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Changes in Anxiety Scores After Butterfly Hug Sessions Among Grade XII Students in Banjar

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ABSTRACT

Introduction: Brief relaxation activities may support adolescent wellbeing, but evidence for butterfly hug in schools remains limited.

Objective: To examine changes in anxiety questionnaire scores before and after butterfly hug sessions among Grade XII students at SMA Negeri 1 Banjar.

Method: This exploratory one-group pretest-posttest study included 40 students aged 17–18 years selected from 81 screened students. Anxiety was assessed using an electronic self-report HARS adaptation without established adolescent validity. Six 15-minute sessions with music and breathing were delivered three times weekly on April 10-22, 2026; attendance was 100%. Posttest was on April 23. The paired t test was supplemented by Shapiro–Wilk and Wilcoxon analyses of reconstructed pairs.

Result: Mean anxiety scores decreased from 18.15 to 16.00, with a mean reduction of 2.15 points (95% CI: 1.338–2.962; $p < 0.001$). After the intervention, most students were classified as having mild anxiety (80%), while the proportion with moderate anxiety decreased from 45% to 20%.

Conclusion: Following six butterfly hug sessions accompanied by breathing exercises and music over two weeks, 40 Grade XII students at SMA Negeri 1 Banjar showed a decrease in mean anxiety scores from 18.15 to 16.00, representing a reduction of 2.15 points. The paired-samples t test indicated a statistically significant difference ($p < 0.001$). The proportion of students with moderate anxiety decreased from 45% to 20%, while the proportion with mild anxiety increased from 55% to 80%. These findings provide preliminary support for further evaluation of butterfly hug as a supportive activity for anxiety management in schools.

Keywords: Adolescents; Anxiety; Butterfly hug; Relaxation; School health

Introduction

Anxiety during late adolescence can affect participation in school and decisions about further education or employment. Indonesia's 2022 National Adolescent Mental Health Survey identified anxiety disorders as the most common mental disorders among adolescents aged 10–17 years, with a 12-month prevalence of 3.7% (Universitas Gadjah Mada, 2022). These diagnostic estimates provide national context but cannot be equated with questionnaire-based symptom categories in students aged 17–18 years. Academic demands are also relevant to school mental health, although associations between academic pressure and distress do not establish a single cause of anxiety (Pascoe et al., 2020; Steare et al., 2023).

For students in the final year of secondary school, examinations and decisions about further education or employment may be particularly demanding. Academic stress reflects the interaction between educational demands, personal resources, and expectations from the surrounding environment. Pascoe et al. (2020) described implications of stress for students in secondary and higher education. Steare et al. (2023) found that academic pressure was associated with adverse adolescent mental health outcomes across much of the available literature, while emphasizing limitations in causal evidence. These findings provide a rationale for investigating support in Grade XII, but they do not establish that academic pressure is the cause of anxiety in every student.

At SMA Negeri 1 Banjar, screening for this study identified 22 students with mild and 18 with moderate anxiety among 81 screened students; 16 were classified without anxiety and 25 with severe anxiety. These figures describe the screened group rather than prevalence among all 426 Grade XII students. They identify a locally relevant group for an exploratory evaluation of brief relaxation sessions and underscore the need for support pathways for students outside the intervention criteria.

Butterfly hug involves crossed arms and alternating gentle taps on the upper chest or shoulder region. Jarero and Artigas (2024) describe it as a method of self-administered bilateral stimulation developed by Lucina Artigas. Its use within EMDR protocols does not establish the effectiveness of isolated tapping in school settings. Lazzaroni et al. (2021), for example, incorporated butterfly hug within a broader remotely delivered EMDR group intervention for adolescents and young adults; those findings cannot be attributed to tapping alone.

Indonesian studies have investigated butterfly hug in populations relevant to nursing practice. Aulia et al. (2024) studied 42 adolescents in a one-group pretest-posttest design and reported a significant change in anxiety following the intervention. Erni et al. (2025) investigated adolescent anxiety in an orphanage setting, while Girianto et al. (2021) examined anxiety in older adults. These studies indicate local research interest, but differences in age, setting, intervention schedule, and comparison conditions limit direct extrapolation. A final-year school sample in Banjar offers a distinct educational context in which to describe symptom change and assess the questions that require stronger future research.

The specific gap addressed here is the limited description of pretest–posttest anxiety scores in final-year students with mild or moderate symptoms following 15-minute butterfly hug sessions scheduled three times weekly with music. The study contributes exploratory evidence from a school in Banjar rather than a test of the technique's independent efficacy.

