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Resilience Training to Reduce Stress Levels and Improve the Quality of Life for First-Year Medical Students at Hasanuddin University

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ABSTRACT

Medical students are more vulnerable to stress. This condition can lead to any psychological problem, such as anxiety, depression, burnout, and even suicide, and affect the quality of life. Resilience training has the potential to enhance adaptiveness and improve quality of life. This study aims to develop resilience training suitable for first-year medical students and assess the efficacy of this training. This is a quasi-experimental study, with pre- and post-test design conducted in October to November 2022. We first screened 120 first-year medical students of Hasanuddin University who completed the pre-survey online questionnaire consisting of demographic data, 21-item Depression Anxiety Stress Scale (DASS-21), 25-item Connor-Davidson Resilience Scale (CD-RISC 25), and World Health Organisation Quality of Life (WHOQOL-BREF). Using consecutive sampling, students who consented to participate attended a four-session resilience training programme and then completed the post-survey questionnaire. We analysed the data using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) version 24.0 with paired *t*-test, independent *t*-test, and Pearson correlation. We first delivered resilience training to 30 medical students, 25 of them finished all sessions. More subjects were female, aged 18 years. Mostly, they were capable of building relationships and had enough financial and familial support. At first, they mostly had mild depression, severe anxiety, moderate to severe stress, low resilience, and good quality of life. Stress level decreased significantly in intervention group (±26%) than in control group (±6%), while the resilience and quality of life scores tend to get increased (±3% improvement). Thus, we can conclude that resilience training decreases stress levels and has the potential to improve quality of life and resilience scores, thereby enhancing students' study process.

Keywords: *Stress, Medical students, Resilience, Anxiety, Depression, Quality of life*

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INTRODUCTION

Medical study is a stressful process, mostly because of the many lectures, courses, tasks, and exams, as well as interpersonal problems (1, 2). In general, medical students are more susceptible to stress than other students and communities (3, 4). This could lead to psychological problems, such as anxiety, depression, burnout, sleep disturbances, or even suicidal ideation (5).

Hasanuddin University's Bachelor of Medicine Leading to the Medical Doctor Programme consists of a bachelor's phase and a professional phase. Since 2019, the curriculum has evolved into a blended learning strategy that transforms passive learning into an active learning strategy (6). This has led to an increase in students' motivation and a decrease in students' anxiety (7, 8).

Even with the blended learning strategy, the stress level is considered high in the medical curriculum. The tasks, exams, and lectures are all sources of stress (3). The prevalence of stress among medical students reportedly varies from ± 30% to 70% (9, 10). An online survey in Indonesia showed that more than 50% of students had an overload due to their mental workload during the pandemic (11). Our preliminary study found that more than 50% of first-year medical students at Hasanuddin University showed high levels of stress, depression, and anxiety. Meanwhile, a study has shown that a medium level of anxiety could improve academic performance (12). There are many stressors involved. A study in Al-Azhar showed that academic-related stressors are the highest contributing factors in medical students' stress and anxiety (3). In Indonesia, a significant proportion of students experienced high levels of stress (approximately 50%) due to academic-related stressors and stressors related to intra- and inter-personal relationships (13, 14). It is therefore important to develop a stress resistance system for medical students.

Resilience is an ability to rebound from stressful events, which is known to improve stress resistance (15). It is said to enable people to remain stable psychologically and physically despite any threatful events. A resilient person does not necessarily lack psychological symptoms; rather, even if they have them, they are still able to be functional. In medical students, resilience was found to be associated with learning ability, a sense of coherence, and the skill of adapting in difficult circumstances (16, 17). There are many factors that contribute to resilience and stress resistance. Kubrusly et al. (18) found that medical students generally have a high resilience level. Kubrusly et al. (18) also found that family and financial support (work-related) were related to medical students' resilience scores. A study on breast cancer patients also showed the importance of social support to resilience level (19). Although Kubrusly et al. (18)'s study found that gender did not have an association with resilience level, another study on medical students showed that gender was related to stress resistance (coping mechanisms). Although there is still a less adaptable method, medical students regularly employ a relatively adaptive coping mechanism that varies according to gender and years of medical training. Men are more likely to avoid asking for emotional help from others, while women are more likely to give up on solving the issue (2).

