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The effect of deep breathing exercises on anxiety levels among students approaching school examinations

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Abstract

Background: Anxiety is an emotional response commonly experienced by students before school examinations and may affect physical, cognitive, and emotional aspects. High levels of anxiety can decrease concentration and academic performance. One non-pharmacological method that can be used to reduce anxiety is deep breathing exercise

Purpose: To determine the effect of deep breathing exercise on the anxiety level of tenth-grade students to school examinations.

Method: A pre-experimental design with a one-group pretest-posttest design and a total sampling technique. Anxiety levels were measured using the STAI-S questionnaire before and after the deep breathing exercise intervention. Data were analyzed using paired sample t-tests, both univariately to assess the distribution of anxiety levels and bivariate to analyze the effect of the intervention.

Results: There was a decrease in anxiety levels after being given deep breathing exercises with a difference in average values of 39.83. Statistical analysis obtained a P-Value of 0.001 ($p < 0.05$) indicating that deep breathing exercises had a significant effect on reducing students' anxiety levels before school exams.

Conclusion: Deep breathing exercise is effective as an independent intervention to reduce students' anxiety levels prior to school examinations.

Keywords: Anxiety Level; Deep Breathing Exercise; Students, School Examination.

INTRODUCTION

Anxiety is an emotional condition characterized by feelings of discomfort, such as tension, disturbing thoughts, and physical changes including increased blood pressure, trembling, and headaches (Zhou, Wang, Yang, Yang, Zhang, Guo, & Chen, 2020). It is a form of worry and fear toward unclear situations. Anxiety differs from fear; fear arises as a response to a real stimulus, whereas anxiety is associated with situations or events that have not yet occurred (Gruber, Gauthier-Gagne, Voutou, Somerville, Saha, & Boursier, 2021). Anxiety disorders are among the most common mental health problems experienced by adolescents worldwide, and if left untreated, they can interfere with learning functions and psychological well-being (Wang, Zhao, Zhai, Huang,

Yang, Pan, & Fan, 2022). Anxiety is an emotional state characterized by feelings of fear, worry, and tension caused by certain threats or pressures (Azhari & Anggarawati, 2021). Among school adolescents, anxiety often occurs before examinations due to academic demands and expectations to achieve good grades (Kurniawan & Mahmud, 2024). Anxiety conditions can affect physiological aspects such as heart palpitations, sleep disturbances, shortness of breath, and decreased students' concentration in learning activities (Verawaty & Widiastuti, 2020).

Adolescence is a developmental period that is vulnerable to emotional and psychological changes. High school adolescents tend to experience greater

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academic pressure, making them more susceptible to anxiety when facing school examinations (Kurniawan & Mahmud, 2024). Uncontrolled anxiety levels may negatively affect academic achievement and students' self-confidence (Azhari & Anggarawati, 2021). Younger adolescents tend to experience higher levels of anxiety compared to older adolescents (Saragih & Harahap, 2024). One non-pharmacological therapy that can be used to reduce anxiety is deep breathing exercise. Deep breathing exercise is a relaxation technique performed by taking slow and deep breaths to help the body become more relaxed and calm (Multazam & Utami, 2024). This technique works by improving body oxygenation and reducing sympathetic nervous system activity, thereby decreasing anxiety responses (Verawaty & Widiastuti, 2020).

Previous studies have shown that deep breathing exercise is effective in reducing students' anxiety before school examinations. Other studies also explain that deep breathing relaxation techniques can help students control physiological and emotional responses when facing academic pressure. Based on a preliminary study conducted, most tenth-grade students admitted feeling anxious before school examinations. Students reported

frequently feeling afraid that they would not be able to answer exam questions properly, experiencing difficulty sleeping, and having trouble concentrating while studying (Li, Zhou, Ru, Niu, He, & Zhou, 2021).

