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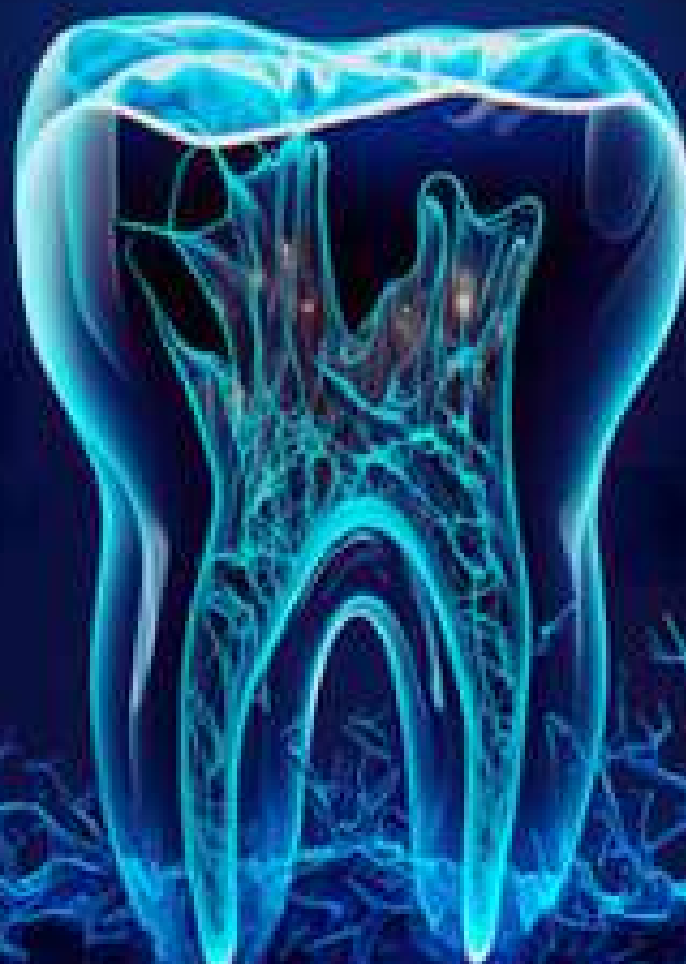
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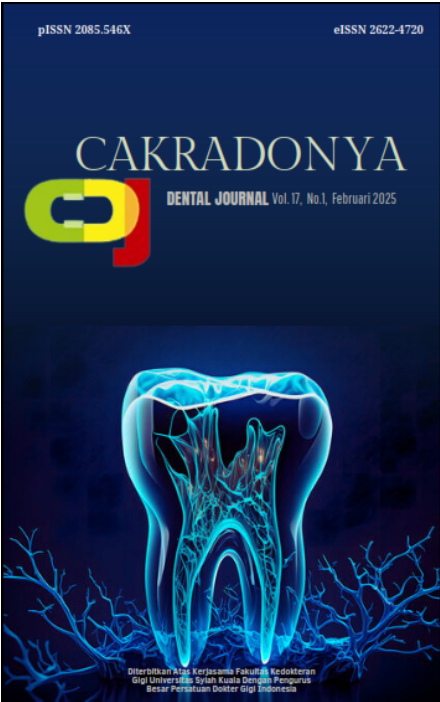**pISSN 2085.546X** **eISSN 2622-4720**

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The Effect of Classical Music on Anxiety: A Pre-Post Design

Pengaruh Musik Klasik Terhadap Kecemasan: *Pre-Post Design*

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ABSTRACT
Anxiety is a psychological response often experienced by university students when facing exams, which can affect academic performance. Various factors, such as the exam situation, personal experiences, and physical conditions, can worsen anxiety levels. One intervention that is believed to help reduce anxiety is classical music therapy. This study aims to examine the effect of classical music on the anxiety among students at the Faculty of Dentistry. A pre-experimental study was conducted with 165 students from the 2024 cohort of the Faculty of Dentistry at Universitas Trisakti. The research participants completed the ZSAS questionnaire before and after receiving the classical music intervention. The results showed that he Wilcoxon test yielded p=0.000 (p< 0.001), indicating a statistically significant difference between scores before and after the classical music intervention, based on the ZSAS questionnaire. The limitation of this study lies in its participants, who were restricted to a single cohort of students, and in the study design. It can be concluded that classical music has the potential to reduce students' anxiety levels.
Keywords: Anxiety, classical music, students, faculty of dentistry.

ABSTRAK
Kecemasan merupakan respons psikologis yang sering dialami oleh mahasiswa dalam menghadapi ujian, dimana hal tersebut dapat memengaruhi kinerja akademik. Berbagai faktor seperti situasi ujian, pengalaman pribadi, dan kondisi fisik dapat memperburuk tingkat kecemasan. Salah satu intervensi yang dapat mengurangi kecemasan adalah terapi musik klasik. Tujuan penelitian ini untuk mengetahui pengaruh musik klasik terhadap kecemasan mahasiswa Fakultas Kedokteran Gigi. Metode penelitian ini menggunakan pre-eksperimental pada mahasiswa FKG Usakti Angkatan 2024 sebanyak 165 mahasiswa. Peserta penelitian mengisi kuesioner ZSAS sebelum dan sesudah diberikan intervensi musik klasik. Hasil menunjukkan bahwa uji Wilcoxon menghasilkan p=0.000 (p<0.001), menunjukkan adanya perbedaan yang signifikan secara statistik antara skor sebelum dan setelah intervensi musik klasik, berdasarkan kuesioner ZSAS. Keterbatasan penelitian ini adalah pada peserta penelitian yang terbatas pada mahasiswa satu angkatan dan design studi. Disimpulkan bahwa musik klasik dapat berpotensi menurunkan tingkat kecemasan mahasiswa.
Kata Kunci: Kecemasan, musik klasik, mahasiswa, fakultas kedokteran gigi.

