

## ORIGINAL ARTICLE

# Insights from The Pandemic: Exploring Strategies for Coping with Stress Among First-Year Medical Students in Indonesia During Online Basic Medical Science Courses

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## ABSTRACT

**Introduction:** In early 2020, the COVID-19 pandemic prompted Indonesia to transition to online learning, significantly impacting medical education, including Basic Medical Science (BMS) courses. This study aims to identify stress levels and coping mechanisms among first-year medical students, particularly in BMS courses, and offer insights for educational institutions that face the challenges. **Methods:** This was an observational study with a cross-sectional approach. Data were collected via an online survey, encompassing the Perceived Stress Scale (PSS-10) questionnaire, BMS course grades, and open-ended questions. Data were collected from March to April 2022 from first-year medical students in Indonesia and then analyzed using IBM SPSS and thematic grouping. **Results:** A total of 89 participants showed that the majority of students experienced moderate stress (66.29%), with smaller percentages reporting mild stress (31.46%) and severe stress (2%). BMS course grades indicated a satisfactory average of 3.61 (B+). Spearman's test analysis revealed a very weak and non-directional relationship ( $r=-0.032$ ) between BMS course grades and stress, which was not statistically significant ( $p=0.764$ ). Most students faced difficulties in understanding course material, managing time effectively, and coping with mental well-being concerns. Coping strategies mainly revolved around time management, study techniques, and prioritizing emotional and physical health. **Conclusion:** Despite the challenges, students demonstrated resilience and adaptability in navigating the online BMS course. Faculty should evaluate student reactions and the effectiveness of implemented innovations. Providing effective time management strategies and academic advisors as a support system are crucial.

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## INTRODUCTION

In early 2020, Indonesia faced the COVID-19 pandemic, necessitating a shift to online learning. The repercussions were significant, with approximately 40% of Indonesian students experiencing anxiety due to remote learning; for students outside of Indonesia, the percentage was 57.2% (1). While various factors may cause these anxieties, academic stressors are believed to arise from the differences in interaction between online and face-to-face learning. The challenges of disrupting conventional face-to-face interaction were particularly pronounced in medical education. For example, practical laboratory activities changed to only discussing the picture of laboratory findings in online discussions, which might endanger the students' skills. Without

students doing direct practice, this may amplify stressors for students due to a lack of understanding about the skill. Emerging studies, particularly those focused on medical students, underscore the superiority of face-to-face learning over its online counterpart (2). This disruption of the conventional face-to-face interaction proved especially critical for first-year medical students engaging with a foundational block.

As medical education is inherently stressful and challenging, the pandemic has exacerbated these stressors through remote learning, disruptions in clinical education, and concerns about personal and family health (3). Stress in this context can lead to decreased academic performance, burnout, and, ultimately, impact the quality of care future physicians provide. Therefore, addressing stress early on can prevent adverse outcomes, such as decreased academic performance and burnout, and promote student well-being. Medical students are at increased risk of psychological distress and mental health disorders, such as anxiety and depression (4). In

the context of basic medical science courses that can be particularly challenging for first-year students, it is crucial to address the issue of stress experienced by the students.

Basic Medical Science (BMS) is essential to the first-year medical curriculum, encompassing fundamental sciences such as anatomy, physiology, biochemistry, molecular and cellular biology, symptomatology, microbiology, parasitology, immunology, pathology, pharmacodynamics, and pharmacology. This block is an introductory phase for students before delving into organ system blocks (5). Research by Anggunan has shown that the performance in the BMS block is associated with the coping mechanisms employed by medical students, whether it is a problem-solving-focused or emotion-focused coping mechanism (6). The substantial amount of foundational knowledge and novel information can create academic stress among new students.

A prior study highlighted the need to assess the efficacy of strategies designed to navigate the transition from traditional offline to online learning and their impact on students' acquisition of physiology content.(7) Acknowledging that virtual breakout rooms are not a direct substitute for in-person laboratories (F2F) is essential.(8) The BMS blocks, including its practical laboratory activities, also shifted to online learning during the pandemic, which may have affected first-year medical students' academic achievement and stress levels. This research aims to identify stress levels among first-year medical students during the pandemic and online learning, correlate the stress levels with BMS scores, and explore the coping mechanisms employed by the students. The insights gained from this study aim to inform educational institutions about the challenges medical students face in the context of the pandemic and online learning. By doing so, the research provides a foundation for developing targeted interventions and necessary support systems. These interventions are designed to enhance both student well-being and academic success during these challenging times.