Its practical significance lies in identifying what can be learned from a feasible school activity and what must be established through controlled evaluation. Breathing and music are treated as components of the delivered intervention, not as separable explanations of its outcome.

Objective

To examine changes in anxiety questionnaire scores before and after butterfly hug sessions among Grade XII students at SMA Negeri 1 Banjar in 2026. The null hypothesis was that the mean paired difference was zero; the alternative hypothesis was that the mean paired difference was not zero. These hypotheses concern within-group change and do not establish causation.

Method

Design and setting

This exploratory quantitative study used a pre-experimental, one-group pretest–posttest design without randomization or a control group. It was conducted at SMA Negeri 1 Banjar, West Java, Indonesia, in 2026. Baseline screening was conducted on April 9, 2026. Six intervention sessions were delivered from April 10 to April 22, 2026, over two weeks, and the posttest was administered on April 23, 2026, one day after the final session. The intervention took place after school examinations, while students continued to face graduation and further-education decisions. The design permits description of within-group change but cannot separate the intervention from natural variation, school-related events, repeated testing, or regression to the mean. Reporting was reviewed against applicable TREND items for nonrandomized evaluations (Des Jarlais et al., 2004); the absence of a comparator remains a fundamental design limitation.

Population and sampling

The source population comprised 426 Grade XII students across 12 classes. Slovin's formula with a researcher-selected 10% error tolerance yielded a screening target of 81 students. Selection took account of the number of students in each class, although the within-class selection procedure was not sufficiently specified to establish probability sampling. The 10% tolerance was a pragmatic choice for the initial screening sample, not evidence of 90% accuracy or an a priori power calculation for the paired comparison. Purposive selection of students with mild or moderate baseline symptoms produced the 40-person analysis sample. Adequacy for detecting a prespecified clinically meaningful difference was not established, and statistical significance does not demonstrate representativeness.

Eligibility criteria were active enrollment in Grade XII, age 17-18 years, willingness to participate and provide informed consent, mild or moderate anxiety at baseline, and ability to attend the intervention sessions. Exclusion criteria included illness or absence, refusal to participate, nonattendance at a session, or failure to complete the posttest questionnaire. Of the 426 Grade XII students in the source population, 81 underwent anxiety screening. Of these, 16 were classified as having no anxiety and 25 as having severe anxiety; these 41

students did not meet the symptom-based eligibility criteria. The remaining 40 students, comprising 22 with mild anxiety and 18 with moderate anxiety, formed the intervention and analysis sample. The reduction from 81 screened students to 40 analyzed participants therefore reflects eligibility-based selection rather than loss to follow-up. Severe symptoms were excluded because the study protocol considered them to require more comprehensive professional assessment. Actual referral completion was not documented. All 40 enrolled participants attended all six intervention sessions (100% attendance), completed both assessments, and remained in the study; there were no dropouts. Attendance was distinguished from fidelity to each component of the procedure.

Instrument and measurement

Anxiety was assessed with a 14-item electronic self-report questionnaire adapted from the Hamilton Anxiety Rating Scale (HARS), distributed through Google Forms via WhatsApp. Items were scored 0–4, giving a total of 0–56. Operational categories were 0–13, no anxiety; 14–20, mild; 21–27, moderate; 28–41, severe; and 42–56, the highest severity category. These study-specific classifications are not clinical diagnoses. Because the administration differed from clinician-rated HAM-A and adolescent self-report validation was not established, scores are treated as exploratory symptom indicators.

Hamilton (1959) developed the scale as a rating instrument. Ramdan (2019) reported internal consistency of .756 and item correlations of .529–.727 for an Indonesian version among adult nurses. Those findings do not validate an electronic self-report adaptation in adolescents. No documented adaptation procedure, adolescent-specific validation of the category thresholds, independent clinician rating, or sample-specific psychometric evaluation was available.

Data collection and analysis

Baseline screening was conducted on April 9, 2026, using Google Forms distributed through WhatsApp with assistance from school counseling staff and the vice-principal. Eligible students joined a WhatsApp group for coordination. Before the intervention, the researcher explained its purpose and trained participants by demonstrating the butterfly hug procedure according to the standard operating procedure. The researcher directly guided the sessions. This instruction constituted participant training; it did not establish formal facilitator certification.