INTRODUCTION

A student is someone who is currently studying at a university level. In their daily lives, they often face various demands that can trigger anxiety. Anxiety can arise from changing situations that cause feelings of worry, anxiety, fear, or unease. Anxiety levels vary, from mild to severe (panic), and can affect an individual's ability to adapt to anxiety-provoking situations. If left untreated, anxiety can disrupt daily activities.[1]

Anxiety is an emotional state characterized by stress, worry, fear, and anxiety resulting from frustration with self-esteem and self-confidence. This condition can be triggered by an increased sense of failure and guilt that arises when an individual is unable to achieve desired goals or overcome existing obstacles.[2]

In the world of education, the most common anxiety experienced by students is exams.[1] Chao et al. stated that anxiety levels are highest just before exams. This is related to the fear of failure and can negatively impact student performance.[3] Exam anxiety is one of the challenges often experienced by dental students. This also determines the student's learning process and is important to consider to improve the success of dental education.[4] Based on several studies, it is clear that one of the anxieties faced by students is exams.

Several factors influencing student anxiety in exam preparation include the exam situation, preparation, experience, health, and learning environment factors such as social support and the learning atmosphere. Excessive anxiety can lead to psychosomatic disorders such as anxiety, tension, sleep disturbances, and other physical problems. This anxiety has three main aspects: physical symptoms (e.g., dizziness and headaches), emotional aspects (panic and fear), and mental/cognitive aspects (impaired focus and confusion).[5]

Anxiety disorders can be addressed through pharmacological and non-pharmacological approaches. Non-pharmacological therapies include progressive muscle relaxation, deep breathing, meditation (such as yoga and walking), and behavioral relaxation (such as listening to music and chewing gum).[6] Music of various genres, including classical music, can reduce anxiety levels. Classical music is known to influence human emotions and physiology and has been shown to relieve pain and anxiety.[7] Shih KC et al. explained that listening to classical music is effective in reducing anxiety.[8] Glasziou's research supports that music can reduce anxiety in patients undergoing surgical procedures in hospitals.[9]

Van der Weijden et al. reported that music is effective in reducing anxiety in adolescents and adults during dental procedures, strengthening the evidence that music can be used as a beneficial non-pharmacological intervention in various clinical contexts.[10]

Most participants in various studies reported that listening to music helped reduce stress and accelerated recovery from the stress response. Previous systematic reviews and meta-analyses have shown that music interventions, both listening and music therapy, have significant effects in reducing stress levels physiologically (e.g., cortisol levels, blood pressure) and psychologically (perceived stress and anxiety).[11] Furthermore, research in the context of sports has found that listening to music before or during physical activity can improve mood, enhance performance, and reduce perceived fatigue during exercise.[12–15]

The novelty of this study is the type of music used to reduce anxiety and the research participants. While most previous studies used classical music by Mozart[16–18], this study used Christian Petzold Minuet in G Major. The study's research participants were pre-clinical students at the Faculty of Dentistry.

RESEARCH METHODS

The study population was students from the Faculty of Dentistry, Universitas Trisakti, Class of 2024. The initial research phase used total sampling with a population of all preclinical students from the Class of 2024 (165 students) who met the inclusion criteria. The inclusion criteria for this study were active Faculty of Dentistry students from the Class of 2024 who were not diagnosed with psychological disorders by a doctor, were present and provided informed consent.

The participants of this study are first-year students (pre-clinical) from the Faculty of Dentistry, Class of 2024. They were selected without any direct association with exams or other academic evaluations that could

influence their anxiety levels. This study aims to examine the general anxiety levels of first-year students, rather than anxiety related to exams or exam preparation. Therefore, the intervention provided is intended to reduce anxiety in a broader context, not solely anxiety caused by exams.

A pre-test was then conducted using the ZSAS questionnaire. The results showed anxiety levels ranging from normal, mild, moderate, to severe. Normal score range was 20-41, mild scores ranged from 42-63, moderate scores ranged from 64-84, and severe anxiety was scores from 85 or above.

Phase 2 Research Based on the inclusion criteria, the next phase of the study involved an intervention using a subsample with moderate anxiety levels.

The subsample size for the intervention phase was determined using the appropriate sample size for detecting a difference between the means of two samples with the following formula:

$$n = (Z_{\alpha/2}+Z_{\beta})^2 *2*\sigma^2 / d^{2},[19]$$

Notes : α is 0.05 and the critical value is 1.96, power of 80% then β is 0.2 and the critical value is 0.84, σ2 is 295 points from the post test result of 165 research participant and d is 10 points. Thus, the sample size is 47 for the pre-test and 47 for the post-test.

Formula to calculate the minimum sample size, from the resulting minimum sample of 47 students. Based on the results of Phase 1, sample size selected was 70. Research participants were asked to complete a questionnaire and listen to classical music.

From the 165 students who participated, baseline assessment using the Zung Self-Rating Anxiety Scale (ZSAS) identified **77** with normal anxiety levels, 18 with mild anxiety, and 70 with moderate anxiety. The music intervention was administered only to those with moderate anxiety, as therapeutic effects are more likely to be clinically meaningful in individuals whose anxiety levels exceed the normal threshold, whereas those with normal or mild anxiety were considered not to require targeted intervention. Individuals with mild anxiety are generally able to manage their symptoms without the need for therapeutic interventions, as these symptoms typically do not

significantly impair daily functioning or well-being. Furthermore, individuals with mild anxiety often have natural coping mechanisms that allow them to manage stress effectively without the need for professional assistance.[20]