## MATERIALS AND METHODS

An observational analytic approach with a cross-sectional design was conducted to investigate the correlation between stress levels and academic performance in Basic Medical Science among medical students at the Faculty of Medicine, Universitas Brawijaya, during the pandemic. The study was granted ethical clearance by Universitas Brawijaya with no. 48/EC/KEPK/S1-PD/03/2022. The researchers obtained the participants' consent before data collection and guaranteed data confidentiality. The population for this research comprises all medical students enrolled in the Bachelor Study Program of Medicine at the Faculty of Medicine, Universitas Brawijaya (BSPM-FMUB), Malang, the batch

of 2020, totalling 263 individuals. This study employed total purposive sampling using all participants who met the criteria for data. The sample selection for this study involved specific inclusion and exclusion criteria.

The inclusion criteria for this study were as follows: active medical students in BSPM-FMUB during the academic years 2020/2021 and 2021/2022, students who have completed all the Basic Medical Science courses, and students who have undergone fully online learning since the first semester. Conversely, the exclusion criteria included students who did not complete all the questions in the questionnaire, students from other cohort years who took the Basic Medical Science course together with the 2020 batch, students with attendance below 80%, and students with a history of depression prior to entering medical school.

Data were collected from students' final grades in Basic Medical Science courses, their completion of The Perceived Stress Scale (PSS-10) questionnaire, and two open-ended questions (any complaints experienced during the course and the coping strategies employed by the students). This study used PSS-10 because it is widely recognized for its effectiveness in assessing stress levels, particularly among college students, due to its well-established reliability and validity.(9) The questionnaire was distributed to all students in the 2020 batch through student representatives using Google Forms from March to April 2022.

The numerical scale variables obtained from the PSS-10 are transformed into an ordinal scale using specific cut-off points to categorize the stress levels. These cut-off points result in three groups: (1) Mild stress (total scores 0 to 13); (2) Moderate stress (total scores 14 to 26); and (3) Severe stress (total scores 27 to 40). In this study, the PSS-10 was translated into Indonesian. The Perceived Stress Scale has been validated and reliable, with a Cronbach's alpha coefficient of 0.85 (10). The Indonesian version of PSS-10 has been tested in previous research, yielding a Cronbach's alpha value of 0.81 (11).

The BMS course consists of several components: BMS 1 (Biochemistry and Biomolecular, three credits), BMS 2A and 2B (Anatomy and Physiology, each worth two credits), BMS 3 (Life Cycle and Symptomatology, two credits), BMS 4A (Microbiology, three credits), BMS 4B (Parasitology, two credits), BMS 4C (Immunology, two credits), BMS 5 (Biopathology and Neoplasia, two credits), and BMS 6 (Pharmacology and Pharmacodynamics, three credits). The final score for each course is determined by a formula comprising 50% cognitive assessment, such as computer-based tests, quizzes, mid-term exams, and final exams, and a 50% average of case-based and project-based assessments. During the pandemic, this includes student performance scores in online problem-based learning tutorials, projects involving skills development, video tutorial

creation, or other active participatory assignments. Data were collected in grade terms (A, B+, B, C+, C, D, D+, and E). The collected BMS scores from the respondents were converted based on the grading conversion points and multiplied by the credit workload of each course to obtain the average BMS score for each respondent. This conversion and calculation process allows for a more comprehensive assessment of the respondents' performance in the BMS courses. The difficulties and coping mechanisms are statements from students about what they feel and do during online BMS courses.

A total of 94 questionnaires were completed by medical students of the 2020 batch at FMUB. Out of all 263 students, the response rate for questionnaire completion was 35.7%. Five students were excluded based on the exclusion criteria, primarily due to a history of depression before entering medical school. Therefore, a total of 89 students were included for data analysis. The data analysis employed in this study includes univariate analysis for each variable, specifically the academic performance in Basic Medical Science (BMS) courses and PSS-10 scores. Bivariate analysis will be conducted to examine the relationship between academic performance in BMS courses and stress levels using the Spearman rank correlation test. Then, the open-ended answers were analyzed with a thematic approach using semi-automatic coding (12).

