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The Influence of A Combination of ACT, WDEP Technique, and Butterfly Hug on Reducing Anxiety in Cancer Patients

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ABSTRACT

Cancer is a chronic disease that triggers significant psychological anxiety in patients who can negatively affect quality of life and adherence to treatment, making psychological management very important. This study aims to determine the effect of combining Acceptance and Commitment Therapy (ACT), the Wants, Doing, Evaluation, and Planning (WDEP) technique, and the butterfly hug on reducing anxiety among cancer patients. This study employed a quasi-experimental design with a pre-test and post-test and a control group, ensuring comparison between participants who received the intervention and those who did not. 40 patients selected by accidental sampling. The intervention group received a combination therapy of ACT, WDEP, and butterfly hug, while the control group received deep breathing therapy. Anxiety was measured using the STAI-T instrument. The mean anxiety score before receiving the combined ACT, WDEP, and butterfly hug therapy in the intervention group was 33.0, and after the intervention, it decreased to 27.85. The mean anxiety score before receiving deep breathing therapy in the control group was 31.30, and after the intervention, it decreased to 28.30. The independent samples T-Test showed a p-value≤0.0001. The combination of ACT, WDEP technique, and the butterfly hug proved effective in reducing anxiety levels among cancer patients at the halfway house in Bengkulu City. This combination therapy appears feasible, safe, and potentially effective as a brief psychological intervention for cancer patients. It should be considered as part of supportive care packages in oncology services with ongoing evaluation of its effectiveness and its long-term impact on patients' psychological well-being.

INTRODUCTION

Cancer remains a significant health problem worldwide, with its incidence continuing to rise. According to the WHO (2024b), approximately 20 million new cancer cases will be reported in 2022. The Global Burden of Cancer (GLOBOCAN) reports that in Indonesia, cancer cases reached 396,914 in 2020, rising to 408,661 in 2022 (WHO, 2024a). The most common types of cancer include breast, cervical, lung, colorectal, and liver cancer Global Cancer Observatory (Arniyanti, 2020). Cancer is one of the non-communicable diseases that currently cannot be fully cured. According to the Kementerian Kesehatan Republik Indonesia (2024), cancer patients not only face physical problems due to disease progression and side effects of therapy (such as chemotherapy, radiotherapy, and surgery) but also experience significant psychological impacts (Zang et al., 2023).

One psychological issue frequently experienced by cancer patients is anxiety. This anxiety can arise from fear of death, loss of hope for recovery, changes in body image, as well as economic and social pressures caused by chronic illness. If left unaddressed, anxiety can worsen the physical and psychological condition of patients, triggering depression, insomnia, family conflicts, social isolation, and a decrease in quality of life (Prajogo & Yudiarso, 2021).

Anxiety management can be approached through pharmacological and non-pharmacological methods. Pharmacological therapy typically involves the use of antidepressants or benzodiazepines, while non-pharmacological therapy includes ACT, WDEP techniques, Butterfly Hug, deep breathing therapy, writing therapy, and exposure therapy. ACT is a psychotherapeutic approach that helps patients accept their condition and commit to undergoing treatment in accordance with their life values. This therapy has been shown to reduce anxiety and improve self-acceptance in cancer patients effectively (Salari, 2023). ACT therapy can lower anxiety levels in patients and enhance their self-acceptance regarding their condition.

The WDEP technique (Wants, Doing, Evaluation, and Planning) focuses on exploring the patient's desires, behaviors, evaluations, and planning, encouraging positive change. Research by Isfia et al. (2024) shows that this technique is effective in reducing anxiety with a p-value of 0.003. Another therapy is the Butterfly Hug, derived from EMDR, which uses bilateral stimulation through movements that resemble a butterfly's wings. This therapy helps patients reduce anxiety, fear, and stress, while enhancing their ability to manage negative emotions. According to research conducted by Astuti et al. (2024), the Butterfly Hug's effectiveness in reducing anxiety has a p-value of 0.000.

The integration of ACT, WDEP, and Butterfly Hug offers a more comprehensive and innovative approach to anxiety management in cancer patients. Each technique targets different psychological mechanisms: ACT strengthens acceptance and value-based coping; WDEP enhances problem-solving and behavioral self-regulation; and Butterfly Hug regulates emotional distress through bilateral stimulation. Combining these three methods allows the intervention to address cognitive, emotional, and behavioral domains simultaneously. Recent studies highlight that multimodal psychological interventions are more effective than single-technique approaches in oncology populations because they produce synergistic effects on emotional regulation and treatment adherence (Cheng et al., 2023). Therefore, combining these three evidence-based techniques enhances the novelty and clinical relevance of the intervention, offering a more holistic and potentially more powerful strategy to reduce anxiety among cancer patients.