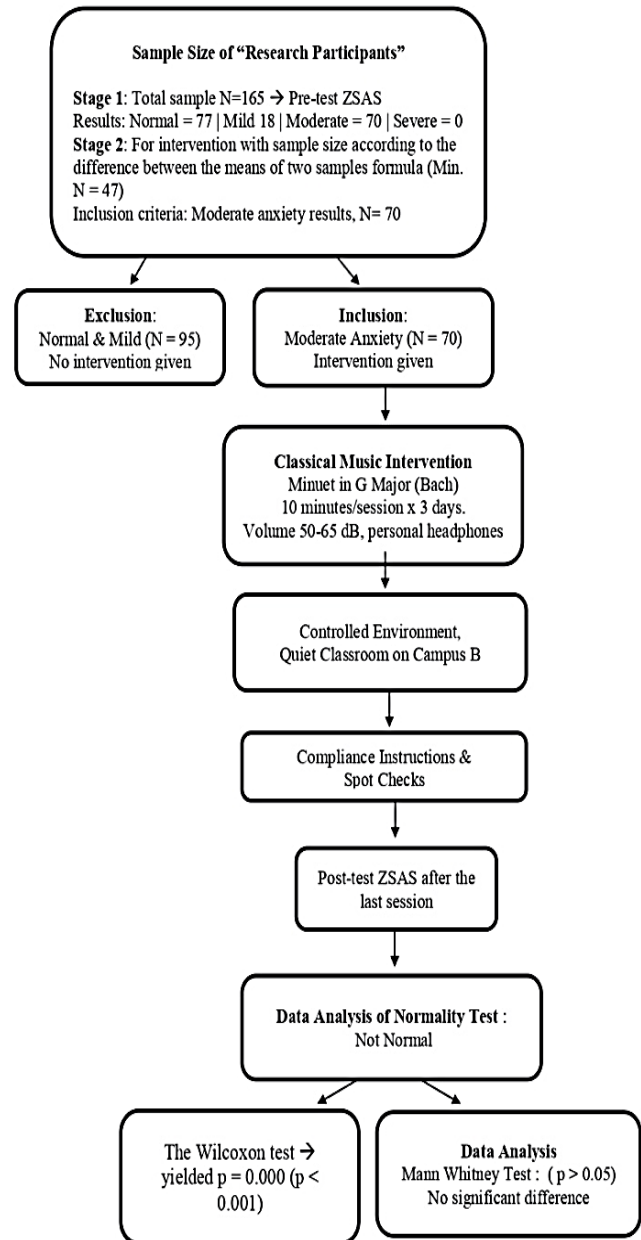**Figure 1.** Flow diagram of participant recruitment, screening, intervention and analysis.

This study used instrument in the form of a questionnaire consisting of 20 questions, including 15 questions aimed at increasing anxiety and 5 statements aimed at decreasing anxiety.[21] This research has been approved by the Health Research Ethics Committee of the Faculty of Dentistry Usakti number 862/S1/KEPK/FKG/7/2024.

This study used research participant from one batch at the Faculty of Dentistry, but participation in this survey was voluntary and there was no coercion. They filled out an informed consent form stating that they could withdraw at any time without affecting their grades. The research and data collection were conducted by student researchers and a team of campus staff that did not involve lecturers. This was done to reduce the risk of lecturer-student conflicts of interest and to ensure the neutrality of students in answering the questionnaire. The data used was anonymous to ensure the neutrality of the research results. The questionnaire answers were confidential, no individual answers will be identified.

Through implementing the strategies, the lecturer-student power dynamic can be mitigated, fostering an environment where students feel safe, valued, and respected. Ensuring voluntary participation, no impact on grades, non-instructor data collectors, and data anonymity can empower students to engage honestly without fear of negative repercussions, thereby reducing risk of bias.

The next stage of the research, intervention, was based on survey results from 70 research participants with moderate symptoms. These symptoms often disrupt daily activities, reduce focus, and affect emotional well-being. The intervention involved having research participants listen to classical music by Christian Petzold Minuet in G Major" for 10 minutes per session over three days, each of them using individual headphones to ensure that the sound was only received by the research participant without interference from external noise.

The music was played at a volume of 60-65 dB, which is considered a moderate sound level, providing a soothing auditory environment without causing discomfort or overstimulation. The intervention sessions were conducted in a quiet, controlled classroom environment to minimize external distractions and create an atmosphere conducive to concentration and relaxation. Participants received clear instructions on proper headphone use and the importance of avoiding distractions during listening sessions. The research team conducted spot checks and if necessary, encouraged participants who missed a session to reschedule promptly to

complete the full intervention. Immediately after the final session, the Zung Self-Rating Anxiety Scale (ZSAS) was administered as a post-test to measure changes in anxiety levels compared with baseline pre-test results. The collected questionnaires were then tabulated, the pre-test obtained a p-value of 0.000 ($p < (0.001)$ and the post-test obtained a p-value of 0.000 ($p<0.001$). The Wilcoxon signed-rank test was applied for analysis.

RESULT

Table 1. Characteristic participants based on gender

Gender	N	%
Male	38	23.0%
Female	127	77.0%
Total	165	100%

Table 2. Category of Anxiety levels

Category	N	%
Normal/Not Anxious	77	46.7
Mild Anxiety	18	10.9
Moderate Anxiety	70	42.4
Severe Anxiety	0	0
Total	165	100.0

The distribution of research participants by gender can be seen in Table 1. The majority of esearch participants were female (77.0%).

Table 2 shows that the results of anxiety from 165 research participants were normal for 77 research participants, 18 were mild anxiety, and 70 were moderate anxiety, and 0 for severe anxiety. The next stage, the research participant who were intervened were those with moderate anxiety.[22]

The total scores on the pre-test of 20 items ranged from 160 to 261 per item. On the post-test of 20 items, the range of scores per item ranged from 91 to 162.

