Available on: https://nursingjurnal.respati.ac.id/index.php/JKRY/index
Jurnal Keperawatan Respati Yogyakarta, 12(3), September 2025, 174 – 180

The Effect of Butterfly Hug Virtual Reality Therapy on Anxiety Levels in Caregivers of Children with HIV AIDS

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Abstract

Parents of children living with HIV/AIDS often face emotional turmoil, experiencing inner struggles that lead to feelings of anxiety and concern about revealing their child's HIV status. *This study contributed to assessing how Butterfly Hug virtual reality therapy influences the anxiety levels experienced by caregivers of children living with HIV/AIDS. Method: The study employed a crossover design, involving 18 caregivers of children with HIV/AIDS from LSM KOMPAK KEPRI. Participants were chosen through random sampling and assigned to the intervention group using random allocation methods. The interval between methods was determined to be 7 days. Hypothesis test with Paired T-Test. Results: Anxiety level was significantly higher in the butterfly hug virtual reality group compared to the deep breathing technique. During the first period of pre-test, respondents who received Therapy. An anxiety level was 32.77. Meanwhile, the post-test average level was 17.92 ($p < 0.001$). Meanwhile, the anxiety level of respondents who received Therapy during pre-test was 35.20, and the post-test average was 23.20 with a p-value <0.002. Conclusions: Butterfly hug virtual therapy can be an option for a distraction technique in reducing anxiety levels among caregivers of children with HIV-AIDS, based on research data.*

Keywords: *Anxiety; Caregiver; Deep Breathing Relaxation; HIV; Virtual Reality*

Article info: *Article info: Sending on December 03, 2024; Revision on August 16, 2025; Accepted on September 14, 2025*

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1. Introduction

The increase in HIV/AIDS cases has an impact on national development issues. In Indonesia, the community considers the HIV/AIDS virus as a disgrace; people tend to avoid PLHIV, even affecting people closest to PLHIV, such as parents, siblings, and friends, as well as discrimination against PLHIV in the community, resulting in psychological pressure such as fear, stress, anger, and disappointment (Ayuningtyas et al., 2021).

The projection of the number of people with HIV/AIDS in the productive age (15-49 years) dominates the distribution of cases, both in HIV and AIDS. In Indonesia, the percentage of HIV cases is 88.6% and 86.6% for AIDS (Kesehatan & Indonesia, 2021). HIV/AIDS treatment and Therapy take a long time and sometimes cause patients to stop the treatment. In addition, it is also due to boredom, the variety of drugs, side effects, and complications that may be experienced (Sagala et al., 2023). For this reason, caregivers have an essential role in providing support to children suffering from HIV AIDS. Supports provided have an impact, such as compliance with taking ARV medication, which can improve the quality of life of people living with HIV (PLHIV) (Pramadhani et al., 2022).

Caregivers often face emotional and psychological challenges, such as feelings of disappointment, physical exhaustion, mental stress, anxiety, or feelings of pressure due to ongoing responsibilities and concern about the transmission and disclosure of PLHIV identity (Sagala et al., 2023).

Research findings from Toledano & Rubia (2018) show that as the child's illness worsens, both the child and their caregiver experience a decline in their quality of life, leading to significant deterioration in their physical, psychological, social, and economic well-being. Caregivers of children with chronic illnesses, such as sickle cell disease and HIV, may experience a significant impact on their quality of life due to increased stress, financial pressure, social isolation, and changes in routine activities (Mumuni et al., 2023).

Understanding the quality of life of these caregivers is essential to identify areas of support, implementation of intervention effectively, and improve the well-being of caregivers, children, and adolescents they care for (Ekoube et al., 2024). Carrying out these responsibilities is necessary to help chronically ill patients fulfill their needs and reduce the lack of autonomy and independence that patients experience (Toledano & Rubia, 2018).

The role of the nurses has a fundamental responsibility to control symptoms by reducing suffering and providing practical support according to patient needs (Pramadhani, 2022). Methods for managing fatigue and sleep quality include non-pharmacological methods (Pouraboli et al., 2019). One of the non-pharmacological therapies is distraction to reduce anxiety by diverting the patient's attention so that the anxiety is diverted (Aprilia et al., 2022). There are several types of distraction techniques: respiratory system distraction, auditory distraction, visual distraction, and intellectual distraction. There are two types of distraction based on their type: active and passive.