Nurses and other healthcare professionals play a crucial role in implementing non-pharmacological therapies. These non-pharmacological therapies can include a combination of ACT, WDEP, and Butterfly Hug therapy for cancer patients in hospice care. Healthcare professionals, particularly nurses, play a strategic role in providing supportive therapy focused on the psychological needs of cancer patients (Sonalika et al.,2024). Nurses conduct initial psychological assessments, provide education on the benefits of therapy, facilitate each session using therapeutic communication techniques, and continuously monitor the patient's emotional responses. Structured psychosocial support is a crucial component of holistic care for cancer patients, so nurses need to integrate these interventions into the care plan. Nurses also collaborate with psychologists or other professionals to ensure continuity of care. Jingjia, S., & Lingyu, Z. (2025) state that nurses' active involvement in psychological therapy increases the accessibility and effectiveness of interventions for oncology patients. With this comprehensive role, this combination of therapies becomes more structured, accessible, and has the potential to provide optimal impact on reducing anxiety in cancer patients.

Based on a survey at a shelter in Bengkulu City, there are still cancer patients experiencing anxiety with no non-pharmacological therapy implemented. The combination of ACT therapy, WDEP techniques, and Butterfly Hug is expected to reduce the anxiety levels of cancer patients receiving treatment at the halfway house.

METHOD

This research is a quantitative study employing a quasi-experimental design with a pre-test and post-test, including a control group. This design was used to identify the effect of the independent variables, namely Acceptance and Commitment Therapy (ACT), WDEP techniques, and the Butterfly Hug, on the dependent variable, namely anxiety levels. The quasi-experimental

design was chosen because field conditions did not allow for complete randomization, considering that cancer patients in a halfway house have diverse characteristics and medical therapy schedules, so researchers had to use naturally formed groups. In addition, this design provides flexibility in real clinical settings while still producing strong causal evidence on the effectiveness of the psychological interventions provided. The study was conducted from March 21 to May 26, 2025, at three shelters in Bengkulu City: Baitil Jannah Shelter, Sido Mulyo Shelter, and Khairunnisa Shelter.

The population in this study consisted of all cancer patients residing in shelters in Bengkulu City in 2025, totaling 126 individuals. The sample consisted of 40 respondents, selected using accidental sampling, divided into two groups: 20 in the intervention group and 20 in the control group. Inclusion criteria consisted of adult patients (aged ≥18 years) suffering from cancer, willing to be respondents, having an STAI-S (State Trait Anxiety Inventory-State form) anxiety score of 30–49 (moderate and severe anxiety), and being able to communicate in two directions. Exclusion criteria included respondents who experienced decreased consciousness or death.

The primary instrument used to measure anxiety levels was the STAI-S questionnaire, which has demonstrated good validity and reliability. The intervention used audiovisual media for ACT and Butterfly Hug therapy, along with written guidance for the WDEP technique. Face-to-face therapy sessions were conducted in small groups over four consecutive days. The intervention began with a Butterfly Hug to reduce anxiety through bilateral stimulation, followed by the first ACT session, which explored unpleasant experiences and the client's emotional and behavioral responses. On the second and third days, the intervention focused on the second and third ACT sessions, which aimed to evaluate the anxiety management strategies used, identify maladaptive behaviors, and develop new, more adaptive behaviors aligned with the client's values. Positive reinforcement was provided to support consistent behavior change. On the fourth day, a fourth ACT session was conducted to strengthen the client's commitment to preventing maladaptive behaviors and maintaining emotional stability by developing an action plan. The intervention concluded with the WDEP, which included exploring desires, analyzing current behavior, self-evaluation, and developing a realistic and meaningful action plan to help the client manage anxiety more effectively.

The control group underwent deep-breathing exercises for 4 consecutive days, focusing on slow, diaphragmatic breathing to improve relaxation and respiratory function. The nurse first assessed the patient's respiratory status, ensuring no severe pain or respiratory distress, and then positioned them comfortably. Patients then inhaled slowly and deeply through their mouths and noses, pushing their abdomens out as far as possible. They held their breath for a count of 6, then exhaled slowly through their mouth, repeating 5–7 times per session. This exercise lasted 25 minutes.

Data collection was conducted twice, before the intervention (pre-test) and after the intervention (post-test). Data analysis began with a normality test using the Shapiro-Wilk Test. Differences within groups were analyzed using the Paired Sample t-Test, while differences between groups were analyzed using the Independent t-Test. This research has undergone ethical review by the Ethics Committee of Poltekes Kemenkes Bengkulu, with Number KEPK.BKL/164/03/2025.