Table 3 shows the average results of the anxiety questionnaire for the male and female groups before and after the classical music intervention. Male participant showed lower levels of anxiety, with a pre-test score of 66.8 and a post-test score of 34.8, while female participant had higher average levels of anxiety, with a pre-test score of 67.2 and a post-test score of 36.4.

Table 3. Distribution of average anxiety of male and female (N=70)

Variable	Mean	SD	Median	Min	Max	N
Male						
Pretest	66,8	2,3	66	64	71	17
Posttest	34,8	10,9	33	20	58	17
Female						
Pretest	67,2	2,3	68	64	71	53
Posttest	36,4	11	34	20	58	53
Total						
Pretest	66,8	2,3	68	64	71	53
Posttest	34,8	11	34	20	58	53

Table 4 shows the results of the wilcoxon tests for the pre-test and post-test questionnaires, showing the output data from the students' questionnaires before and after listening to classical music. As a result, the Wilcoxon test was conducted to compare the scores before and after the classical music intervention. The Wilcoxon test yielded p = 0.000 (p <0.001), indicate a statistically significant difference in the scores before and after the classical music intervention.

Table 4. Wilcoxon Test for pre test and post-test questionnaire

	Mean	SD	Median	Lowest	Highest	95%CI	p
Male	32,0	11,4	33,0	9	50	26.3-37.2	
							0.072
Female	30,8	11,3	32,0	7	49	6.8-14.2	

Table 5. Effect of of classical music by gender (N=70)

	Mean	SD	Median	Min	Max	p
Pre-test (N=70)	67.1	2.3	67.0	64	71	
						0.000
Post-test (N=70)	35.9	10.9	34.0	20	58	

Sig<0.001 Wilcoxon test

Table 5 shows the effect of classical music on reducing anxiety levels, differentiated by gender, among 70 research participant with moderate anxiety. The average reduction in anxiety scores among male research participant was 32.0, compare to female research participant, the average reduction in anxiety scores was slightly lower at 30.8. The reduction in anxiety scores among males ranged from 9 to 50, while among females it ranged from 7 to 49.

Additionally, the 95% Confidence Interval (CI) for males was 26.3-37.2, while for females it was 6.8-14.2. The overlapping CI range indicates that there was no significant difference between the effects of anxiety reduction in both genders. This is supported by the results of the Mann-Whitney U test, which showed a p-value of 0.072, greater than 0.05, indicating no significant difference between men and women in anxiety reduction after listening to classical music.

In this research classical music has a comparable anxiety-reducing effect on both men and women among dental students.

DISCUSSION

This study was conducted to determine the effect of classical music on anxiety levels of students at the Faculty of Dentistry, Usakti. This study involved 165 research participants, consisting of 127 female (75.76%) and 38 male (23.0%), with the majority being female. Of the 165 research participants who participated in this study, the majority 77 research participants (46.7%) had normal anxiety levels, 70 research participants (42.42%) experienced moderate anxiety, 18 research participants (10.9%) experienced mild anxiety and no research participants experienced severe anxiety.

The results showed that 70 research participants experienced a decrease in anxiety levels, as seen in Table 4. This decrease in anxiety levels was due to the positive influence of the classical music played during the period. Most research participants reported feeling calmer and more comfortable during lectures after the intervention.

Based on the Wilcoxon test results in Table 4 there was a significant difference with p=0.000 (p<0.001) gin the questionnaire responses of research participants, indicating a decrease in anxiety among FKG Usakti students before and after the classical music intervention. This decrease is attributed to the characteristics of classical music, which has gentle and stable dynamics,[23] which can help students feel more relaxed. As with previous research conducted by Smith and Johnson,

classical music has been shown to have a calming effect on the human nervous system, thus helping students manage academic stress.[24] Classical music generally offers many benefits, including reducing anxiety and depression. These findings strengthen the evidence that classical music not only provides momentary calm but can also contribute to overall mental health.[25]

The results of this study also demonstrate that gender can influence anxiety levels. Of the 70 research participants, 17 (24.29%) were male and 53 (75.71%) . Based on Table 3, the average questionnaire results show that men's anxiety levels were 66.8 in the pre-test and decreased to 34.8 in the post-test. Meanwhile, women's anxiety levels were higher, with a pre-test average of 67.2 and a post-test average of 36.4. This study shows that the distribution of anxiety scores is not normal, which means that the results cannot be generalized to the wider population. In other words, although there were no significant differences between genders in this study, if the sample used was more representative and the distribution of anxiety scores followed a normal distribution, differences between genders might have been found.

This finding aligns with research conducted by Bao and Han (2024), which found that, while anxiety levels in females were higher on average, the study did not observe any significant gender-based difference in anxiety outcomes after intervention. Their research supports the idea that gender influences anxiety levels, but the overall impact of interventions, such as music therapy, is similar across genders. This mirrors the findings in the present study, where both male and female participants showed comparable reductions in anxiety levels after the classical music intervention.[26]

This research also aligns with Yuliana and Hidayati's study, "The Effect of Music Therapy on Reducing Stress Levels in Adolescents at the Kyai Ageng Majapahit Orphanage Foundation in Semarang," which found that classical music therapy can provide significant benefits in reducing stress levels in adolescents, especially in stressful situations, such as exams or academic assignments. Classical music, with its characteristically gentle and harmonious melodies, has been shown to be effective in creating a calmer and more relaxed atmosphere for listeners. As a result, adolescents exposed to classical music for three days, including 10 minutes of Mozart, reported feeling more at ease and better able to manage their anxiety and stress.[27]

In line with this, it is important to understand the physiological mechanisms that underlie anxiety and stress. Anxiety is closely linked to the activation of the autonomic nervous system (ANS), which triggers an increased release of norepinephrine, leading to heightened blood pressure, heart rate, and muscle tension. Moreover, the activation of the hypothalamic-pituitary-adrenal (HPA) axis results in the secretion of cortisol, a hormone that plays a crucial role in the body's stress response. Previous studies have shown that elevated cortisol levels are directly associated with increased anxiety, and thus, the reduction of cortisol levels might help alleviate these symptoms.[28]

Additionally, this study did not consider factors that could influence anxiety, such as sleep quality, caffeine consumption, and music preferences, even though these factors have been shown to significantly impact anxiety levels. Proper sleep control can reduce anxiety symptoms, high caffeine consumption can increase anxiety risk and preferred music types can affect emotional and mental well-being. [29-31]

The limitation of this study is that the research participants were limited to students, of one level at the Faculty of Dentistry. Another limitation is that this study used a one-group pretest–post test design (without control). It is recommended to use a two-group pretest and pos-test design with control.