Virtual Reality is a form of active distraction (Aprilia et al., 2022). Butterfly hug virtual Reality is an instrument that utilizes technological advances and can project visual forms, self-healing, where later on, respondents can control anxiety levels while caring for children with HIV/AIDS (Arviani et al., 2021).

The implications for nursing practice include the Butterly hug intervention, which enhances the feasibility and accessibility of non-invasive, low-cost, and easy-to-implement interventions, especially in low-resource areas. Hence, the VR hardware is becoming increasingly affordable and portable, making broader deployment practical. Also, nurses can lead the integration of therapies, such as training caregivers, setting up VR sessions, tracking anxiety outcomes, and advising on interventions.

2. Method

Design: This study used a crossover clinical trial method, which provides a sequence of interventions for each research subject. In the administration of intervention, participants were divided into two groups in the first period, and then an exchange of interventions was carried out in the following periods. Each individual received a description related to the crossover design in this study (Ketut Tunas, 2022).

Sample and setting: This study was conducted in June – September 2024 at LSM KOMPAK - Riau Islands, Indonesia. The subject in this study was caregivers of children who were suffering from HIV-AIDS, who were chosen randomly from the population by considering the strata in the population (Dahlan, 2019). The subjects of this study were 18 respondents based on inclusion criteria set by the researcher, such as agreeing to be a respondent, caregiver of HIV-AIDS children who have > 14 anxiety level of based on the HARS scale.

Instruments: This study used HARS (Hamilton Anxiety Rating Scale) to measure the anxiety level of each respondent with a measurement scale consisting of 14 statement items, which is 14-20 (mild), 21-27 (moderate), 28 – 41 (severe), while 42-56 (very severe) Intervention: This study employed two interventions; method (A) butterfly hug virtual reality and method (B) deep breathing exercise technique. The intervention given is shown below:

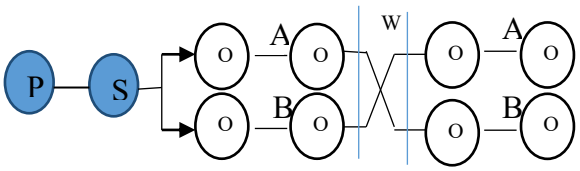

Figure 1. Interventions Between Two Groups

AB: Intervention A in the 1st Period and Intervention B in the 2 nd period
BA: Intervention B in the 1st Period and Intervention A in the 2 nd period
P: Population
S: Sample
A: Intervention of the butterfly hug virtual Reality
B: Intervention of deep breathing exercise Intervensi
WO: Washout
O1: Observation before intervention A in 1st Period
O2: Observation after intervention A in 1st Period
O3: Observation before intervention B in 1st Period
O4: Observation after intervention B in 1st Period
O5: Observation before intervention A in 2nd Period
O6: Observation after intervention A in 2nd Period
O7: Observation before intervention B in 2nd Period
O8: Observation after intervention B in the 2nd period

Data collection:

Data was collected after obtaining ethical approval and official permission from the research location. The researcher utilized the Indonesian version of the HARS questionnaire to assess the respondents' anxiety level. Two research assistants assisted in data collection. Researchers contact the respondents through their respective HIV facilitators in each area to ask about their willingness to become respondents. Anxiety assessment using the HARS questionnaire took 5-10 minutes. Data analysis: The gathered data were

analyzed using frequency, percentage, mean, standard deviation, and the Paired T-test. A Shapiro-Wilk test revealed that the data were normally distributed (>0.05).

Ethical consideration: Before data collection, researchers trained the companion of the HIV-AIDS caregiver to explain the objectives and procedures of the research and obtain informed consent. The researcher received approval from caregivers HIV – AIDS companion, after they conveyed the research objectives and methods to the prospective respondents. Those who agree to participate sign a digital consent to show their approval. Respondents were informed that their involvement in this study was entirely voluntary, and they could choose to participate or not, and withdraw from this study. The ethical permission was gained from Universitas Awal Bros Ethics Committee (No. 0157/UAB1.20/SR/KEPK/09.24).