**RESULTS**

The demographic data obtained from the respondents can be seen in Table I. Of the total respondents, 33 were male (37.08%) and 56 were female (62.92%). Regarding age categories, most respondents were above 20 years old, accounting for 50 individuals (56.18%). These demographic characteristics provide valuable insights into the composition of the study sample and how gender and age distributions may influence the observed stress levels and academic performance.

The average BMS final grade obtained was 3.61 (B+), as presented in Table II. Meanwhile, the frequency distribution of each BMS score can be seen in Figure 1. Figure 1 shows the frequency distribution of BMS scores ranging from BMS 1 to BMS 6. Among these categories, BMS 1 is predominantly associated with grade A (32.58%), BMS 2A with grade A (42.70%), BMS 2B with grade B+ (31.46%), BMS 3 with grade A (44.94%), BMS 4A with grade A (38.20%), BMS 4B with grade A (51.69%), BMS 4C with grade A (49.44%), BMS 5 with grade A (46.07%), and BMS 6 with grade B+ (65.17%).

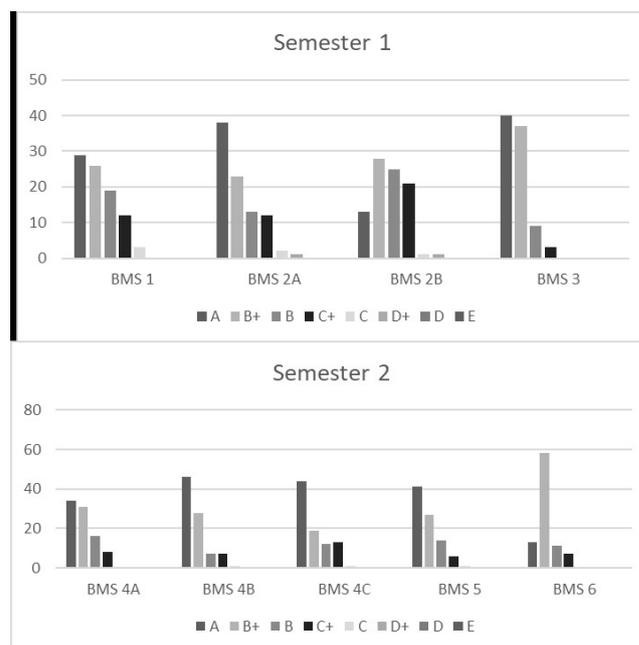
In Table III, the results of the PSS-10 questionnaire for the respondents can be observed. Out of the total respondents, 28 were categorized as experiencing mild stress (31.46%), 59 were categorized as experiencing moderate stress (66.29%), and two were categorized as experiencing severe stress (2.25%). The gender

**Table I: Characteristics of Respondents' Demographics**

Characteristic	Frequency	Percentage (%)
<b>Gender</b>		
Male	33	37.08%
Female	56	62.92%
<b>Age</b>		
<20 years old	39	43.82%
≥20 years old	50	56.18%

**Table II: The Frequency Distribution of The Average of BMS Course Final Grades**

Grade	Conversion Point	Frequency	Percentage (%)
A	4	49	55,06%
B+	3.5	26	29,21%
B	3	2	2,25%
C+	2.5	8	8,99%
C	2	4	4,49%
D+	1.5	0	0,00%
D	1	0	0,00%
E	0	0	0,00%
<b>Total</b>		89	100%
<b>Average of Final Grade</b>		3.61	B+



**Figure 1: Distribution of final grades of each BMS course**

**Table III: Frequency Distribution of Respondents' Stress Levels**

Stress Category	Male (n)	Female (n)	Frequency Total (n)	Percentage (%)
Mild Stress	11	17	28	31.46
Moderate Stress	22	37	59	66.29
Severe Stress	0	2	2	2.25
<b>Total</b>	<b>33</b>	<b>6</b>	<b>89</b>	<b>100</b>

distribution shows that males and females experience moderate stress twice as often as mild stress, while severe stress is only reported by females.