There are many factors affecting depression and anxiety. Acute stress does not always cause depression and anxiety; however, persistent and ongoing stress has been linked to anxiety and depression (20). According to To et al. (21), the resilience score did not undergo many changes during the pandemic, and there were both longitudinal and cross-sectional effects on physical health conditions, depression, anxiety, and stress levels. However, the resilience score had a stronger impact in a cross-sectional study than a longitudinal study (21). This highlights the importance of resilience in maintaining physical and mental well-being, as well as the necessity of regularly monitoring and maintaining resilience levels.

A longitudinal study found a link between resilience and quality of life in adults with mental disorders (22). Higher resilience levels were correlated with a higher overall quality of life, particularly in terms of mental quality. Pigati et al. (23) also found that lower resilience scores were associated with lower quality of life (except for the quality of social relationships) and subjective happiness among physiotherapists during the COVID-19 pandemic. This was also associated with a higher stress level when treating COVID-19 patients (23).

Resilience training for first-year medical students is a potential way to improve their adaptation ability and stress resistance by reducing stress, anxiety, and depression levels and enhancing quality of life. Bird et al. (24) developed a curriculum to teach resilience to medical students in clinical phase based on a survey conducted at a previous university. The curriculum consists of four sessions with materials and skill exercises, namely (a) resilience definition and skills related to goal setting; (b) difficult team interactions and conflict management skills; (c) facing failures and setbacks and compassionate listening skills; and (d) finding meaning and energy balance skills. The curriculum was found to be effective at improving resilience scores measured using the 25-item Connor-Davidson Resilience Scale CD-RISC 25 (24).

In addition to the CD-RISC instrument, other patient training measures the impact of resilience training utilising the 21-item Depression Anxiety Stress Scale (DASS-21) and World Health Organization Quality of Life (WHOQOL-BREF) tools (19, 25). Despite several studies demonstrating the value of resilience in enhancing stress resistance and quality of life, Hasanuddin University continues to provide no preventative training. Thus, we modified Bird et al. (24)'s curriculum in our study to suit medical students in the pre-clinical phase and evaluated the outcome using the DASS-21 and WHOQOL-BREF instruments. The objective of this study was to develop resilience training suitable for first-year medical students, particularly at Hasanuddin University, and to determine the efficacy of this training so that it can serve as a guideline for enhancing students' stress resistance and adaptation abilities.

METHODS

Design

This was a quasi-experimental study that measured pre-test and post-test scores using non-random group selection.

Participants

Selection criteria

The inclusion criteria were as follows: first-year medical students of Hasanuddin University, aged ≥ 17 years, and willing to participate in the training. Students with a history of mental disorder and/or treatment were excluded. Students who did not attend two or more training sessions were considered dropouts.

Recruitment

For the initial screening of the subject, we asked 306 first-year medical students from Hasanuddin University to complete an online pre-survey questionnaire consisting of demographic data, the DASS-21, CDRISC-25, and WHOQOL-BREF in October 2022. A total of 120 students participated in the survey, and 72 of them expressed interest in participating in the training. Four students with a history of mental disorders were excluded. Approximately 68 students were randomly assigned to control (n = 38) and intervention (n = 30) groups.

Sample size

The sample sizes were calculated using the formula for a two-means (paired and independent) *t*-test and Pearson correlation, with a significance level (α) set at 5%, a β value set at 10%, and a dropout estimation set at 10%. The estimated sample sizes were 24 for each group.

Intervention

The resilience training provided was modified from a resilience programme designed by Bird et al. (24) for medical students undergoing clinical training. We modified the training to suit medical students in the pre-clinical phase and another cultural context. It had four sessions that were 70 minutes each, consisting of a 5-minute pre-test, a 10-minute introduction, 15 minutes of skills building, 10 minutes of application/practice, 15 minutes of group discussion, and 10 minutes of closing and a post-test. The first session was an introduction with skills building related to energy balance. The second session focused on setting goals, with skills-building centred on setting realistic expectations. The third addressed difficult team interactions and skills building regarding conflict management. The last session was a review and reinforcement. The complete training module is presented in the supplement.

Outcome

Sociodemographic data

We gathered sociodemographic data, including age, gender, the ability to build interpersonal relationships, and students' subjective perceptions of their financial and family support. Numerous studies have investigated multiple factors related to stress in medical students. In addition to academic stressors being one of the major factors, gender also played a role because different genders coped with stress in unique ways (2, 3, 13, 14). Another factor related to stress and resilience comprised financial support (work-related) and family support (2, 18, 26).