In a quiet setting, participants sat comfortably with their eyes closed and arms crossed over the chest. They were instructed to inhale through the nose, hold their breath for four seconds, exhale through the mouth for four seconds, and apply 20–30 gentle, alternating taps to the shoulders according to the protocol. Tapping ended when participants felt calm, followed by evaluation of their feelings and documentation.

Six 15-minute sessions were delivered three times weekly over two weeks, from April 10 to April 22, 2026. All 40 participants attended every session (100% attendance), and the posttest was administered on April 23, 2026.

Music accompanied the sessions: Tanda by Yura Yunita, Diri by Tulus, and Terima Kasih Sudah Bertahan by Ghea Indrawari. Music was played at a slow tempo and low-to-moderate volume; the songs were selected for messages of self-acceptance, emotional

acknowledgment, and perseverance. Delivery was observed and recorded using an observation sheet. Full attendance did not establish complete performance of every prescribed movement; a quantified fidelity rate was not available. Exact tapping cadence, music tempo and volume measurements, and session-level group sizes were not documented, limiting replication under the TIDieR framework (Hoffmann et al., 2014).

Descriptive analyses summarized frequencies, percentages, means, standard deviations, medians, and ranges. Pretest and posttest scores were compared using a paired-samples t test in IBM SPSS Statistics version 26, with a two-sided significance threshold of .05. The mean reduction was defined as the pretest score minus the posttest score and reported with its 95% confidence interval. Complete pretest and posttest scores were available for all 40 analyzed participants. SPSS significance values displayed as .000 are reported as $p < 0.001$.

An additional analysis of the tabulated total scores assessed normality of pretest-minus-posttest differences using the Shapiro–Wilk test. As differences were non-normal, a two-sided Wilcoxon signed-rank test was performed as a sensitivity analysis using the normal approximation, excluding zero differences and adjusting for tied ranks. Pairing followed the order of eligible baseline records and posttest records, with age, sex, and class checked for consistency. The standardized paired change (Cohen's dz) was calculated as the mean paired reduction divided by the standard deviation of paired differences. The t-based confidence interval is retained as a model-based estimate and should be interpreted cautiously given non-normal differences. The Wilcoxon result is a sensitivity check, not proof that all distributional assumptions are satisfied. Individual category transitions were described using the reconstructed pairs; an exact two-sided McNemar test evaluated the mild-versus-moderate transition counts. These supplementary analyses used the tabulated totals without silently correcting item sums.

Result

Participant screening and characteristics

Of 81 students screened, 40 students met the anxiety-related selection criteria and were included in the intervention analysis. Among these participants, 30 (75.0%) were aged 18 years and 10 (25.0%) were aged 17 years. There were 22 female participants (55.0%) and 18 male participants (45.0%). All 40 participants attended all six sessions (100% attendance) and completed the posttest, with no dropouts. Table 1 presents the characteristics of the analyzed sample.

Table 1. Participant characteristics

Characteristic	n	%
Age 17 years	10	25.0
Age 18 years	30	75.0
Male	18	45.0
Female	22	55.0

Anxiety categories before and after the intervention

Before the intervention, 22 participants (55.0%) were classified as having mild anxiety and 18 (45.0%) as having moderate anxiety. After the intervention, 32 (80.0%) were classified as having mild anxiety and 8 (20.0%) as having moderate anxiety. The proportion in the moderate category decreased by 25 percentage points. The marginal distributions alone do not identify individual transitions. Table 2 summarizes the pretest and posttest distributions. In the reconstructed paired records, 22 students remained in the mild category, 10 moved from moderate to mild, eight remained moderate, and none moved from mild to moderate. The exact two-sided McNemar p value was .00195, based on 10 versus zero discordant pairs. These transitions and the associated test are provisional because cross-time identifiers and item-total discrepancies have not been resolved; they do not represent confirmed clinical recovery.

Table 2. Anxiety categories before and after the intervention

Anxiety category	Pretest n (%)	Posttest n (%)
Mild	22 (55.0)	32 (80.0)
Moderate	18 (45.0)	8 (20.0)
Total	40 (100.0)	40 (100.0)

Comparison of anxiety scores

Among 40 participants, the mean anxiety score decreased from 18.15 (SD = 3.887) before the intervention to 16.00 (SD = 2.783) afterward. The mean reduction was 2.150 points (SD of paired differences = 2.537; 95% CI: 1.338–2.962), $t(39) = 5.359$, $p < 0.001$. The pretest median was 17.00 (range: 14–25), and the posttest median was 14.50 (range: 14–22). These results indicate a within-group reduction under the test assumptions; they do not establish causation or clinical importance. Shapiro–Wilk tests indicated non-normal pretest and posttest distributions (Shapiro–Wilk W = .838 and .709, respectively; both $p < 0.001$), and the additional analysis of paired differences also indicated non-normality ($W = .804$, $p < 0.001$). Based on tabulated total scores, the Wilcoxon sensitivity analysis yielded $W = 0$, $Z = -4.581$, $p < 0.001$ (27 decreases [67.5%], 13 unchanged scores [32.5%], and no increases).