**Correlation of Stress Level and Basic Medical Science Course Grades**

The normality test results using Kolmogorov-Smirnov indicated that the BMS grades and PSS-10 scores did not follow a normal distribution ( $p < 0.05$ ). Therefore, the researchers conducted a correlation test using Spearman’s test. The analysis using Spearman’s test showed a correlation coefficient of  $-0.032$ , indicating a very weak and non-directional relationship. The significance value of  $0.764$  indicates that the relationship between BMS grades and stress scores was not statistically significant. This finding is consistent with the results presented in Table IV.

**Challenges and Coping Mechanisms during Online Basic Medical Science Course**

The open-ended question was completed by 55 participants (62%) who expressed that they had been experiencing difficulties during the online Basic Medical Science (BMS) courses. Their responses were analyzed, and several themes were identified regarding the challenges or difficulties the students faced during the pandemic concerning online BMS courses and how they coped with them. Table V summarises the themes related to the challenges faced by students during the online BMS courses. At the same time, Table VI highlights the coping mechanisms utilized by the students in response

**Table IV: Spearman’s Test Result**

Variable	N	Correlation Coefficient (R)	P-value
BMS grades	89	-0.032	0.764
PSS-10 score			

**Table V: Common Challenges Faced by Students in BMS Online Course**

Theme	Number of Responses
1. Difficulty understanding and keeping up with the course material.	9
2. Challenges in adapting to online learning.*	5
3. High academic workload.	5
4. Mental well-being concerns.	8
5. Difficulty in adjusting and managing time effectively.	6
6. Limited social interaction and feelings of loneliness.	4
7. Balancing extracurricular activities.	2
8. Physical health issues.*	3
9. Struggles in comprehending new topics.	3
10. Lack of focus and learning difficulties.	6
11. Impact of the pandemic	4

\* Indicates occurrence only among female participants

**Table VI: Coping Mechanisms for Challenges in BMS Online Course**

Theme	Number of Responses
1. Time Management and Study Strategies	11
2. Adaptation to Online Learning*	7
3. Emotional Well-being*	8
4. Collaboration and Help-Seeking	4
5. Physical and Mental Health Care	7
6. Faith and Spiritual Support	3
7. Resource Utilization	6
8. Balancing Responsibilities	6
9. Social Interaction and Support	4
10. Personal Well-being	4

\* Indicates occurrence only among female participants

to those challenges.

First, students struggled to understand and keep up with the course material. They found the content to be extensive and naturally challenging to grasp, leading to a sense of being overwhelmed. Moreover, the transition to online learning presented additional obstacles as students had to adapt to new platforms and modes of instruction. Notably, female participants exclusively mentioned challenges related to online learning adaptation, as they had to adjust to new virtual environments. Motivation and engagement were also reported as issues, as the virtual learning environment lacked the same stimulation level as face-to-face classes.

Second, the heavy workload emerged as a significant concern. Students faced a large volume of material to cover within a limited timeframe, making it challenging to balance their study time effectively. The pressure was further intensified by the need to memorize specific topics, adding to the burden of their academic responsibilities.

Mental well-being was another prominent theme. Students reported that they experienced stress, fatigue, and a sense of worthlessness due to the quite demanding nature of the courses. They struggled with anxiety, mood swings, and focus difficulty, which negatively impacted their overall well-being and academic performance. The lack of social interaction in online learning environments also contributed to feelings of loneliness and isolation.

Physical health issues, including symptoms such as fatigue, dizziness, and breathing difficulty, were also mentioned by several students. These issues were often attributed to academic stress, inadequate rest, and excessive screen time. Notably, these concerns were reported solely by female participants, with no mention from male participants. Furthermore, students highlighted the challenges of transitioning from high school to university-level material. They needed

help understanding new terms and topics and with concentration and time management. The ongoing pandemic added a layer of stress and uncertainty as students had to adapt to online learning and cope with changes in their academic schedules.