In this study, we did not specify the use of the same brand of headphones for reasons of cost efficiency, but the researchers gave instructions on the procedure for using the music, including: medium volume, comfortable listening, and this was complied with by the research participants.

It is hoped that future studies will involve more research participant, several faculties of dentistry so that the results will be more varied, changes to the design of the study and the standard of the music listening equipment are also needed.

CONCLUSION

The results showed Students' anxiety levels were lower after classical music sessions during lectures. The majority of research participant stated that they felt calmer and more comfortable after the intervention .

It can be concluded that classical music is potentially effective and reduce anxiety in the short term among students.

SUGGESTION

Based on these findings, it is recommended that educational institutions provide outreach to students, especially those just entering their studies or at a particular semester level, regarding the importance of strategies for reducing anxiety, one of which is listening to classical music.

Future research can be developed to examine the effect of other music genres on anxiety, so that students can choose music that suits their personal preferences.

Further research is needed with a more definitive design, namely RCT (Randomized Controlled Trial)

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Mita Juliawati

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The Effect of Classical Music on Anxiety: A Pre-Post Design

Pengaruh Musik Klasik Terhadap Kecemasan: *Pre-Post Design*

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ABSTRACT

Anxiety is a psychological response often experienced by university students when facing exams, which can affect academic performance. Various factors, such as the exam situation, personal experiences, and physical conditions, can worsen anxiety levels. One intervention that is believed to help reduce anxiety is classical music therapy. This study aims to examine the effect of classical music on the anxiety among students at the Faculty of Dentistry. A pre-experimental study was conducted with 165 students from the 2024 cohort of the Faculty of Dentistry at Universitas Trisakti. The research participants completed the ZSAS questionnaire before and after receiving the classical music intervention. The results showed that he Wilcoxon test yielded p=0.000 (p< 0.001), indicating a statistically significant difference between scores before and after the classical music intervention, based on the ZSAS questionnaire. The limitation of this study lies in its participants, who were restricted to a single cohort of students, and in the study design. It can be concluded that classical music has the potential to reduce students' anxiety levels.
Keywords: Anxiety, classical music, students, faculty of dentistry.

ABSTRAK

Kecemasan merupakan respons psikologis yang sering dialami oleh mahasiswa dalam menghadapi ujian, dimana hal tersebut dapat memengaruhi kinerja akademik. Berbagai faktor seperti situasi ujian, pengalaman pribadi, dan kondisi fisik dapat memperburuk tingkat kecemasan. Salah satu intervensi yang dapat mengurangi kecemasan adalah terapi musik klasik. Tujuan penelitian ini untuk mengetahui pengaruh musik klasik terhadap kecemasan mahasiswa Fakultas Kedokteran Gigi. Metode penelitian ini menggunakan pre-eksperimental pada mahasiswa FKG Usakti Angkatan 2024 sebanyak 165 mahasiswa. Peserta penelitian mengisi kuesioner ZSAS sebelum dan sesudah diberikan intervensi musik klasik. Hasil menunjukkan bahwa uji Wilcoxon menghasilkan p=0.000 (p<0.001), menunjukkan adanya perbedaan yang signifikan secara statistik antara skor sebelum dan setelah intervensi musik klasik, berdasarkan kuesioner ZSAS. Keterbatasan penelitian ini adalah pada peserta penelitian yang terbatas pada mahasiswa satu angkatan dan design studi. Disimpulkan bahwa musik klasik dapat berpotensi menurunkan tingkat kecemasan mahasiswa.
Kata Kunci: Kecemasan, musik klasik, mahasiswa, fakultas kedokteran gigi.

INTRODUCTION

A student is someone who is currently studying at a university level. In their daily lives, they often face various demands that can trigger anxiety. Anxiety can arise from changing situations that cause feelings of worry, anxiety, fear, or unease. Anxiety levels vary, from mild to severe (panic), and can affect an individual's ability to adapt to anxiety-provoking situations. If left untreated, anxiety can disrupt daily activities.[1]

Anxiety is an emotional state characterized by stress, worry, fear, and anxiety resulting from frustration with self-esteem and self-confidence. This condition can be triggered by an increased sense of failure and guilt that arises when an individual is unable to achieve desired goals or overcome existing obstacles.[2]

In the world of education, the most common anxiety experienced by students is exams.[1] Chao et al. stated that anxiety levels are highest just before exams. This is related to the fear of failure and can negatively impact student performance.[3] Exam anxiety is one of the challenges often experienced by dental students. This also determines the student's learning process and is important to consider to improve the success of dental education.[4] Based on several studies, it is clear that one of the anxieties faced by students is exams.

