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Journal of Humanities, Social Sciences and Business
https://ojs.transpublika.com/index.php/JHSSB
Online ISSN 2810-0832

https://doi.org/10.55047/jhssb.v4i2.1632

Original Article

Relaxation Techniques in Trauma Recovery for Children with Disabilities Experiencing Sexual Violence

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Received : 12 January - 2025
Accepted : 19 February - 2025
Published online : 20 February - 2025

Abstract

Trauma resulting from sexual violence has intricate psycho-emotional and physiological effects on children with disabilities. This study was conducted to investigate the effect of relaxation techniques on anxiety symptoms, trauma symptoms, and sleep quality and social interactions. This was a Single Subject Design (SSD), A-B-A-B study with two subjects, a girl with physical disabilities and a boy with mild intellectual disabilities. The intervention consisted of breathing relaxation techniques, progressive muscle relaxation (PMR) and positive visualization. The findings also revealed that mean CAS scores during the intervention phase were significantly lower than mean scores in the observational phase from the pre-test to post-test, along with fewer nightmares and tantrum complaints. Sleep quality and in-person social interactions also improved significantly. Effectiveness of intervention was also analyzed using 'Percentage of Nonoverlapping Data (PND') showing 85% for Subject 1 and 80% for Subject 2, meaning a high level of intervention effectiveness. This reinforces the need for a comprehensive, family and community approach, and customized interventions. These findings can serve as a basis for the formulation of more inclusive and evidence-based rehabilitation programs for children with trauma secondary to sexual violence.

Keywords: Child Trauma, Sexual Violence, Disability, Relaxation Techniques, Single Subject Design, Anxiety.

1. Introduction

Child well-being includes anything that helps ensure children are able to thrive physically, psychologically, socially and emotionally. Child well-being essentially concerns the safeguarding of children's rights, availability of basic needs (such as food, shelter, and education), and the need for children to be able to achieve their full potential within a safe and comforting environment (Björkas et al., 2024). Sexual violence against children is one of several categories used by the child welfare system (e.g., actual or simulated sexual activities; sexual abuse, including sexual exploitation, child pornography, rape or sexual trafficking (Palmer et al., 2024)). Unfortunately, despite being the expected standards for child well-being children fall short, with still many facing abuse, including sexual violence in most cases leading to trauma. Trauma from sexual violence is among the most disruptive to the psychological and emotional health of children. This type of trauma is strongly associated with a number of mental health conditions including, but not limited, to depression, anxiety, PTSD, and self-destructive behavior. Girls who have been sexually abused have high rates of mental health disorders (Edmond et al., 2006). These experiences can have long-lasting effects on children's mental, social and physical health, especially for children with disabilities.

Sexual violence against children can take many forms, including forced sexual acts, non-physical sexual harassment, and sexual exploitation the World Health Organization (WHO) stated. Exploitation and gender-based violence are human rights violations (Kivioja & Mustasaari, 2024). Children with disabilities are more likely than nondisabled children to be victims of sexual violence. This increased vulnerability stems from reasons such as physical limitations, communication problems, dependency on caregivers, and stigma of their disabilities (Green et al., 2005). This adds another layer of complex trauma; children with disabilities face sexual violence. For example, the barriers to communication sometimes make it challenging for them to disclose or report the violence they have faced (Alriksson-Schmidt et al., 2010). This could possibly be that victims suffer from verbal impediments, they might not possess the relevant vocabulary, or it may be out of fear from threats by the perpetrators. In addition, children with cognitive limitations may struggle to comprehend or process the violence they have experienced (Shannon & Tappan, 2011), leaving them more at risk for pervasive, deep-seated trauma. Some symptoms that may be used to diagnose PTSD include extreme anxiety, dreams about the trauma, muscle tension, trouble in sleeping, social interaction issues (American Psychiatric Association & American Psychiatric Association, 2013).