RESEARCH METHOD

A quantitative pre-experimental design with a one-group pre-test post-test approach to determine the effect of deep breathing exercise on students' anxiety levels before school examinations. The study was conducted at High School Al Falah Sukoharjo among 10th-grade students. The sample consisted of 30 students selected using purposive sampling based on inclusion criteria, including cooperative students who were able to communicate well and experienced mild to moderate anxiety. Anxiety levels were measured using the State-Trait Anxiety Inventory-State (STAI-S) questionnaire before and after the intervention. The intervention consisted of deep breathing exercises performed for approximately 10–15 minutes. Data were analysed using descriptive statistics and the paired t-test to determine differences in anxiety levels before and after the intervention, with a significance level of $p < 0.05$.

RESEARCH RESULTS

Table 1. Respondent Characteristics (N=30)

Variable	Results
Age (n/%) (Mean±SD)(Range)(Year)	(15.5±0.6)(15-17)
15	16/53.3
16	13/43.3
17	1/3.3
Gender (n/%)	
Male	14/46.7
Female	16/53.3

Table 1 presents the demographic characteristics of the respondents. Based on age distribution, the mean age of participants was 15.5 ± 0.6 years, with an age range of 15–17 years. Most respondents were aged 15 years (53.3%), followed by 16 years (43.3%), while only 3.3% were aged 17 years. Based on gender, the majority of respondents were female (53.3%), whereas male respondents accounted for 46.7% of the total sample.

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Table 2. Results of the normality test

Data	P value
Pre test	0.069
Post test	0.092

Based on Table 2, the test results show a significance value of 0.069 for the pre-test and 0.092 for the post-test. Since the p-value is greater than 0.05, the data are considered to be normally distributed, so the analysis continues using a paired-sample t-test.

Table 3. The Effect of Deep Breathing Exercises on Anxiety Levels

Data	Mean $\pm$ s.b	Difference Mean $\pm$ s.b	P value
Pre test	49.93 $\pm$ 4.68	10.10 $\pm$ 545	0.001
Post test	39.83 $\pm$ 3.09		

The results of the study showed that the p-value of the paired-sample t-test was 0.001, which is less than the significance level of 0.05, indicating that there is a statistically significant difference between students' anxiety levels before and after the intervention.

DISCUSSION

The majority of respondents in this study were 15 years old, which falls into the category of early adolescence. During early adolescence, physical, emotional, and psychological changes occur, making adolescents more vulnerable to experiencing academic anxiety (Syaharani, Anjani, Kurniawan, & Aini, 2024). Adolescents tend to have a high fear of failure when facing school examinations, which affects their emotional condition (Azhari & Anggarawati, 2021). According to the researchers, the age range of 15–17 years is a period that is highly vulnerable to anxiety because adolescents at this stage are still developing self-confidence and personal identity. Academic achievement is often used as a measure of self-worth; therefore, when facing examinations, students easily become afraid of failure or worried that their grades will not meet expectations. Emotional stability at this age is also still developing, causing even minor pressures to be perceived as significant. Adolescents aged 15–17 years experience a close relationship between sleep

disturbances, anxiety, and academic demands within their learning context (Zhang, Dimitriou, & Halstead, 2021).

Other studies have shown that academic anxiety is a common phenomenon among high school students, especially among adolescents. A systematic review explained that adolescent students are more vulnerable to academic anxiety because of the imbalance between academic demands and psychological adaptation abilities that are still developing. This condition causes students to experience excessive worry, emotional tension, and decreased concentration during examinations more easily (Tomivuori, Kallio, Culnane, Pasanen, Salanterä, Sawyer, & Kosola, 2024).

Based on gender, female respondents were more dominant than male respondents. Females tend to be more sensitive to emotional pressure and more likely to experience anxiety compared to males (Verawaty & Widiastuti, 2020). According to the researchers' observations during the study, female students were more open in expressing their concerns regarding examination results. They more frequently expressed fear of obtaining low grades or disappointing their parents. Meanwhile, male students appeared calmer; however, during brief interviews and closer approaches, they also admitted feeling tense before examinations.