DASS-21

DASS-21 is one of the most widely used self-rated questionnaires for measuring levels of depression, anxiety, and stress. It is a shorter version of the DASS-42, containing 21 questions instead of 42. This questionnaire was developed using a sample of students and has been validated among medical students (27, 28). The Indonesian version has also been validated by Onie et al. (29). Instead of Cronbach's alpha, Onie et al. (29) used McDonald's omega for internal reliability, with a DASS total score of 0.910 ($\omega \geq 0.785$ means good reliability).

CD-RISC 25

Davidson (30) developed a 25-item self-rated questionnaire to measure resilience levels. The full user's guide provides comprehensive information on scale administration, psychometric validity, reliability, and factor analysis studies, as well as details on translations presented online (r = 0.4–0.7, α = 0.05, Cronbach's alpha = 0.9) (30). We were granted permission to use the questionnaire for our study.

WHOQOL-BREF

The WHOQOL-BREF is a short form of the WHOQOL-100. It was developed by the WHOQOL group in 15 centres worldwide and has been validated across various age groups and populations. It has four domain groups as follows: (a) Domain 1 Quality of Life (QoL1) = physical health (activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest, and work capacity); (b) Domain 2 Quality of Life (QoL2) = psychological (bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality/religion/personal beliefs, and thinking, learning, memory, and concentration); (c) Domain 3 Quality of Life (QoL3) = social relationships (personal relationships, social support, sexual activity); and (d) Domain 4 Quality of Life (QoL4) = environment [financial resources, freedom, physical safety and security, health and social care: accessibility and quality, home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation/leisure activities, physical environment (pollution, noise, traffic, climate and transport)]. The WHOQOL-BREF had good internal consistency (Cronbach's alpha coefficient = 0.91), and the correlation coefficient values are significantly correlated at $\alpha < 0.01$ (31).

Statistical Analysis

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 24.0. First, we analysed the equality of the variances (homogeneity) of the subject from intervention and control group using Levene's test then used a paired t-test for mean comparison of pre- and post-test intervention and control group, independent t-test for comparison of mean change of intervention and control group, and Pearson correlation to analyse the correlation of resilience and quality of life. Data are presented as mean (standard deviation), and the two-sided level of significance was defined as $p < 0.05$.

RESULTS

Participant Flow

The participant flow is presented as a Consolidated Standards of Reporting Trials (CONSORT) diagram in Figure 1.

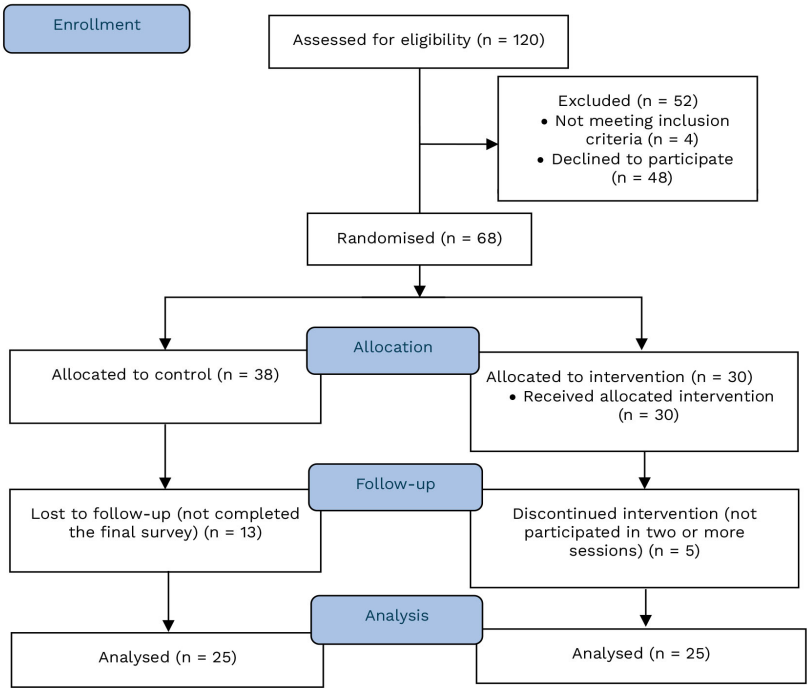

Figure 1: CONSORT flow diagram of participant enrolment, allocation, follow-up and analysis.