In light of the challenges above, data reveals that students employ various coping strategies to overcome these obstacles and achieve their academic goals. First, they focus on effective time management and study strategies, which involve prioritizing tasks, studying the materials in advance, and utilizing proactive study methods. Those help them stay organized on top of all of their coursework. Second, students adapt to the online learning environment by coping with online learning platforms, building social connections with peers, and adjusting to the virtual setting. They explore different ways to engage and interact with their classmates and instructors. Emotional well-being is another crucial aspect. Students, particularly female participants, actively seek motivation, resilience, and emotional support to adapt to these challenging courses. They practice self-forgiveness and work on maintaining a sense of calm amidst the challenges. Collaboration or group studying has a significant role as students engage with their peers, seek assistance when needed, and participate in study groups to enhance their learning experience.

Recognizing the importance of physical and mental health care, students prioritize rest, sleep, and relaxation. They seek medical assistance when necessary and engage in stress-relief activities to improve their well-being. Faith and spiritual support also play a role as students seek blessings, support, and guidance from God, finding solace in their faith. Social interaction and support are crucial. Students seek emotional support from friends and family. They engage in social activities to address their feelings of loneliness and to ensure a sense of connection. Personal well-being is prioritized, with students engaging in leisure activities, enjoying their favorite food and drinks, and practicing self-care to rejuvenate themselves and maintain a positive mindset throughout their BMS course journey.

Lastly, resource utilization is another coping mechanism, where students review lecture materials, textbooks, and online resources to enhance their comprehension and understanding of the course materials. Students ability to balance their responsibilities is essential as they must manage their academic and non-academic commitments, adjust their extracurricular activities, and strive to maintain a balanced lifestyle.

## DISCUSSION

### Effects of the Pandemic on BMS Course Delivery

The findings of this study indicate that first-year medical students have mild to moderate levels of stress among first-

year medical students, primarily attributed to challenges in adapting to the demands of medical education during a global health crisis. Specifically, as a fundamental block in medical education, the BMS course requires extra understanding, critical thinking, and laboratory practice. It is typically delivered through problem-based learning (PBL), skill training, and practical laboratory sessions. However, the lack of in-person interaction and hands-on practice during the pandemic has made it more difficult for students to engage in the necessary learning activities and hindered their ability to grasp the concepts effectively (13). Learning and developing the practical skills required for the BMS course was more challenging for students; for example, visualize the anatomy of the muscle without the help of the memory of sensory and motoric experience they get during practicum or laboratory practice.

Concerning students' adaptation, the transition happens from a high school environment to a higher education situation and from real interaction to a new virtual environment. Transition to virtual platforms has required innovative approaches and adaptations, both for teachers who will prepare the course and students who will attend the course. For example, students take time to familiarize themselves with the user interface of the Learning Management System and proficiency in using all the activities programmed there. It is the faculty's job to ensure that students receive a comprehensive education despite the limitations imposed by the online learning format. Despite training the teacher literacy of LMS, faculty needs to assess students' responses and the effectiveness of their implemented innovations. Faculty can start by developing a synchronous or asynchronous meeting after considering its class equipment or lesson content planning and adopting a classroom-centric perspective to ensure preparation (14).

The change in the mode of delivery resulted in the students' workload. In Indonesia, 1 SCU is mainly defined as 170 minutes each week each semester. During the pandemic, assignments, presentations, and discussions replaced practicum, skill, and laboratory activities, leading to increased student proportion in independent study and task-based learning. Based on the findings of this study, the faculty must help students manage their study time effectively. One way to unlock this potential is by activating academic advisors who can listen to students and provide solutions for their mental health and academic problems. This suggestion aligns with the perspective of Hassan et al. (2022), where medical students and faculty members perceive online learning to offer general advantages for student education. Online learning can actively engage students, capture their attention, increase their desire to participate in classes, motivate timely assignment submission, and promote active participation in collaborative learning with their peers(15). So, during the first year, faculty should schedule specific sessions for the academic

advisors to maintain students' motivation or adaptation problems and find solutions for managing independent study during online learning.

### **Effects of the Pandemic on Students' Competence**

The good average of the BMS final grade shows that even during online learning, the student still can catch up with the learning outcome. As the foundation course, most learning outcomes are principal for understanding the clinical manifestations they will get in the advanced semester. The study conducted by Goshu (2022) found that the basic medical science knowledge score in the first year was higher than that of the fourth and sixth years (16). In line with that, it will be wise if faculty continue to monitor the retention of knowledge besides the learning outcome of the course. The researcher suggests that during the transition, faculty should take note of the practicum, skill, and laboratory experience, which were skipped and made students revisit after the pandemic.