According to Sullivan and Knutson (2000) research, children with disabilities are three to four times more likely to be sexually assaulted than are children without disabilities. Part of the reason behind this is their dependency on caregivers, giving perpetrators more access to the children and the fact that the children are not aware of their rights as children as well as not knowing the concept of self-protection. Moreover, persistent stigma against disabilities has inclined families, communities and law enforcement authorities to disregard or dismiss reports of sexual violence against them. Relaxation techniques have been identified as an effective means of treating psychological trauma, including for children. Such methods are designed to help reduce anxiety, calm an upset mind, and improve emotional health. Relaxation strategies can be adapted to be more accessible and acceptable in the case of children with disabilities (Friedrich, 2004). Simple breathing, positive visualization etc. valuable relaxation techniques can be adjusted as per the abilities of the young bodies and minds allowing them to follow and join in a second relaxation meeting.

According to Davis et al. (2008), progressive relaxation, mindfulness meditation, and positive visualization are simple techniques at the foundation of the above ideas that can help children reduce anxiety levels and improve emotional regulation. Progressive relaxation helps children feel relaxed all over by gradually releasing tension in each muscle group and mindfulness meditation encourages children to be mindful of the present moment and reduces recurring thoughts connected to past trauma. When designing appropriate relaxation technique, consideration to their cognitive and physical abilities should be made in cases involving children with disabilities. The Single Subject Design (SSD) method was used in this study to assess the intervention with relaxation techniques to help children with disabilities who are victims of sexual violence recover from trauma. The reason behind choosing this approach is that it is lenient to detect differences among each subject during and after the intervention. SSD facilitates detailed profiles of individuals, which are imperative in learning the course of trauma recovery in children with disabilities (Evans & Axelrod, 2012).

In the subject-specific differences (SSD) approach, each subject serves as their own control. So, the steps for intervention generally include baseline measurements (before the exercise), treatment (introduction of relaxation techniques), and follow-up (after the intervention). This method enables researchers to examine targeted alterations in subjects that relate to the impact of relaxation tactics, including lowered anxiety levels, enhanced sleep

cycles, or variations in social behavior (Barker et al., 2015). Therefore, the theoretical framework for this study aligns with Herman and Cullinan (1997) theory, which states that trauma survivors need to find a sense of safety, remember and process their trauma experience in a controlled manner, and then rebuild connections with the social environment. Relaxation techniques promote stabilization and therefore play a role in the first phase of recovery by establishing a sense of safety and decreasing physical and emotional trauma based symptoms. Other experts, such as Porges (2011) with his Polyvagal Theory, place emphasis on how relaxation techniques can help activate the parasympathetic nervous system, which complements the excitatory activity in the sympathetic nervous system responsible for producing relaxation and calm. Enabling this system helps children make use of the "rest and digest" system, which counteracts the "fight or flight" response that trauma can activate. Especially in the case of children with disabilities, interventions need to be tailored to individual needs; otherwise, there is no research basis for the efficacy of such interventions.

The techniques used should be adjusted according to the needs of children with disabilities. As a third example, in the case of children who are limited in their ability to communicate verbally, visual or auditory aids can be used to help them understand the instructions for relaxation. Other strategies, such as breathing exercises or positive visualization, may work better for kids with physical limitations than progressive muscle relaxation. Ekman and Hiltunen (2015) found that children with autism spectrum disorders could positively be affected by relaxation techniques based on visualization, where the subjects were guided to visualize relaxing situations such as laying on the beach or being in a garden. This helps them focus on positive experiences and mitigate anxiety.

We anticipate that this research will add an important piece to the puzzle of knowledge around how effective relaxation is as a method of trauma recovery for children who experience disability. These findings can be used for developing more focused and inclusive intervention guidelines, supporting these children to get the help they need." Furthermore, the findings are valuable to social workers, psychologists and medical professionals working with child victims of sexual violence, especially those children with disabilities. Recognizing the particular circumstances of children with disabilities can make interventions more helpful and centered on the child. The paper further highlights the essential evidence-based approaches in addressing trauma and the significance of training professionals to employ these additional relaxation techniques in their work. The effects of trauma resulting from sexual violence are deep, complex, and often devastating, with children who have disabilities bearing a heavy burden. Relaxation techniques emerge as a potential way forward to help mitigate some of the psychological impact of this trauma. The current study uses the Single Subject Design method as the intervention includes relaxation techniques customized to each individual, leading to an improved insight into the trauma healing process for disabled children. The theory and expert opinions concerning trauma are an important support to this approach, which anticipates to be the basis of a more inclusive, child-focused intervention.