RESULTS

The average age of respondents in the intervention group is 46.80 years, while that of the control group is 47.45 years. In terms of gender characteristics, the intervention group consists entirely of females (100%), whereas the control group is predominantly female (85.0%). The average duration of cancer diagnosis in the intervention group is 10.95 months, while in the control group, it is 11 months.

Table 1. Distribution of cancer patients based on characteristics of age, gender, and duration of cancer suffering

Variable	Group	
	Intervention (n=20)	Control (n=20)
Age		
Mean	46.80	47.45
Median	46.00	47.00
Minimum	38	32
Maximum	71	61
SD	7.403	7.550
CI 95%	43.34-50.26	43.92-50.98
Gender		
Male	0	3(15.0%)
Female	20(100%)	17(85.0%)
Duration of cancer diagnosis		
Mean	10.95	11.00
Median	8.50	10.00
Minimum	1	4
Maximum	27	21
SD	7.222	4.910
CI 95%	4.57-14.33	8.70-13.30

Before conducting the bivariate analysis, a normality test was performed using the Shapiro-Wilk test. The results showed that the data were normally distributed, with a pre-intervention *p*-value of 0.191 for the treatment group and 0.161 for the control group. After the intervention, the p-value for the treatment group was 0.077, and for the control group, it was 0.068. Subsequently, an equivalence test between the two groups was conducted, yielding a p-value of 0.007 ($p<0.05$), indicating that the average anxiety scores before therapy were equivalent between the two groups.

Table 2. Differences in average anxiety scores before and after the combination treatment of ACT, WDEP techniques, and butterfly hug in the intervention group, and deep breathing in the control group

Variable	N	Mean	SD	Mean difference	IK 95%	t	p-value
Anxiety intervention group							
Before	20	33.0	2.200	5.150	4.186-6.114	11.186	0.000
After	20	27.85	1.268				
Anxiety control group							
Before	20	31.3	1.525	3.00	2.412-3.588	10.677	0.000
After	20	28.3	1.218				

Table 2 shows the average anxiety score for the intervention group before the combination of Acceptance and Commitment Therapy (ACT), WDEP techniques, and Butterfly Hug was 33, which decreased to 27.85 after the intervention, representing a reduction of 5.15 points. The results of the Paired t-Test indicated a p-value of 0.000, demonstrating a significant difference in anxiety levels before and after the combined intervention of ACT, WDEP techniques, and Butterfly Hug in cancer patients.

For the control group, the average anxiety level before the deep breathing intervention was 31.30 and decreased to 28.30 afterward, reflecting a reduction of 3 points. The Paired t-Test yielded a p-value of 0.000, indicating a significant difference in anxiety levels before and after the deep breathing intervention in cancer patients.

Table 3. The effect of the combination therapy of ACT, WDEP techniques, and butterfly hug on reducing anxiety levels in cancer patients

Variable	N	Mean	SD	Mean Difference (95% CI)	p-value
Anxiety intervention group	20	5,15	2.059	2.150(1.058-3.242)	0.0001
Anxiety control group	20	3.00	1.257		

Table 3 shows the independent-samples t-test yielded a p-value of ≤ 0.0001. This indicates a significant difference in the average anxiety scores between the intervention group and the control group. Thus, it can be concluded that the combination therapy of ACT, WDEP techniques, and Butterfly Hug has a greater impact on reducing anxiety in cancer patients compared to deep breathing therapy at the shelters in Bengkulu City.

DISCUSSION

Characteristics of respondents

The study results indicate that the average age of respondents in the intervention group is 46.80 years, while the average age in the control group is 47.45 years. This suggests that most patients are in their 40s to early 50s, consistent with national findings that the average age at cancer diagnosis falls within this range. According to data from hospital-based cancer registries in Indonesia, the average age of cancer patients is approximately 45.4 years (± 0.2 years), with the highest prevalence in the 40s (26%) and 50s (25.1%) (Prihantono, 2023). Research by Mochtar et al (2024)states that nearly half (47%) of cancer patients are aged 41-50. Thus, the findings in Bengkulu align closely with national trends.