Characteristics of Subjects

Table 1 describes the characteristics and distribution of the research subjects. Table 1 shows that more subjects were females aged 18 years. The majority were capable of building relationships and had enough financial and familial support. The Levene's test for homogeneity, with all *p*-values > 0.05, showed that there was no difference in the distribution of the characteristics of the subjects. It meant that none of the characteristic factors affected our study.

Table 1: Sociodemographic characteristics

Characteristic		Intervention	Control	*p*-value*
		n (%)	n (%)	
Gender	Male	10 (40)	4 (16)	0.061
	Female	15 (60)	21 (84)	
Age (years old)	17	3 (12)	3 (12)	0.138
	18	16 (64)	11 (44)	
	19	5 (20)	9 (36)	
	20	1 (4)	1 (4)	
	22	0 (0)	1 (4)	
Interpersonal relationship	Capable	21 (84)	20 (80)	0.720
	Less capable	4 (16)	5 (20)	
Financial support	Adequate	23 (92)	23 (92)	1.000
	Less adequate	2 (8)	2 (8)	
Family support	Adequate	24 (96)	25 (100)	1.000
	Less adequate	1 (4)	0 (0)	

Note: * Levene's test for homogeneity

Table 2 presents the initial scores for depression, anxiety, stress, resilience, and quality of life in the intervention and control groups, with a *p*-value greater than 0.05, indicating no significant differences in initial scores between the two groups. It shows the average of initial levels as follows: mild level of depression, severe anxiety, moderate-heavy stress, low resilience, and good quality of life.

Table 2: Initial scores of depression, anxiety, stress, resilience, and quality of life

Scores	Mean (SD)		*p*-value*
	Intervention	Control	
Depression	10.72 (8.0)	12.16 (9.8)	0.622
Anxiety	14.08 (8.3)	15.52 (8.0)	1.000
Stress	25.76 (8.7)	21.12 (8.3)	0.790
Resilience	67.40 (16.5)	70.44 (13.0)	0.357
QoL1 (Physical health)	59.20 (16.8)	58.28 (13.3)	0.512
QoL2 (Psychological)	60.12 (20.0)	62.3 (17.0)	0.282
QoL3 (Social relationship)	60.76 (19.4)	63.56 (14.7)	0.093
QoL4 (Environment)	67.64 (18.0)	71.92 (16.4)	0.604

Note: * Levene's test for homogeneity

Effects of Resilience Training

Table 3 shows a comparative analysis of stress, anxiety, depression, resilience, and quality of life scores between the two groups. It is found that the mean scores of depression, anxiety, and stress levels in both groups all decreased at the end of the study. There is a significant difference in the stress score, where the intervention group's score decreased by 6.8 points more than the control group ($p < 0.05$). For the depression score, the intervention group showed a slight decrease, whereas the control group showed a slight increase; however, the difference was not statistically significant ($p > 0.05$). For the anxiety score, both the intervention group and the control group showed similar decreases. A different finding showed in the resilience, physical, psychological, and social relationship scores for both groups at the end of the study. Although not statistically significant, the mean scores of changes in the intervention group tended to increase, while the control group tended to decrease.

Figure 2 shows the decreases in the depression, anxiety, and stress mean scores. A significant difference was found in stress scores, and no difference in anxiety scores. For the decreases in the depression scores, there is only a 0.56-point difference (2.4 points for the intervention group and 1.8 points for the control group). Figure 3 illustrates the increases in the mean scores for resilience and quality of life. Although statistically insignificant, Figure 3 shows a promising trend for positive change in the intervention group.