A non-significant relationship between stress levels and BMS learning outcomes among medical students suggests that despite the academic and non-academic burdens during this challenging period, students possess effective coping mechanisms to deal with their stress. The researchers suggest that this may be due to the adaptability of the BSPM-FMUB medical students in the class of 2020 during the online learning period. Additionally, family support played a significant role in the stress levels of the students who remained in their hometown during the pandemic. Online learning also provided more flexibility as students did not need to commute from home to campus, which was more time-efficient.

### **First-Year Student's well-being during pandemic**

Additionally, referring to respondents' answers to the open-ended question, the emotional toll of uncertainties and social isolation during the pandemic significantly impacted the mental well-being of first-year medical students. Consequently, it becomes crucial to prioritize their mental health and provide appropriate support systems. Therefore, facilitating support and resources fostering student well-being is essential for the faculty. Jiang et al. (2021) suggest that faculty should offer online counseling sessions, provide guidance and resources on mental health, and encourage students to participate in online social activities (14).

Moreover, the study revealed a very weak relationship between stress levels and BMS learning outcomes. This result suggests that medical students have various coping mechanisms to deal with academic and non-academic stressors. According to Fares et al. (2016), preclinical students can use different methods and strategies to cope with stress during their studies. These methods include forming commitments, engaging in non-academic activities, autonomous learning, guidance

programs, evaluation systems, career counselling, and life coaching. The commitments formed are those related to problem-solving, student adaptation, and mental health (17). During the pandemic, these coping strategies will held in online platform. The student can discuss in universities online forums to get peer support initiatives, counselling and life coaching. Faculty should help to provide the safe and stable platform and made a regular check-in especially for discuss with peer or academic advisor.

We acknowledge several limitations of the current study. First, this study only focused on one independent variable: the stress level of medical students at FMUB. Therefore, there are limitations in controlling confounding factors. The difficulties experienced in each course, which may serve as a source of stress, were not separately examined in this research. Future studies may benefit from distinguishing the burden associated with each course, as this could provide valuable insights into the specific challenges medical students face in different phases of their education. Second, the sample size in this study could have been more optimal, as only 89 out of the targeted 263 students participated. Moreover, this study is susceptible to memory bias as the BMS courses were conducted in the first and second semesters while the respondents had already been in higher semesters during the sample collecting period. These limitations should be considered when interpreting our study's results because temporal misalignment could influence the accuracy of reported stress levels. Therefore, future studies could adopt alternative methodologies and approaches, for example, exploring stressors associated with each course of BMS separately or employing longitudinal studies to capture changes in stress levels over time and track students' retention of online learning. Future studies should include more extensive and diverse samples and consider other relevant variables to enhance the generalizability of findings.

### **CONCLUSION**

The current study showed first-year medical students who experienced a mild to moderate stress level during the pandemic. Despite the challenges posed by the unique circumstances of medical education during this period, the students demonstrated resilience and adaptability in navigating the new learning environment. The shift to online learning raises challenges in the BMS courses, which require critical thinking, practical skills, and laboratory practices. The limited access to practical training and clinical experiences necessitated alternative ways for students to develop their clinical skills and knowledge. It would be better if faculty could introduce virtual labs, simulation exercises, and interactive online platforms that replicate practical experiences and clinical scenarios.

Faculty must evaluate and support students' reactions and the effectiveness of the applied innovations by conducting regular surveys, focus group discussions, or feedback sessions to gauge student experiences and tailor interventions based on their feedback. After the pandemic has passed, faculty could evaluate the retention of BMS or provide refresher sessions for students impacted by the pandemic. Additionally, managing study time effectively and providing academic advisors as a support system are pivotal for students' success. During the first year, faculty could offer workshops on time management and ensure accessible platforms for students to connect with advisors for academic and mental health support.

This study underscores the need for ongoing support and resources to promote medical students' well-being and academic achievement during this challenging time. Furthermore, fostering a supportive community through online forums, peer support initiatives, and regular check-ins is crucial. Faculty could develop guidelines and training programs for academic advisors to excel in online advising and support situations where in-person interaction is limited. These areas present significant opportunities for further research and investigation, especially to explore emerging topics in medical education during challenging times.