3. Results and Discussion

The demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic Data (n=18)

No	Variable	Frequency	Percentage
1	Caregiver age		
	25-40 years old	12	66.7
	41-60 years old	6	33.3
2	Gender		
	Male	6	33.3
	Female	12	66.7
3	Married Status		
	Married	15	83.3
	Widow	1	5.6
	Widower	2	11.1
4	Education Background		
	No School	1	5.6
	Elementry School	3	16.7
	Junior High School	3	16.7
	Senior High School	10	55.6
	College	1	5.6
5	Working Status		
	Unemployed	11	61.1
	Labor	6	33.3
	Private Sector Employees	1	5.6
6	Length of HIV Infected		
	< 5 years old	9	50.0
	>5 years old	9	50.0

The participants in this study were 18 HIV-AIDS children caregivers. The majority of respondents were female (n=12, 66.7%); 25-40 years old (n=12, 66.7%); married (n=15.883%). Respondents' educational background was mainly senior high school (n=10, 55.6%), followed by junior high school (16.7%) and elementary school (16.7%). Most of the respondents were unemployed (n=11. 61.1%). The length of care was 9 (50%) participants taking care of their children who were infected with HIV for less than 5 years, while the remaining 9 (50%) participants took care of their children who had been infected with HIV for more than 5 years. Based on Table 2, the result of the Shapiro-Wilk test revealed a p-value >0.05, indicating that the data were normally distributed.

Table 2. Normality Test

Anxiety Level	df	p value (Pre-test)	p value (Post-test)	Conclusion
Virtual Reality	13	0.793	0.171	Data Normally Distributed
Deep Breathing Exercise	5	0.547	0.228	Data Normally Distributed

Table 3. Breathing Exercise Toward Children's HIV Caregiver Anxiety Level (PreTest Measurement)

Respondent	Intervention	1st period Pre-Test Anxiety Level	2 nd Pre Test Anxiety Level	Difference
1	AB	36	24	12
2	AB	40	36	4
3	AB	41	22	19
4	AB	33	29	4
5	AB	37	28	9
6	AB	29	26	3
7	AB	25	41	-16
8	AB	36	36	0
9	AB	35	35	0
10	AB	31	33	-2
11	AB	32	32	0
12	AB	33	41	-8
13	AB	32	29	3
14	BA	36	28	8
15	BA	36	31	5
16	BA	41	32	9
17	BA	32	28	4
18	BA	32	33	-1

As shown in Table 3, the HARS (Hamilton Anxiety Rating Scale) was used to measure the

anxiety level of children with HIV-AIDS caregivers. Data revealed that respondents 1 to 13 were initially given a butterfly hug virtual reality intervention (A), which was continued with a deep breathing exercise (B). Respondents showed anxiety level during pre-test 1st period: the lowest score was 25 (anxiety level moderate) and the highest score was 41 (anxiety level severe). Meanwhile, in the 2nd period, anxiety levels were varied at a level of 22 – 41 (moderate–severe level). The difference in score among 13 respondents varies and is high in terms of range, with the lowest being 16, followed by the highest being 19, which is a mild anxiety level. Another five respondents initially received deep breathing exercise intervention (B), followed by butterfly hug virtual reality (A). Anxiety level during pre-test in the 1st period was around 32- 41 (Severe Anxiety levels). Then, in the 2nd period, the Anxiety level of the respondents decreased to 28-33, even though it was still at the severe level. The difference score among five respondents varies from 1 to 9.

Table 4. Crossover Clinical Trial Butterfly Hug Virtual Reality and Deep Breathing Exercise Toward Children's HIV Caregiver Anxiety Level (Post Test Measurement)

Respondent	Intevention	1st Post Test Anxiety Level	2 nd Post Test Anxiety Level	Difference
1	AB	21	12	9
2	AB	23	16	7
3	AB	20	14	6
4	AB	16	16	0
5	AB	24	22	2
6	AB	14	15	-1
7	AB	18	27	-9
8	AB	14	23	-9
9	AB	18	19	-1
10	AB	15	18	-3
11	AB	15	15	0
12	AB	20	20	0
13	AB	15	15	0
14	BA	21	24	-3
15	BA	27	25	2
16	BA	23	23	0
17	BA	22	21	1
18	BA	23	24	1