Table 3. Comparison of mean anxiety scores (n = 40)

Pretest mean (SD)	Posttest mean (SD)	Mean reduction (95% CI)	t (df); p
18.15 (3.887)	16.00 (2.783)	2.150 (1.338–2.962)	5.359 (39); < .001

Discussion

The principal finding was a reduction in mean anxiety scores following butterfly hug sessions among 40 Grade XII students with mild or moderate anxiety. Mean scores decreased by 2.15 points, and the proportion classified as having moderate anxiety declined from 45.0% to 20.0%. The reported paired comparison was statistically significant. These results describe

a within-group change following the intervention period. They do not establish how much change would have occurred without the sessions, whether the improvement persisted, or whether the difference was clinically meaningful. The interpretation must therefore remain consistent with the uncontrolled design and the measurement procedure.

Aulia et al. (2024) studied 42 students in Grades X–XII using a one-group design and HARS. They reported eight 10-minute sessions within one meeting, with mean scores decreasing from 22.8 (SD = 8.4) to 10.1 (SD = 6.6), a 12.7-point reduction compared with 2.15 points here. The larger numerical change cannot establish greater efficacy: baseline severity, session schedules, grade composition, and assessment procedures differed, and neither study had a control group. Their sample included severe symptoms, whereas this study selected only mild or moderate symptoms. The present posttest distribution also showed persistent symptoms in all participants. Erni et al. (2025) examined adolescents in an orphanage, and Girianto et al. (2021) studied older adults; these settings further limit direct comparisons with final-year secondary students.

Wardhani et al. (2025) reported a school-based activity involving butterfly hug and mindful breathing among 35 younger students, assessed with the Zung Self-Rating Anxiety Scale. Their descriptive evaluation reported 31 students in the no-anxiety category afterward and four moving from moderate to mild anxiety. Their report specified three activity dates and parental consent, whereas the present study delivered six sessions over two weeks; separate parental permission was not established in the available records for this study. Differences in instrument, age, and delivery prevent direct numerical comparison of score changes. The contrast supports documenting intervention exposure and participant safeguards more completely; it does not establish that one program is superior.

The present sessions contained several elements that could plausibly influence students' immediate experience: alternating touch, comfortable breathing, music, a pause from school activities, and contact with the facilitator. Zaccaro et al. (2018) reviewed psychophysiological correlates of slow breathing, while Balban et al. (2023) investigated structured breathing practices and changes in mood and physiological arousal. These studies support investigating breathing as a potential contributor, but their findings do not demonstrate that the same physiological processes occurred here. Heart rate variability, cortisol, and other physiological outcomes were not measured. Statements that the sessions altered neurotransmitters, amygdala activity, or autonomic functioning would exceed the study's evidence.

Self-touch offers another possible explanation requiring careful qualification. Dreisoerner et al. (2021) found changes in cortisol responses to stress following self-soothing touch or receiving a hug in an experimental adult sample. That protocol is distinct from repeated butterfly hug sessions in adolescents. Similarly, Lazzaroni et al. (2021) incorporated butterfly hug within a broader EMDR group intervention rather than testing tapping alone. These findings provide a rationale for further study of tactile regulation strategies. They cannot establish that bilateral stimulation was the active ingredient of the present program or that a brief school session is equivalent to professionally delivered EMDR treatment.

Musical accompaniment is especially relevant because it was explicitly included in the intervention. De Witte et al. (2020) synthesized evidence that music interventions can affect stress-related outcomes. In this study, music may have contributed to the experience

independently of tapping, but its contribution was not measured separately. Breathing research also cautions against assuming that a specific technique is responsible for improvement merely because participants improve over time. Fincham et al. (2023a) compared coherent breathing with a matched attention-placebo condition and did not find the anticipated superiority of coherent breathing. An active comparator would help distinguish butterfly hug-related effects from attention, expectancy, or general relaxation. A synthesis of breathwork studies also reported mental health outcomes across varied protocols (Fincham et al., 2023b).

