interest in this article.

ACKNOWLEDGEMENTS

None.

REFERENCES

Abu-Elenin, M. M., Atalla, A. A. O., & El-Salamy, R. (2017). Cigarette smoking among medical students and some associated risk factors. Tanta Medical Journal, 45(4), 206. https://link.gale.com/apps/doc/A530883593/HRCA?u=anon~b4d7c8d3&sid=googleScholar&xid=9f77a94c

Algorani, E. B., & Gupta, V. (2025). *Coping Mechanism*. StatPearls Publishing.

Almalki, S. A., Almojali, A. I., Alothman, A. S., Masuadi, E. M., & Alaqeel, M. K. (2017). Burnout and its association with extracurricular activities among medical students in Saudi Arabia. *International Journal of Medical Education*, *8*, 144–150. https://doi.org/10.5116/ijme.58e3.ca8a

Brown, R. W., & Kolb, B. (2001). Nicotine sensitization increases dendritic length and spine density in the nucleus accumbens and cingulate cortex. *Brain research*, *899*(1-2), 94-100.

Cattaruzza, M. S., & West, R. (2013). Why do doctors and medical students smoke when they must know how harmful it is?. *The European Journal of Public Health*, *23*(2), 188-189. https://doi.org/10.1093/eurpub/ckt001

Chaaya, R., Sfeir, M., Khoury, S. E., Malhab, S. B., & Khoury-Malhame, M. E. (2025). Adaptive versus maladaptive coping strategies: insight from Lebanese young adults navigating multiple crises. *BMC Public Health*, *25*(1). https://doi.org/10.1186/s12889-025-22608-4

Cortez, P. A., da Silva Veiga, H. M., Stelko-Pereira, A. C., Lessa, J. P. A., Martins, J. Z., Fernandes, S. C. S., Priolo-Filho, S. R., Queluz, F. N. F. R., Trombini-Frick, L., & Peres, R. S. (2023). Brief Assessment of Adaptive and Maladaptive Coping Strategies During Pandemic. *Trends in Psychology*. https://doi.org/10.1007/s43076-023-00274-y

Cui, Y., Guo, Z., Yang, T., Zhang, M., Mu, H., Li, J., Fang, J., Du, T., & Yang, X. (2025). Stress and Interpersonal Relationships in Medical Students During Public Health Emergencies: A Network Analysis. *Advances in Medical Education and Practice*, *Volume 16*, 123–133. https://doi.org/10.2147/amep.s495472

Dinis, T., Santiago, L. M., Caetano, I. R., & Marôco, J. P. (2020). Perfeccionismo, Burnout e as Atividades Extracurriculares nos Estudantes de Medicina da Universidade de Coimbra. *Acta Médica Portuguesa*, *33*(6), 367. https://doi.org/10.20344/amp.12083

Han, M. Y., Chen, W. Q., & Chen, X. (2011). Do smoking knowledge, attitudes and behaviors change with years of schooling? A comparison of medical with non-medical students in China. *Journal of community health*, *36*, 966-974. https://doi.org/10.1007/s10900-011-9396-0

Harun, S. N. F., Jasman, N., Mustapha, F., Jaafar, N., Nadzir, S. N. B. M., Zaini, Z., Krishnan, M., & Subramaniam, P. (2025). Noteworthy trends in maladaptive coping strategies and hindrances to help-seeking behaviour among adolescents living in Malaysia's People's Housing Project (PPR) during the COVID-19 pandemic: A qualitative study. *PLoS ONE*, *20*(3). https://doi.org/10.1371/journal.pone.0318381

Huang, Y. S., Tan, Y., Chen, D. X., Xie, M. S., & Zhang, X. Q. 2013. The status Quo of test anxiety and coping behavior of senior students in Guangzhou high school. China Journal of Health Psychology. 2013 Mar;21(1), 107–109.