Table 4 shows the anxiety levels during the post-test period. Anxiety level was displayed by respondents 1 to 13 in the 1st period of pre-test, at a level of 14 – 21, which indicates a mild to moderate level. Then, in the 2nd period, anxiety was at a level of 12-27 (mild – moderate). The difference scores among 13 respondents were -9 through 9. On the other hand, five respondents' anxiety levels in the 1st period post-test were at the level of 21-27, with anxiety levels of moderate. Then, in the 2nd period, anxiety levels were 21-25 (moderate anxiety level)—difference score among five respondents, -3 through 2.

Table 5. Analysis of Butterfly Hug Virtual Reality and Deep Breathing Exercise Effect on Children with HIV – AIDS Caregiver Anxiety Level

Period	Group	n	Mean (SD)	*p-value*
1st Anxiety Level	**VR Therapy**	13		
	Pre-Test		32.77 (5.166)	0.001
	Post-Test		17.92 (3.427)	
	Deep Breathing Exercise	5		0.003
	Pre-Test		35.20 (3.962)	
	Post- Test		23.20 (2.280)	
2nd Anxiety Level	**Deep Breathing Exercise**	13		0,001
	Pre-Test		32.15 (6.039)	
	Post-Test		19.76 (3.833)	
	VR Therapy	5		0,002
	Pre-Test		30.40 (2.302)	
	Post-Test		16.60 (1.949)	

Table 5 shows the bivariate analysis to analyze the effect of butterfly hug virtual reality on the anxiety level of children with HIV-AIDS caregiver, revealed that the average anxiety levels pre-test of respondents who received virtual Therapy (VR) in the 1st period was 32.77 (±5.166), while the average score of post-test was 17,92 (±3.427). Meanwhile, the average pre-test anxiety level of respondents who received deep breathing exercise in the 1st period was 35.20 (± 3,962), and the average during the post-test was 23.20 (±2.280). On the other hand, in the 2nd period, during the pre-test session, the average anxiety level of those who received deep breathing exercise was 32.15 (± 6.029), and the average post-test was 19.76 (±3.833). Respondents who received VR therapy were 30.40 (±2.302) in the pre-test, and the post-test average was 16.60 (±1.949). Paired T Test revealed p value < 0.05, which indicates there was a

difference in anxiety level in each group (Table 5)

According to the findings of this study, there was a difference in anxiety levels among children with HIV-AIDS caregivers after receiving the butterfly hug and deep breathing technique, with the two different treatments in a week using a crossover clinical trial. Data shows that anxiety level in the 1st period among respondents who received virtual Reality (VR) decreased from severe to mild level of anxiety. While respondents who employed deep breathing exercises also had a reduction in their anxiety level, it also reduced from severe to a moderate level. On the other hand, in the 2nd period during the pre-test period, the level of anxiety among the deep breathing exercise group displayed a decrease in anxiety level from severe to mild. The same situation in virtual Reality also experienced a reduction in anxiety level from severe to mild.

Based on this study, it was found that all respondents in all age groups experience anxiety, this situation is because they still live with their children with HIV-AIDS and become full-time caregivers. These findings are supported by research from, who state that caregivers who live with people who have HIV are more anxious than caregivers who live separately. On the other hand, in terms of the length of suffering from HIV, this study shows that there was no difference in anxiety level. This data is inconsistent with (Khan et al., 2018), which states that the caregiver will display more anxiety in taking care of their children with short-term suffering from HIV than those who experience longer-term suffering.

Feeling anxious among caregivers can result from various factors, including the maturity level, education level, and understanding of home care, as well as psychological and financial aspects. This result was consistent with findings by Song et al. (2022) that the caregivers of children with HIV may experience mental pressure with burdens in the family, financial problems, physical and psychological, because they must meet medical needs, nutrition, and well-being. In addition, several studies stated that there were difficulties in caring for children with HIV due to stigma from the community, exacerbation of disease, and changes in children's behavior (Rodriguez et al., 2019).