Several factors influencing student anxiety in exam preparation include the exam situation, preparation, experience, health, and learning environment factors such as social support and the learning atmosphere. Excessive anxiety can lead to psychosomatic disorders such as anxiety, tension, sleep disturbances, and other physical problems. This anxiety has three main aspects: physical symptoms (e.g., dizziness and headaches), emotional aspects (panic and fear), and mental/cognitive aspects (impaired focus and confusion).[5]

Anxiety disorders can be addressed through pharmacological and non-pharmacological approaches. Non-pharmacological therapies include progressive muscle relaxation, deep breathing, meditation (such as yoga and walking), and behavioral relaxation (such as listening to music and chewing gum).[6] Music of various genres, including classical music, can reduce anxiety levels. Classical music is known to influence human emotions and physiology and has been shown to relieve pain and anxiety.[7] Shih KC et al. explained that listening to classical music is effective in reducing anxiety.[8] Glasziou's research supports that music can reduce anxiety in patients undergoing surgical procedures in hospitals.[9]

Van der Weijden et al. reported that music is effective in reducing anxiety in adolescents and adults during dental procedures, strengthening the evidence that music can be used as a beneficial non-pharmacological intervention in various clinical contexts.[10]

Most participants in various studies reported that listening to music helped reduce stress and accelerated recovery from the stress response. Previous systematic reviews and meta-analyses have shown that music interventions, both listening and music therapy, have significant effects in reducing stress levels physiologically (e.g., cortisol levels, blood pressure) and psychologically (perceived stress and anxiety).[11] Furthermore, research in the context of sports has found that listening to music before or during physical activity can improve mood, enhance performance, and reduce perceived fatigue during exercise.[12–15]

The novelty of this study is the type of music used to reduce anxiety and the research participants. While most previous studies used classical music by Mozart[16–18], this study used Christian Petzold Minuet in G Major. The study's research participants were pre-clinical students at the Faculty of Dentistry.

RESEARCH METHODS

The study population was students from the Faculty of Dentistry, Universitas Trisakti, Class of 2024. The initial research phase used total sampling with a population of all preclinical students from the Class of 2024 (165 students) who met the inclusion criteria. The inclusion criteria for this study were active Faculty of Dentistry students from the Class of 2024 who were not diagnosed with psychological disorders by a doctor, were present and provided informed consent.

The participants of this study are first-year students (pre-clinical) from the Faculty of Dentistry, Class of 2024. They were selected without any direct association with exams or other academic evaluations that could

influence their anxiety levels. This study aims to examine the general anxiety levels of first-year students, rather than anxiety related to exams or exam preparation. Therefore, the intervention provided is intended to reduce anxiety in a broader context, not solely anxiety caused by exams.

A pre-test was then conducted using the ZSAS questionnaire. The results showed anxiety levels ranging from normal, mild, moderate, to severe. Normal score range was 20-41, mild scores ranged from 42-63, moderate scores ranged from 64-84, and severe anxiety was scores from 85 or above.

Phase 2 Research Based on the inclusion criteria, the next phase of the study involved an intervention using a subsample with moderate anxiety levels.

The subsample size for the intervention phase was determined using the appropriate sample size for detecting a difference between the means of two samples with the following formula:

$$n = (Z_{\alpha/2}+Z_{\beta})^2 *2*\sigma^2 / d^2,[19]$$

Notes : α is 0.05 and the critical value is 1.96, power of 80% then β is 0.2 and the critical value is 0.84, σ2 is 295 points from the post test result of 165 research participant and d is 10 points. Thus, the sample size is 47 for the pre-test and 47 for the post-test.

Formula to calculate the minimum sample size, from the resulting minimum sample of 47 students. Based on the results of Phase 1, sample size selected was 70. Research participants were asked to complete a questionnaire and listen to classical music.

From the 165 students who participated, baseline assessment using the Zung Self-Rating Anxiety Scale (ZSAS) identified **77** with normal anxiety levels, 18 with mild anxiety, and 70 with moderate anxiety. The music intervention was administered only to those with moderate anxiety, as therapeutic effects are more likely to be clinically meaningful in individuals whose anxiety levels exceed the normal threshold, whereas those with normal or mild anxiety were considered not to require targeted intervention. Individuals with mild anxiety are generally able to manage their symptoms without the need for therapeutic interventions, as these symptoms typically do not

significantly impair daily functioning or well-being. Furthermore, individuals with mild anxiety often have natural coping mechanisms that allow them to manage stress effectively without the need for professional assistance.[20]

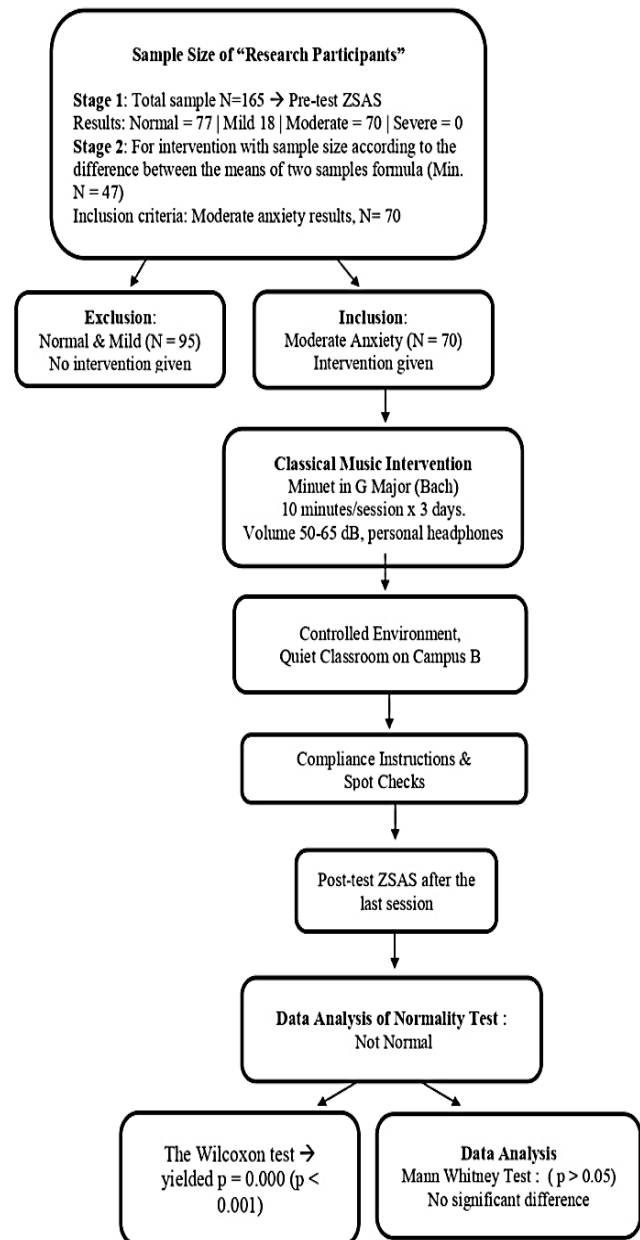**Figure 1.** Flow diagram of participant recruitment, screening, intervention and analysis.