## REFERENCES

1. Fauziyyah R, Awinda RC, Besral B. Dampak Pembelajaran Jarak Jauh terhadap Tingkat Stres dan Kecemasan Mahasiswa selama Pandemi COVID-19. *Jurnal Biostatistik, Kependudukan, dan Informatika Kesehatan*. 2021;1:113. doi: 10.51181/bikfokes.v1i2.4656
2. Singh K, Srivastav S, Bhardwaj A, Dixit A, Misra S. Medical Education During the COVID-19 Pandemic: A Single Institution Experience. *Indian Pediatr*. 2020;57:678–9. doi: 10.1007/s13312-020-1899-2.
3. Muslim Moh. Manajemen Stress pada Masa Pandemi Covid-19. *Jurnal Manajemen Bisnis*. 2020;23:192–201. doi:10.55886/esensi.v23i2.205
4. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students. *JAMA*. 2016;316:2214. doi:10.1001/jama.2016.17324
5. Program Sarjana Kedokteran FKUB. *Buku Pedoman Akademik Fakultas Kedokteran Universitas Brawijaya Tahun Akademik 2021/2022*. Malang: Fakultas Kedokteran Universitas Brawijaya; 2021.
6. Anggunan A, Hariansyah H. Hubungan Coping Mechanism Dengan Hasil Ujian Akhir Blok Basic Medical Science Pada Mahasiswa Angkatan 2016. *Jurnal Ilmu Kedokteran Dan Kesehatan*. 2014;7:1–7. doi: 10.33024/v4i1.764
7. Ertmer PA, Nour AYM. Teaching Basic Medical Sciences at a Distance: Strategies for Effective Teaching and Learning in Internet-Based Courses. *J Vet Med Educ*. 2007;34:316–24. doi: 10.3138/jvme.34.3.316.
8. Attardi SM, Barbeau ML, Rogers KA. Improving Online Interactions: Lessons from an Online Anatomy Course with a Laboratory for Undergraduate Students. *Anat Sci Educ*. 2018;11:592–604. doi: 10.1002/ase.1776.
9. Lee E-H. Review of the Psychometric Evidence of the Perceived Stress Scale. *Asian Nurs Res (Korean Soc Nurs Sci)*. 2012;6:121–7. doi: 10.1016/j.anr.2012.08.004
10. Cohen S, Kamarck T, Mermelstein R. Perceived Stress Scale. *Measuring Stress: A Guide for Health and Social Scientists*. 1994;10:1–2.
11. Hary ZAP. Hubungan antara kelekatan terhadap ibu dengan tingkat stres pada mahasiswa perantau (Internet) (Skripsi). (Yogyakarta): Sanata Dharma University; 2017 (cited 2023 May 12). Available from: <https://repository.usd.ac.id/8873/>
12. Züll C. *Open-Ended Questions*. GESIS Survey Guidelines. 2.0. Mannheim, Germany: GESIS – Leibniz Institute for the Social Sciences; 2016.
13. Pangastuti D, Widiasih N, Soemantri D. Piloting a constructive feedback model for problem-based learning in medical education. *Korean J Med Educ*. 2022;34. doi:10.3946/kjme.2022.225
14. Jiang Z, Wu H, Cheng H, Wang W, Xie A, Fitzgerald SR. Twelve tips for teaching medical students online under COVID-19. *Med Educ Online*. 2021;26. doi:10.1080/10872981.2020.1854066
15. Hassan AB, El-Agroudy A, Shehata MH, Almoawda MA, Atwa HS. Adaptations of Clinical Teaching During the COVID-19 Pandemic: Perspectives of Medical Students and Faculty Members. *Adv Med Educ Pract*. 2022;13:883–92. doi:10.2147/AMEP.S371201
16. Goshu BT. Basic Medical Sciences Knowledge Retention for Clinical Practice. *Adv Med Educ Pract*. 2022;13:475–82. doi:10.2147/AMEP.S364631
17. Fares J, Al Tabosh H, Saadeddin Z, El Mouhayyar C, Aridi H. Stress, Burnout and Coping Strategies in Preclinical Medical Students. *N Am J Med Sci*. 2016;8:75. doi: 10.4103/1947-2714.177299