Table 3: Comparative analysis of stress, anxiety, depression, resilience, and quality of life scores between two groups

Scores		Intervention		Control		*p*-value for change**
		Mean (SD)*	*p*-value	Mean (SD)	*p*-value*	
Depression	Pre-test	10.72 (8.0)	0.061	12.16 (9.8)	0.24	0.740
	Post-test	8.32 (5.4)		10.32 (8.3)		
Anxiety	Pre-test	14.08 (8.3)	0.186	15.52 (8.0)	0.216	1.000
	Post-test	12.56 (8.0)		14.00 (9.0)		
Stress	Pre-test	25.76 (8.7)	0.000	21.12 (8.3)	0.373	0.006
	Post-test	17.52 (6.8)		19.68 (6.9)		
Resilience	Pre-test	67.40 (16.5)	0.675	70.44 (13.0)	0.121	0.178
	Post-test	69.00 (14.9)		65.10 (11.1)		
QoL1 (Physical health)	Pre-test	59.20 (16.8)	0.576	58.30 (13.3)	0.874	0.599
	Post-test	61.70 (13.8)		57.60 (11.2)		
QoL2 (Psychological)	Pre-test	60.12 (20.0)	0.845	62.30 (17.0)	0.553	0.597
	Post-test	61.30 (18.8)		59.40 (16.8)		
QoL3 (Social relationship)	Pre-test	60.76 (19.4)	1.000	63.60 (14.7)	0.269	0.519
	Post-test	60.76 (18.3)		58.50 (12.6)		
QoL4 (Environment)	Pre-test	67.64 (18.0)	0.533	71.90 (16.4)	0.368	0.291
	Post-test	70.90 (15.6)		68.10 (14.3)		

Notes: * Paired *t*-test; ** Independent *t*-test

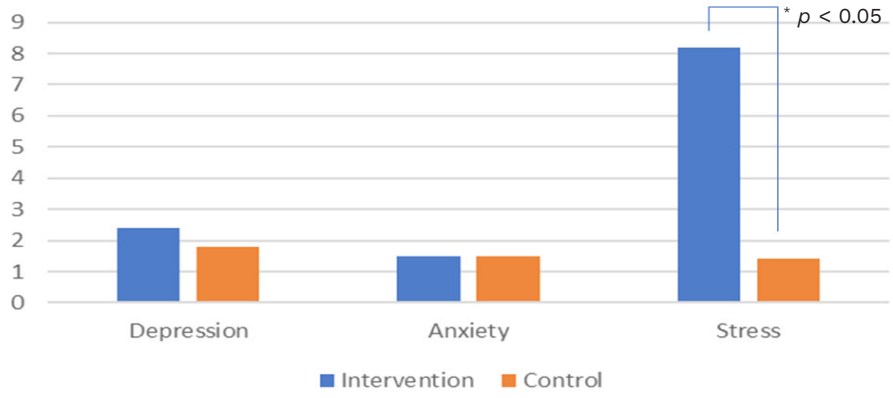

Figure 2: Comparison of decreases in mean scores of depression, anxiety, and stress levels in the intervention and control groups.

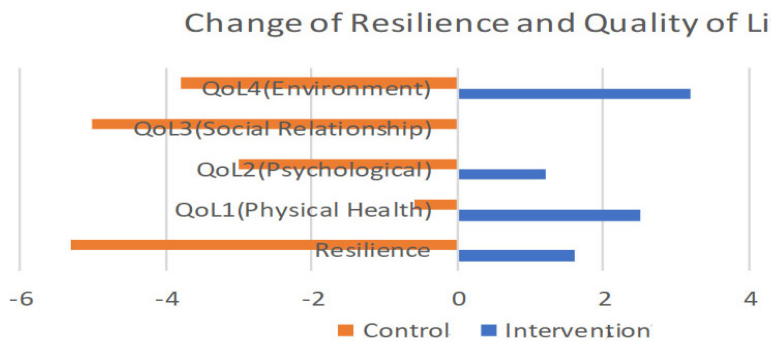

Figure 3: Comparison of changes in mean scores of resilience and quality of life levels in the intervention and control groups.

Based on Figure 3, we analysed the correlation between the resilience score and the quality of life score using Pearson's correlation, as presented in Table 4. It shows that the resilience score had a significant correlation with the quality of life score ($p < 0.05$). Moderate positive associations were found between the quality of social relationships and environment (r = 0.4–0.6), and strong positive associations were found between the quality of physical health and psychological functioning (r = 0.6–0.8), indicating that a higher resilience score is associated with a higher quality of life.