This study used instrument in the form of a questionnaire consisting of 20 questions, including 15 questions aimed at increasing anxiety and 5 statements aimed at decreasing anxiety.[21] This research has been approved by the Health Research Ethics Committee of the Faculty of Dentistry Usakti number 862/S1/KEPK/FKG/7/2024.

This study used research participant from one batch at the Faculty of Dentistry, but participation in this survey was voluntary and there was no coercion. They filled out an informed consent form stating that they could withdraw at any time without affecting their grades. The research and data collection were conducted by student researchers and a team of campus staff that did not involve lecturers. This was done to reduce the risk of lecturer-student conflicts of interest and to ensure the neutrality of students in answering the questionnaire. The data used was anonymous to ensure the neutrality of the research results. The questionnaire answers were confidential, no individual answers will be identified.

Through implementing the strategies, the lecturer-student power dynamic can be mitigated, fostering an environment where students feel safe, valued, and respected. Ensuring voluntary participation, no impact on grades, non-instructor data collectors, and data anonymity can empower students to engage honestly without fear of negative repercussions, thereby reducing risk of bias.

The next stage of the research, intervention, was based on survey results from 70 research participants with moderate symptoms. These symptoms often disrupt daily activities, reduce focus, and affect emotional well-being. The intervention involved having research participants listen to classical music by Christian Petzold Minuet in G Major" for 10 minutes per session over three days, each of them using individual headphones to ensure that the sound was only received by the research participant without interference from external noise.

The music was played at a volume of 60-65 dB, which is considered a moderate sound level, providing a soothing auditory environment without causing discomfort or overstimulation. The intervention sessions were conducted in a quiet, controlled classroom environment to minimize external distractions and create an atmosphere conducive to concentration and relaxation. Participants received clear instructions on proper headphone use and the importance of avoiding distractions during listening sessions. The research team conducted spot checks and if necessary, encouraged participants who missed a session to reschedule promptly to

complete the full intervention. Immediately after the final session, the Zung Self-Rating Anxiety Scale (ZSAS) was administered as a post-test to measure changes in anxiety levels compared with baseline pre-test results. The collected questionnaires were then tabulated, the pre-test obtained a p-value of 0.000 ($p < 0.001$) and the post-test obtained a p-value of 0.000 ($p<0.001$). The Wilcoxon signed-rank test was applied for analysis.

RESULT

Table 1. Characteristic participants based on gender

Gender	N	%
Male	38	23.0%
Female	127	77.0%
Total	165	100%

Table 2. Category of Anxiety levels

Category	N	%
Normal/Not Anxious	77	46.7
Mild Anxiety	18	10.9
Moderate Anxiety	70	42.4
Severe Anxiety	0	0
Total	165	100.0

The distribution of research participants by gender can be seen in Table 1. The majority of esearch participants were female (77.0%).

Table 2 shows that the results of anxiety from 165 research participants were normal for 77 research participants, 18 were mild anxiety, and 70 were moderate anxiety, and 0 for severe anxiety. The next stage, the research participant who were intervened were those with moderate anxiety.[22]

The total scores on the pre-test of 20 items ranged from 160 to 261 per item. On the post-test of 20 items, the range of scores per item ranged from 91 to 162.

Table 3 shows the average results of the anxiety questionnaire for the male and female groups before and after the classical music intervention. Male participant showed lower levels of anxiety, with a pre-test score of 66.8 and a post-test score of 34.8, while female participant had higher average levels of anxiety, with a pre-test score of 67.2 and a post-test score of 36.4.

Table 3. Distribution of average anxiety of male and female (N=70)

Variable	Mean	SD	Median	Min	Max	N
Male						
Pretest	66,8	2,3	66	64	71	17
Posttest	34,8	10,9	33	20	58	17
Female						
Pretest	67,2	2,3	68	64	71	53
Posttest	36,4	11	34	20	58	53
Total						
Pretest	66,8	2,3	68	64	71	53
Posttest	34,8	11	34	20	58	53

Table 4. Wilcoxon Test for pre test and post-test questionnaire

	Mean	SD	Median	Lowest	Highest	95%CI	*p*
Male	32,0	11,4	33,0	9	50	26.3-37.2	
							0.072
Female	30,8	11,3	32,0	7	49	6.8-14.2	

Table 5. Effect of of classical music by gender (N=70)

	Mean	SD	Median	Min	Max	*p*
Pre-test (N=70)	67.1	2.3	67.0	64	71	
						0.000
Post-test (N=70)	35.9	10.9	34.0	20	58	

Sig<0.001 Wilcoxon test

Table 5 shows the effect of classical music on reducing anxiety levels, differentiated by gender, among 70 research participant with moderate anxiety. The average reduction in anxiety scores among male research participant was 32.0, compare to female research participant, the average reduction in anxiety scores was slightly lower at 30.8. The reduction in anxiety scores among males ranged from 9 to 50, while among females it ranged from 7 to 49.