Female students tend to have higher levels of

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academic anxiety compared to male students. These differences are associated with biological and psychological factors, including hormonal variations and differences in emotional regulation mechanisms among females (Farrasia, Safira, Hairul, Ramadhani, & Yulandari, 2023). Females are reported to be more sensitive to academic stressors, causing them to experience stronger anxiety symptoms when facing academic demands and examinations.

The study results showed that all respondents experienced moderate anxiety before the intervention was administered. This condition occurred because students were afraid that they would not be able to answer examination questions properly and felt pressure to achieve high grades (Herawati, 2026). Academic anxiety can cause physiological disturbances such as heart palpitations, sleep difficulties, and difficulty concentrating while studying (Azhari & Anggarawati, 2021). Academic anxiety has a major influence on students' learning processes. This anxiety may affect their ability to regulate and control learning activities. The study revealed that academic anxiety contributed positively to learning difficulties, meaning that the greater the academic pressure experienced by students, the higher their anxiety levels. These findings are consistent with the pre-intervention condition, where students experienced relatively high anxiety before school examinations. According to the researchers, this condition emerged because most students had not yet developed effective coping mechanisms to deal with academic pressure, making them more susceptible to anxiety before examinations.

Breathing techniques, such as deep breathing exercises, are highly effective in reducing anxiety symptoms. Findings from the *Jurnal Pengabdian Sosial* showed that by recognizing and practicing emotional regulation through breathing exercises, adolescents become more capable of managing anxiety by controlling their breathing. This is an important component in developing psychological calmness.

After the deep breathing exercise intervention was administered, a decrease in respondents' anxiety levels was observed. Most students were categorized as having low anxiety after performing deep breathing relaxation exercises. Deep breathing exercises help the body become more relaxed by increasing oxygen supply and reducing sympathetic

nervous system activity, thereby making the body calmer (Wang, Guo, Du, Li, Wu, Guo, & Lu, 2022). This technique also helps reduce muscle tension and slow heart rate so that anxiety responses decrease (Verawaty & Widiastuti, 2020).

Deep breathing techniques combined with psychological support approaches can have positive effects in reducing anxiety among students. The study demonstrated differences in anxiety scores before and after deep breathing exercises accompanied by social and psychological support, indicating that this breathing exercise was effective in reducing students' anxiety symptoms. These findings are consistent with previous studies that reported a decrease in anxiety scores after deep breathing exercises were performed (Atika & Purnamasari, 2023).

Other studies also showed that deep breathing relaxation techniques are effective in reducing anxiety symptoms among adolescents and can be used as an easily accessible emotional regulation strategy, especially before examinations. The findings strengthen the understanding that breathing exercises provide significant relaxation benefits toward psychological responses (Syafi'i & Naqiyah, 2024). According to the researchers, deep breathing exercises are easy for students to perform and provide rapid relaxation effects, helping students control fear and worry when facing school examinations.

The statistical test results showed a value of $p=0.001$ ($p<0.05$), indicating that deep breathing exercise had a significant effect on reducing students' anxiety levels. Deep breathing exercise is effective in reducing students' anxiety before examinations (Hu, Liu, Zhao, Bi, Cao, Liu, & Yang, 2023). Deep breathing relaxation techniques can help improve comfort and reduce stress responses through the regulation of more stable breathing patterns (Zhao, Xu, He, & Xiang, 2022). With a more relaxed physical condition, students become calmer and better able to concentrate while studying and during examinations. According to the researchers, deep breathing exercise can be used as an independent intervention that is easy to implement in school settings to help students reduce academic anxiety.

CONCLUSION

The majority of respondents in this study were 15

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years old and female. Students' anxiety levels prior to the intervention were in the moderate category, with a mean of 49.93 ± 4.68 . After receiving the deep breathing exercise intervention, anxiety levels decreased to an average of 39.83 ± 3.09 . Statistical test results showed a p-value of 0.001 ($p < 0.05$), indicating a significant effect of deep breathing exercises on the anxiety levels of 10th-grade students approaching their school exams.

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