This recent study also revealed that the difference in pre-test and post-test varied. There was a negative score that indicated during the post-test, there was an increase in anxiety level. This could be a result of anxiety, which is a situational reaction, when the respondents recalled life burdens they experienced, which caused them to feel anxious, lose control, and feel insecure, causing sadness during the post-test session. However, in other respondents who experienced calm, there was a significant decrease in the level of anxiety. The difference score was 19 in the 1st period, while in the 2nd period it was 9. These findings show that there was a decrease in the level of anxiety they experienced. Anxiety is the anticipation of future threats, and could cause the emergence of coping reactions from respondents. In accordance with anxiety theory, anxiety can cause discomfort that leads to feelings of insecurity, manifested by increased physiological activation (Hapsari et al., 2024) Moreover, anxiety is strongly infuenced by contextual sensitivity and alertness process, from the threat of future or survive according to development, and often associated with muscle tension and vigilance in preparation for facing danger situation, be carefull or escape behavior.

The Butterfly hug intervention developed by a psychologist therapist (Jarero et al., 2014) is an alternative solution to overcome anxiety in the population group with trauma and anxiety, by crossing both hands on the chest and clapping like wings that wrap the butterfly. These procedures are done while taking a breath and exhaling slowly. The Butterfly hu is a bilateral method, e.g., eye movement or pressure, to reduce anxiety and calm.

Virtual Therapy combined with the butterfly hug was implemented during the post-test, both in the 1st Period and 2nd Period of treatment, showing that the average score for anxiety level was lower than that of the deep breathing exercise. Butterfly hug is a visual, auditory, and tactile bilateral stimulus therapy that uses virtual Reality to add focus through visual and auditory stimuli. This helps the caregivers process traumatic memory and maintain a balance between the left and right brain so that the caregivers can reduce the emotions that cause pressure in their souls. These findings are consistent with Girianto et al.'s (2021) research, which states there was a decrease in anxiety levels using the butterfly hug, with a sense of comfort to calm down in patients with trauma and loss.

Deep breathing exercise is a relaxation technique that can be easily performed by organizing the respiratory pattern, especially diaphragm breathing. This recent study shows a decrease in anxiety level during the post-test, with a difference score that was significant enough, 10. According to breathing pattern exercise, especially diaphragm breathing, it impacts the brain by changing the signal between the brain and body. The deep breathing technique is one of the essential methods proven to help control anxiety and stress by directly affecting the decrease of CO2 levels and increasing O2 delivery to the tissues. This data is consistent with Pristianto et al. (2022) findings that with breathing exercise, there was an increase in utilisation of positive spiritual coping and

decreased symptoms of depression after intervention in a group of adults living with HIV.

Both intervention relaxation techniques in this study can reduce anxiety levels significantly. Consistent with the recommendation from a previous study, a combination of at least three relaxation techniques and cognitive behavior strategies can decrease physical and psychological symptoms, increase quality of life, and improve health among susceptible populations (Sagala et al., 2023). A combination of breathing in autogenic exercise and acupuncture is recommended for people living with HIV (Tavoian & Craighead, 2023)

4. Conclusions and Suggestions

Anxiety is a feeling of fear, dread, and uneasiness. This feeling is experienced by caregiver who take care of their children with HIV-AIDS. Anxiety among caregivers of children is a result of a variety of situations. The anxiety can affect many aspects of their life, physically and psychologically, that have an impact on children with HIV-AIDS they are taking care of. It is essential to recognize and control the level of anxiety of the caregiver. This study was conducted to implement the butterfly hug virtual Therapy and deep breathing exercise among caregivers. This study showed the significant effect of the butterfly hug virtual Therapy and deep breathing exercise in reducing the anxiety level of caregivers. Furthermore, data revealed that there was a decrease in anxiety levels between the butterfly hug virtual therapy and the deep breathing exercise. It is recommended to use the butterfly hug virtual therapy with deep breathing exercises to reduce anxiety levels since it is easy to perform.

Further study is expected to conduct a mixed-method analysis to explore the problem of anxiety levels and the methods used.

5. Acknowledgments

We thank all participants and parties for their contribution to this study. Also, we greatly acknowledge the LSM of Kompak – Riau Island for the support during this study.

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