Additionally, the 95% Confidence Interval (CI) for males was 26.3-37.2, while for females it was 6.8-14.2. The overlapping CI range indicates that there was no significant difference between the effects of anxiety reduction in both genders. This is supported by the results of the Mann-Whitney U test, which showed a p-value of 0.072, greater than 0.05, indicating no significant difference between men and women in anxiety reduction after listening to classical music.

In this research classical music has a comparable anxiety-reducing effect on both men and women among dental students.

DISCUSSION

This study was conducted to determine the effect of classical music on anxiety levels of students at the Faculty of Dentistry, Usakti. This study involved 165 research participants, consisting of 127 female (75.76%) and 38 male (23.0%), with the majority being female. Of the 165 research participants who participated in this study, the majority 77 research participants (46.7%) had normal anxiety levels, 70 research participants (42.42%) experienced moderate anxiety, 18 research participants (10.9%) experienced mild anxiety and no research participants experienced severe anxiety.

The results showed that 70 research participants experienced a decrease in anxiety levels, as seen in Table 4. This decrease in anxiety levels was due to the positive influence of the classical music played during the period. Most research participants reported feeling calmer and more comfortable during lectures after the intervention.

Based on the Wilcoxon test results in Table 4 there was a significant difference with p=0.000 (p<0.001) gin the questionnaire responses of research participants, indicating a decrease in anxiety among FKG Usakti students before and after the classical music intervention. This decrease is attributed to the characteristics of classical music, which has gentle and stable dynamics,[23] which can help students feel more relaxed. As with previous research conducted by Smith and Johnson,

classical music has been shown to have a calming effect on the human nervous system, thus helping students manage academic stress.[24] Classical music generally offers many benefits, including reducing anxiety and depression. These findings strengthen the evidence that classical music not only provides momentary calm but can also contribute to overall mental health.[25]

The results of this study also demonstrate that gender can influence anxiety levels. Of the 70 research participants, 17 (24.29%) were male and 53 (75.71%) . Based on Table 3, the average questionnaire results show that men's anxiety levels were 66.8 in the pre-test and decreased to 34.8 in the post-test. Meanwhile, women's anxiety levels were higher, with a pre-test average of 67.2 and a post-test average of 36.4. This study shows that the distribution of anxiety scores is not normal, which means that the results cannot be generalized to the wider population. In other words, although there were no significant differences between genders in this study, if the sample used was more representative and the distribution of anxiety scores followed a normal distribution, differences between genders might have been found.

This finding aligns with research conducted by Bao and Han (2024), which found that, while anxiety levels in females were higher on average, the study did not observe any significant gender-based difference in anxiety outcomes after intervention. Their research supports the idea that gender influences anxiety levels, but the overall impact of interventions, such as music therapy, is similar across genders. This mirrors the findings in the present study, where both male and female participants showed comparable reductions in anxiety levels after the classical music intervention.[26]

This research also aligns with Yuliana and Hidayati's study, "The Effect of Music Therapy on Reducing Stress Levels in Adolescents at the Kyai Ageng Majapahit Orphanage Foundation in Semarang," which found that classical music therapy can provide significant benefits in reducing stress levels in adolescents, especially in stressful situations, such as exams or academic assignments. Classical music, with its characteristically gentle and harmonious melodies, has been shown to be effective in creating a calmer and more relaxed atmosphere for listeners. As a result, adolescents exposed to classical music for three days, including 10 minutes of Mozart, reported feeling more at ease and better able to manage their anxiety and stress.[27]

In line with this, it is important to understand the physiological mechanisms that underlie anxiety and stress. Anxiety is closely linked to the activation of the autonomic nervous system (ANS), which triggers an increased release of norepinephrine, leading to heightened blood pressure, heart rate, and muscle tension. Moreover, the activation of the hypothalamic-pituitary-adrenal (HPA) axis results in the secretion of cortisol, a hormone that plays a crucial role in the body's stress response. Previous studies have shown that elevated cortisol levels are directly associated with increased anxiety, and thus, the reduction of cortisol levels might help alleviate these symptoms.[28]

Additionally, this study did not consider factors that could influence anxiety, such as sleep quality, caffeine consumption, and music preferences, even though these factors have been shown to significantly impact anxiety levels. Proper sleep control can reduce anxiety symptoms, high caffeine consumption can increase anxiety risk and preferred music types can affect emotional and mental well-being. [29-31]

The limitation of this study is that the research participants were limited to students, of one level at the Faculty of Dentistry. Another limitation is that this study used a one-group pretest–post test design (without control). It is recommended to use a two-group pretest and pos-test design with control.

In this study, we did not specify the use of the same brand of headphones for reasons of cost efficiency, but the researchers gave instructions on the procedure for using the music, including: medium volume, comfortable listening, and this was complied with by the research participants.

It is hoped that future studies will involve more research participant, several faculties of dentistry so that the results will be more varied, changes to the design of the study and the standard of the music listening equipment are also needed.

CONCLUSION

The results showed Students' anxiety levels were lower after classical music sessions during lectures. The majority of research participant stated that they felt calmer and more comfortable after the intervention .

It can be concluded that classical music is potentially effective and reduce anxiety in the short term among students.

SUGGESTION

Based on these findings, it is recommended that educational institutions provide outreach to students, especially those just entering their studies or at a particular semester level, regarding the importance of strategies for reducing anxiety, one of which is listening to classical music.

Future research can be developed to examine the effect of other music genres on anxiety, so that students can choose music that suits their personal preferences.

Further research is needed with a more definitive design, namely RCT (Randomized Controlled Trial)

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