Table 4: Correlation analysis of resilience and quality of life scores

Quality of life		Resilience score		
		Initial	**Final**	**Changes**
QoL1 (Physical health) (n = 25)	Control, r	0.586**	0.736**	0.674**
	p-value	**0.002**	**0.000**	**0.000**
	Intervention, r	0.806**	0.718**	0.644**
	p-value	**0.000**	**0.000**	**0.001**
QoL2 (Psychological) (n = 25)	Control, r	0.500*	0.584**	0.676**
	p-value	**0.011**	**0.002**	**0.000**
	Intervention, r	0.736**	0.702**	0.664**
	p-value	**0.000**	**0.000**	**0.000**
QoL3 (Social relationship) (n = 25)	Control, r	0.233	0.449*	0.510**
	p-value	0.263	**0.024**	**0.009**
	Intervention, r	0.452*	0.634**	0.581**
	p-value	**0.023**	**0.001**	**0.002**
QoL4 (Environment) (n = 25)	Control, r	0.024	0.477*	0.452*
	p-value	0.910	**0.016**	**0.023**
	Intervention, r	0.365	0.419*	0.423*
	p-value	0.073	**0.037**	**0.035**

Notes: The bold font indicates a significant correlation; * Indicates a moderate positive association; ** Indicates a strong positive association

DISCUSSION

Table 1 shows the sociodemographic data of participants. Although many factors contribute to resilience and stress resistance, in this study, we found that the sociodemographic data (gender, familial and financial support, and interpersonal relationships) were homogeneous in both groups, so that none of these factors affected the results.

The goal of this study was to develop a method for conducting resilience training with medical students to enhance their stress resistance and overall quality of life. We applied a cognitive behaviour-based intervention that included introducing the principles of cognitive behaviour, practicing, and assigning homework. This is in accordance with Joyce et al. (32)'s systematic review that found that the technique used in resilience training could be cognitive behaviour-based, mindfulness-based or both. Another systematic review on the well-being of medical students also explained the many curricula for maintaining medical students' well-being. The study focused more on mindfulness-based training for 8–16 weeks, which we did not use in our study, and was found to be effective in reducing stress, anxiety, depression, and helping maintain students' well-being. It is important to note that for the mindfulness-based training, the time taken for the training to be effective is around eight weeks, whereas our study had only four weeks of follow-up. This could be an area of improvement in the next study of resilience training (15).

In our study, as shown in Table 3, we found significant results of the resilience training in reducing stress levels, yet not particularly noteworthy reductions in reducing depression and anxiety. We found promising results where the depression score in the intervention group tended to decrease. A study on Chinese students revealed a similar outcome when examining the psychological impact of resilience (33). According to this study, a substantial correlation was found between resilience level and mild stress levels, but not a significant correlation with severe stress levels. This is related to our study, which considerably reduced stress levels but had no discernible impact on anxiety or depression.

Another study in Iran on resilience and its effect on stress, anxiety, and quality of life in haemodialysis patients found that resilience training was effective in reducing anxiety and stress levels and the overall DASS score and increasing quality of life (25). They conducted 12 sessions of resilience training with a clinical psychologist. Related to our study, this could show that more sessions are needed to get more significant effects, especially regarding depression and anxiety levels. Meanwhile, another study with two sessions of resilience training on tuberculosis patients showed more efficacy regarding quality of life (in the physical, social, and environmental domains) in the intervention group but less efficacy at increasing the resilience score and in the psychological domain. However, this study also concluded that the resilience level affected quality of life (34). This is rather contradictory because our study had more sessions but did not give a significant result for quality of life, despite an upward trend in the intervention group. A study on the effects of resilience training in military officer cadets showed another result. The study found no significant result indicating a reduction in stress perception after resilience training (35). Despite this, we can still state that even with varying numbers of sessions, resilience training is a promising way to improve stress resistance and quality of life; however, more sessions are needed to affect the psychological domain and the resilience score.

Resilience training for medical students during the clinical phase at two different universities showed a different result regarding the resilience score. Bird et al. (24) found that the resilience score increased at University A but not at University B, although participants at

both universities found the training helpful . This could be associated with fewer participants using social platforms to facilitate training monitoring between sessions. In our study, the participants adhered to the training process, but less than 50% did the homework, although at review time, they actively shared the journey they had and the skills they used between sessions. This may have reduced the efficacy of the training. Some participants noted that their level of participation may be enhanced if the training schedule aligned more easily with their academic and extracurricular schedules. Most students (21, or 84%) found the training to be helpful for reducing stress and wanted to participate in upcoming sessions.