Iqbal, S., Gupta, S., & Venkatarao, E. (2015). Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. *The Indian journal of medical research*, *141*(3), 354. https://doi.org/10.4103/0971-5916.156571

Jarvis, M. J. (2004). Why people smoke. *BMJ*, *328*(7434), 277 279. https://doi.org/10.1136/bmj.328.7434.277

Khan, M. J., Altaf, S., & Kausar, H. (2013). Effect of Perceived Academic Stress on Students' Performance. *FWU Journal of Social Sciences*, *7*(2). Malathi A, Damodaran A. Stress due to exams in medical students--role of yoga. Indian J Physiol Pharmacol. 1999 Apr;43(2):218–24.

Melaku, L., Mossie, A., & Negash, A. (2015). Stress among medical students and its association with substance use and academic performance. *J Biomed Educ*, *2015*(4), 1-9. https://doi.org/10.1155/2015/149509

Mental Health Foundation. Stress: Are we coping? London: Mental Health Foundation. 2018.

Nada, Q., Herdiana, I., & Andriani, F. (2022). Testing the validity and reliability of the Depression Anxiety Stress Scale (DASS)-21 instrument for individuals with psychodermatology. *Psikohumaniora: Jurnal Penelitian Psikologi*, *7*(2), 153–168. https://doi.org/10.21580/pjpp.v7i2.11802

Pipe, A., Sorensen, M., & Reid, R. (2009). Physician smoking status, attitudes toward smoking, and cessation advice to patients: an international survey. *Patient education and counseling*, *74*(1), 118-123. https://doi.org/10.1016/j.pec.2008.07.042

Rafidah K, Azizah A, Norzaidi MD, Chong SC, Salwani MI, Noraini I. The Impact of Perceived Stress and Stress Factors on Academic Performance of Pre-Diploma Science Students: A Malaysian Study. Int J Sci Res Educ. 2009;2(June):13–26. RISKESDAS 2018. Riset Kesehatan Dasar 2018. [Internet]. 2018. Available from http://www.kesmas.kemkes.go.id/assets/upload/dir_519d41d8cd98f00/files/Hasil-riskesdas-2018_1274.pdf Accessed 21 December 2019.

Rotenstein, L. S., Ramos, M. A., Torre, M., Segal, J. B., Peluso, M. J., Guille, C. & Mata, D. A. (2016). Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *Jama*, *316*(21), 2214-2236. https://doi.org/10.1001/jama.2016.17324

Samele, C., Lees-Manning, H., Zamperoni, V., Goldie, I., Thorpe, L., Wooster, E., ... & Grange, R. (2018). Stress: Are we coping? London: Mental Health Foundation. Mental Health Foundation.

Suyanti, I. (2018). InfoDATIN: Situasi Umum Konsumsi Tembakau di Indonesia. *Jakarta: Kementrian Kesehatan RI*, 06-7.

Tamaki, Tetsuo, Yoshitaka Kaneita, Takashi Ohida, Eise Yokoyama, Yoneatsu Osaki, Hideyuki Kanda, Shinji Takemura, and Kenji Hayashi. "Prevalence of and factors associated with smoking

among Japanese medical students." *Journal of epidemiology* 20, no. 4 (2010): 339-345. https://doi.org/10.2188/jea.JE20090127

Tomkins, S. S. (1966). Psychological model for smoking behavior. *American Journal of Public Health and the Nations Health*, *56*(12_Suppl), 17–20. https://doi.org/10.2105/ajph.56.12_suppl.17

Vidović, S., Rakić, N., Kraštek, S., Pešikan, A., Degmečić, D., Zibar, L., Labak, I., Heffer, M., & Pogorelić, Z. (2025). Sleep Quality and Mental Health Among Medical Students: A Cross-Sectional Study. *Journal of Clinical Medicine*, *14*(7), 2274. https://doi.org/10.3390/jcm14072274

Wali, S. O. (2011). Smoking habits among medical students in Western Saudi Arabia. *Saudi Med J*, *32*(8), 843-848.

World Health Organization. (2012). Global adult tobacco survey: Indonesia report 2011.

Zhang, J., Cao, Y., Mo, H., & Feng, R. (2023). The association between different types of physical activity and smoking behavior. *BMC Psychiatry*, *23*(1). https://doi.org/10.1186/s12888-023-05416-1