Regarding gender characteristics, all respondents in the intervention group are female (100%), while the control group is predominantly female at 85.0%. This aligns with the findings of, which indicates that wo Hafsah (2022)women are more susceptible to certain types of cancer, such as breast cancer, ovarian cancer, and cervical cancer. This result is also consistent with research by Zang et al. (2023), which shows that the majority (61%) of cancer patients are female. Women are at an increased risk of breast cancer, which is one of the most common types of cancer among women, due to the influence of estrogen and progesterone. Unequal gender composition across groups may raise concerns about generalizability; however, existing literature suggests that ACT, WDEP, and Butterfly Hug therapies are gender-independent in their psychological mechanisms and therapeutic outcomes. These interventions target universal cognitive-emotional processes such as acceptance, cognitive reframing, bilateral stimulation, and self-regulation, so gender is likely to moderate treatment effectiveness. Thus, while the overrepresentation of women should be acknowledged as a limitation, it does not substantially threaten the validity of the interventions' psychological effects.

The average duration since cancer diagnosis in the intervention group is 10.95 months, while in the control group it is 11 months. Anxiety tends to be high around the time of diagnosis but may decrease with adaptation; however, it can increase again during disease progression or when treatment intensity peaks. Longitudinal and cross-sectional findings in cancer patients illustrate these fluctuations, including changes post-chemotherapy. Therefore, the 11-month duration may indicate that some patients are in an adaptation phase, while others may still experience significant anxiety due to ongoing treatment cycles. This aligns with research by Mahmuddin et al. (2019), which found a relationship between the duration of cancer diagnosis and anxiety. The length of time respondents have been diagnosed with cancer relates to their ability to adapt. Chemotherapy, which consists of several cycles, is a long-term treatment; if the initial experience of chemotherapy causes discomfort due to side effects, it will affect anxiety levels in subsequent treatments.

Average anxiety levels before intervention

The study found that the average STAI-S anxiety score before intervention in the intervention group was 33.0, while in the control group it was 31.30. The STAI-S (Trait form) measures dispositional tendencies towards anxiety, with scores ranging from 20 to 80 (higher scores indicate more severe anxiety). Both groups scored below 40, reflecting mild anxiety levels. Thus, the average anxiety level among cancer patients in Bengkulu suggests relatively low to moderate trait vulnerability, although individual cases with clinical risk may require special attention.

The similarity in pre-intervention anxiety scores between the intervention and control groups (33.0 vs. 31.30) indicates that both groups had comparable baseline characteristics, allowing for a more valid interpretation of post-intervention comparisons. This balance in initial conditions is crucial in experimental research as it minimizes bias due to differences in trait anxiety before treatment. Relatively equal baseline anxiety enables researchers to assess the pure effects of the psychological interventions provided. It strengthens the evidence that post-intervention outcome differences are more likely due to the therapy than uncontrolled factors.

Differences in anxiety levels before and after intervention

The study found a significant difference in anxiety levels before and after the combination intervention of ACT, WDEP techniques, and Butterfly Hug among cancer patients, with a p-value of 0.000. There was a decrease in anxiety scores by 5.15 points. These findings indicate that the Talk WDEP techniques and Butterfly Hug have a positive impact on reducing anxiety in cancer patients. This is clinically important because cancer-related anxiety can exacerbate pain, sleep disturbances, fatigue, and adherence to therapy. Therefore, effective, safe, and easily implemented psychological interventions in cancer services are essential.

In line with these findings, studies by Salari (2023) and Isfia et al. (2024) demonstrate that ACT therapy, WDEP techniques, and the Butterfly Hug serve as approaches that focus on relaxation and calmness. This therapy is based on the principle that by directly facing anxiety in a safe environment, individuals can gain the necessary support to manage their fears. This process allows individuals to learn that their anxiety will decrease over time and that the situations they fear are not as dangerous as they imagine. Thus, these structured, evidence-based interventions significantly reduce anxiety among respondents.

The Talk WDEP technique focuses more on actions, as behavior (actions, thoughts, feelings, and physiology) is a component that can help reduce anxiety levels. Research by Isfia et al. (2024) shows that the WDEP technique effectively lowers anxiety levels, with a p-value of 0.008. The Butterfly Hug, as explained by Salari (2023) and Isfia et al. (2024), is an effective method for reducing anxiety in cancer patients. The Butterfly Hug has been found to increase blood oxygen levels, promoting a sense of calm and relaxation. It is recognized as a means of alleviating anxiety and is also effective in recovering from negative feelings due to trauma (Ramdhani & Soleman, 2023). Several studies have supported the effectiveness of each technique. Research on WDEP shows positive results in reducing anxiety through improved self-regulation and adaptive behavior planning (Corey, 2021). Meanwhile, Butterfly Hug has been found to effectively decrease emotional distress and anxiety, including in populations with chronic illnesses or trauma (Faretta, 2021). In cancer patients, EMDR incorporating Butterfly Hug has been reported to reduce anxiety and trauma symptoms significantly (Danielle et al, 2021).