In the training process, we did not provide much group interaction in the first session. The participants found the training to be fun and helpful for understanding themselves and their ability to endure the medical study process. Participants were able to describe topics that drained them during their study and reconsider those things with different meanings. Meanwhile, when reflecting on the things that sustained them, they did not just mention the good things, but also other aspects that helped them endure the process, whether they wanted to or not. To be more relaxed, they found new meaning in those things. The participants demonstrated an understanding of the lesson content, as indicated by the Session 1 post-test; however, some questions, such as the one about negative feelings, were not fully understood.

The questions that were not understood completely in the previous session were emphasised in the next session, along with the lesson review. The participants were enthusiastic about the group discussion and requested more group interaction in the next session. In the third and fourth sessions, the participants looked more relaxed during the group discussion. They were more active in giving their opinions and ingenious in using the skills learned from previous sessions.

A study showed that patients with depressive episodes have a lower resilience score and quality of life than normal people. However, patients experiencing a depressive episode did not always have a low resilience score (36). We can state that resilience should not only be measured in relation to depressive symptoms, but also needs to be measured in relation to quality of life. Although this was not statistically significant, we observed a similar decrease in depression scores and an increase in quality of life, consistent with the increase in resilience scores.

In our study, although resilience training was only statistically significant for reducing stress levels in the intervention group, the resilience and quality of life mean scores showed an upward trend. An opposing finding was found in the control group, where the mean scores for resilience and quality of life had a downward trend. Although influenced by the number of sessions and the lack of student participation in doing homework, it can be said that the resilience training was effective at improving stress resistance and was beneficial to students.

It is also in accordance with a study by Mugford et al. (37) about the efficacy of active resilience training (ART) for medical students. Participants who had been given six modules of ART completed a 7-question survey 1–18 months after course completion to measure skill usage and benefit. About 90% of participants said that the training was advantageous and that they would recommend participation to others.

Table 4 illustrates the importance of resilience levels in improving quality of life. Although in our study we did not get a significant result for the effects of resilience training regarding improving quality of life, resilience is indeed associated with quality of life (a moderate to

strong positive association in the pre-test and post-test and the change in the scores). This is in accordance with some previous studies. Studies on students in China showed the importance of resilience levels in affecting stress levels and quality of life (19, 33).

A study involving college students in Iran found that resilience was important in determining quality of life (38). Similar results were also shown in a cohort study involving fifth-year medical students in Taiwan. Their level of resilience and perceived stress were found to be related to their professional quality of life (partially physical quality and potential psychological condition) (39). Hence, to improve quality of life, it is important to equip them with skills and knowledge about resilience. Resilience also improved the quality of life and helped older adults face adversity, according to studies on the elderly (40–42). Another study in Iran also found that emotional strength is important for better functioning in life (43).

Our study has some limitations. First, the sample size was relatively small, and there were also challenges in finding a suitable time to conduct the training due to conflicts with the participants' academic and extracurricular obligations. Another limitation was that the follow-up survey was only administered once after the training. In a further study, additional follow-up may be necessary to achieve a more significant result. Additional sessions and lessons on stress-related retention skills can also be added. We attempted to minimise research bias in our study by using randomised group sampling and standardised instruments for the outcome. However, we did not measure any biological markers in our study. Zueger et al. (35) measured heart rate and cortisol levels. Although the heart rate did not show a significant result, the cortisol levels showed a promising one. Hence, in the next study, we suggest measuring cortisol levels.

CONCLUSION

In conclusion, we found that the resilience training adapted and performed in this study was effective in reducing medical students' stress levels, but not effective in reducing anxiety and depression levels. The resilience training also had the potential to improve quality of life and resilience scores. We suggest providing resilience training to first-year medical students and continuing the training in subsequent years to enhance their adaptability and stress resistance, thereby preventing psychological problems during their medical studies and improving their overall quality of life. For future studies, we suggest the resilience training be performed using other combined mindfulness and cognitive methods, also to measure the cortisol levels.

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ETHICAL APPROVAL

This study protocol complies with the Helsinki Declaration and has been approved for ethical clearance by the Ethics Committee of the Medical Faculty of Hasanuddin University (537/UN4.6.4.5.31/PP36/2022), registered for trial under registry number UH22080446. We provided an explanation of our study, including the intervention process and a confidentiality statement, prior to the commencement of the study. The participants then submitted a signed informed consent. All participants gave their consent themselves, as those 17 years old were considered adults in Indonesia.

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