The final-year school setting remains relevant to interpretation. Academic demands and future planning offer plausible contextual stressors, consistent with Pascoe et al. (2020) and Steare et al. (2023). The intervention was delivered after school examinations, while graduation and future education remained relevant concerns. However, academic pressure, family stress, and concurrent counseling were not measured. Changes in any of these factors could have affected anxiety between assessments. A nursing or counseling service could consider brief, voluntary relaxation activities as supportive options while monitoring students' responses. Such activities should be situated within wider support that addresses students' concerns and facilitates assessment when symptoms persist or impair functioning. The study does not establish a replacement for evidence-based clinical care.

Several limitations restrict the conclusions. Purposive selection from one school limits generalizability, and excluding students with severe anxiety means the findings do not represent the full range of symptom severity. Selection on baseline symptoms creates potential for regression to the mean. Without randomization or a control group, natural variation, changes in school demands, facilitator attention, and repeated measurement cannot be separated from intervention-related change. The reconstructed individual transitions remain provisional pending verification of respondent linkage. Although fewer participants were classified as having moderate anxiety after the intervention, the reported distributions contained only mild and moderate categories; the outcome should therefore not be described as resolution of anxiety.

Measurement uncertainty is a major limitation because the electronic self-report HARS adaptation lacks demonstrated validity in this adolescent sample. No sample-specific reliability estimate, validated minimal clinically important difference, or independent functional outcome was established. Neither the 2.15-point reduction nor Cohen’s dz = 0.85 establishes a clinically important benefit. At posttest, all participants remained in the mild or moderate category. Non-normal paired differences further qualify the t-based results. Although the Wilcoxon sensitivity analysis supported the direction of change, unresolved item-total discrepancies and respondent linkage require source-data verification. Correcting item totals could also change eligibility. Although all 40 participants attended all six sessions, adherence to every procedure component was not quantified. Missing details on delivery fidelity restrict reproducibility and interpretation.

Future research should compare a standardized butterfly hug protocol with an attention-matched relaxation or music condition, ideally using randomized allocation and assessments conducted independently of intervention delivery. A validated adolescent anxiety instrument, prespecified outcomes, complete paired-score reporting, and follow-up measurements would strengthen interpretation. Intervention duration, attendance,

acceptability, distress during sessions, and concurrent support should be documented. Such work would help determine whether the observed change is reproducible, persists beyond the intervention period, and reflects benefit specifically attributable to butterfly hug within school mental health support. Before routine school implementation is considered, a prospective protocol should specify safeguarding, parental permission and adolescent assent where applicable, procedures for distress, and referral follow-up. These are recommendations for future implementation, not claims that such procedures were completed in this study.

Conclusion

Among 40 selected Grade XII students at SMA Negeri 1 Banjar, tabulated anxiety questionnaire scores decreased from 18.15 to 16.00 after sessions combining butterfly hug, music, and breathing. The estimated mean reduction was 2.15 points (t-based 95% CI: 1.338–2.962). A supplementary Wilcoxon analysis of reconstructed pairs supported the direction of change ($p < 0.001$), but respondent linkage and item-total discrepancies remain unresolved. These exploratory findings do not establish causation or clinical importance. They provide a basis for further evaluation of voluntary school relaxation support, rather than evidence for routine adoption as an effective intervention. Source-data verification, appropriate ethical documentation, validated adolescent measures, a fully specified protocol, and controlled follow-up studies are needed.

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Author Contribution

Yayi Siti Haeriyah is the first author and provided research supervision. Umi Maola is the second author, conducted the research, and contributed to manuscript writing and editing.

Conflict of Interest

The authors declare no conflicts of interest.

Ethical Clearance

The study was conducted at SMA Negeri 1 Banjar with institutional and school authorization. The supporting documents were issued by STIKes Bina Putera Banjar (No. 021/SK/AK/K-STIKes/I/2026); the Institute for Research and Community Service (LPPM), STIKes Bina Putera Banjar (Nos. 014/SP/K-LPPM/STIKes/I/2026, 042/SP/K-LPPM/STIKes/I/2026, 015/SP/K-LPPM/STIKes/I/2026, 001/IP/K-LPPM/STIKES/IV/2026, and 002/IP/K-LPPM/STIKES/IV/2026); SMA Negeri 1 Banjar (No. 047/TU.01.02/SMAN 1 BANJAR); and the Banjar City National Unity and Politics Agency (Kesbangpol) (Nos. T/000.9/087/KESBANG/2026 and T/000.9/393/KESBANG/2026).

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