There is a notable difference in anxiety levels before and after deep breathing intervention in cancer patients, with a p-value of 0.000. Deep breathing was able to reduce anxiety levels by 3 points. Various national and international studies support the finding that deep breathing techniques significantly lower anxiety levels in cancer patients. For example, research in Japan has shown that 10 minutes of deep breathing can reduce tension, anxiety, and fatigue in gynecological cancer patients undergoing chemotherapy, with significant results ($p<0.05$).

Additionally, a systematic review involving lung cancer patients also reported that various breathing exercises were practical in significantly reducing anxiety (Hayama & Inoue, 2012).

The impact of ACT, WDEP techniques, and butterfly hug on anxiety changes in cancer patients

The research indicates that the combination therapy of ACT, WDEP techniques, and Butterfly Hug has a greater impact on reducing anxiety compared to deep breathing therapy among cancer patients at the Bengkulu shelter. ACT has been shown to significantly improve the quality of life and reduce anxiety in cancer patients through accepting their disease condition and developing psychological flexibility. A study in Indonesia showed that implementing ACT could significantly reduce anxiety and improve the quality of life of cancer patients, with a highly significant p-value (p=0.000). By adopting an acceptance and commitment approach to life values, patients are better equipped to cope with the stress and anxiety arising from cancer diagnosis and treatment (Nurpadilah et al., 2025).

WDEP techniques, as a form of psychological communication therapy, and Butterfly Hug, as a bilateral stimulation technique derived from EMDR (Eye Movement Desensitization and Reprocessing), have also proven effective in reducing anxiety. Butterfly Hug, in particular, has been reported to effectively alleviate anxiety by stimulating emotional regulation and balancing the neural activity of both brain hemispheres. This therapy is simple, non-invasive, and can be performed independently or with guidance, making it easy to adopt (Nurpadilah et al., 2025).

While deep breathing has also shown positive effects in reducing anxiety among cancer patients by activating the parasympathetic nervous system and promoting relaxation, the combination approach of ACT, WDEP techniques, and Butterfly Hug provides a more holistic effect. This combination therapy not only focuses on breathing and relaxation techniques but also integrates cognitive psychological aspects and diverse neural stimulation, resulting in more profound and more comprehensive anxiety reduction (Hu & Kim, 2025).

The combination of ACT, WDEP techniques, and Butterfly Hug demonstrates a more significant effect in reducing anxiety in cancer patients compared to deep breathing therapy. This approach combines effective psychotherapeutic techniques and physical stimulation, aligning with scientific evidence from recent national and international studies that emphasize the advantages of holistic therapy in managing anxiety among cancer patients. Therefore, the integration of this therapy could become an optimal recommendation for the psychological care of cancer patients, as applied at the Bengkulu shelter.

This study has several limitations that should be acknowledged. First, the use of accidental sampling may limit the representativeness of the sample and increase the risk of selection bias. Second, the intervention group consisted entirely of women, resulting in a non-equivalent gender composition between groups, which may limit the generalizability of the findings to male patients. Third, the quasi-experimental design without randomization reduces internal validity compared to randomized controlled trials (RCTs), making it more difficult to control for potential confounding variables. These limitations should be considered when interpreting the results and designing future studies.

CONCLUSION

Overall, the results of this study indicate that the combination of WDEP techniques, Butterfly Hug, and ACT is more effective than deep breathing in reducing anxiety in cancer patients. The integration of cognitive-behavioral approaches with physiological regulation techniques provides a more comprehensive impact on anxiety reduction, making it a potentially applicable, safe, and effective psychological intervention in oncology services.

In practical terms, these findings suggest that the combined intervention can be developed into a standardized protocol for nurses and other healthcare providers in shelters or oncology

units. Implementation may include structured staff training on ACT sessions, WDEP counseling strategies, and Butterfly Hug procedures; integrating these techniques into routine psychological assessments; and scheduling brief, regular intervention sessions for patients undergoing treatment. Nurses can incorporate these therapies into individualized care plans, monitor and document patient responses, and collaborate with psychologists to ensure continuity of care. By embedding this protocol into standard operating procedures, oncology services can offer a more holistic and accessible non-pharmacological approach to anxiety management for cancer patients.

AUTHOR'S DECLARATION

Authors' contributions and responsibilities

CA: Writing original draft, visualization, conceptualization; **AR:** Writing original draft (supporting), review and editing; **HH:** Review and finishing manuscript.

Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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