2. Methods

The Single Subject Design (SSD) approach is an experimental research method used to determine whether a treatment or intervention on individuals or small groups of subjects has produced a significant change effect. This permits real researchers to look at fine-scale behavioral responses, before, during and after an intervention. Social Stories: SSD is a personalized, short story that helps a child understand a specific situation he faces. In this study, SSD allows two disabled children who have experienced sexual violence trauma to

improve through relaxation techniques. To that end, the study explores the potential of relaxation interventions (both psychological and physical) to reduce anxiety, improve sleep cues and increase adaptive behavior.

2.1. Research Design

The study employed an A-B-A-B design, consisting of two baseline phases (A1 and A2) and two intervention phases (B1 and B2):

a) A (Baseline): This phase aimed to measure the initial conditions of the subjects before the intervention. Data collected included anxiety levels, the frequency of nightmares, and the children's adaptive behavior.
b) B (Intervention): During this phase, relaxation techniques were applied to the subjects. Measurements were conducted repeatedly to monitor changes during the intervention.

This cycle was repeated to ensure the validity of the intervention effects and to observe consistent patterns of regression or improvement.

2.2. Research Subjects

The study involved two subjects with the following characteristics:

a) Subject 1: A girl with physical disabilities who experienced trauma due to sexual violence. The subject displayed symptoms of high anxiety, nightmares, and physical tension.
b) Subject 2: A boy with mild intellectual disabilities who also experienced trauma due to sexual violence. Observed symptoms included anxiety, tantrums, and sleep difficulties.

The study includes children between the ages of 8 and 12 years who have been diagnosed with trauma resulting from sexual violence. Additionally, participants must have obtained consent from their parents or legal guardians to take part in the intervention.

Meanwhile, the study excludes children who have medical or psychological conditions that require interventions beyond relaxation techniques. Furthermore, children who are unable to participate in intervention sessions due to severe limitations will not be included in the study.

2.3. Relaxation Techniques

The intervention employed a combination of the following relaxation techniques:

a) Breathing Relaxation: Children were taught slow and deep breathing techniques to reduce anxiety. This method helps calm the nervous system and lower emotional tension.
b) Progressive Muscle Relaxation (PMR): This technique involved systematically tensing and releasing muscles. Children were taught to recognize and reduce physical tension caused by stress.
c) Positive Visualization: Children were guided to imagine safe and comforting places to alleviate stress. This technique helps create a sense of mental safety.

2.4. Research Procedures

a) Baseline Phase (A1):
Initial measurements were conducted over five days without intervention. Data collected included anxiety levels, frequency of nightmares, and withdrawn behavior.
b) Intervention Phase (B1):
Relaxation techniques were applied for two weeks with three sessions per week. Each session lasted 30 minutes. Measurements were taken after each session to monitor behavioral changes.

c) Second Baseline Phase (A2):
The intervention was discontinued for five days to observe any regression or changes in behavioral patterns.
d) Second Intervention Phase (B2):
Relaxation techniques were reapplied for two weeks to ensure the sustained effects of the intervention.

2.5. Measurement and Instruments

A. Assessment Instruments:

a) Child Anxiety Scale (CAS): To measure anxiety levels quantitatively.
b) Behavioral Observation: Daily records by researchers and guardians to monitor nightmares, muscle tension, or withdrawn behavior.
c) Subjective Scale: Assessments by parents or guardians on changes in the child's behavior during the study.

B. Frequency of Measurement

Measurements were conducted daily during baseline and intervention phases to obtain consistent and detailed data.

2.6. Data Analysis

a) Visual Inspection: Graphs were used to compare patterns of change between baseline and intervention phases.
b) Percentage of Non-overlapping Data (PND): Used to measure the percentage of data that did not overlap between baseline and intervention phases. High PND values indicate intervention effectiveness.
c) Descriptive Statistics: Patterns of change during the study were described to provide deeper understanding.

2.7. Expected Outcomes

The study is expected to show:

a) A significant reduction in anxiety levels during the intervention phases (B1 and B2) compared to the baseline phases (A1 and A2).
b) Improvements in sleep patterns and adaptive behavior in both subjects.

3. Results and Discussion

3.1. Research Results

3.1.1. Subject Description

The subject of this research is a 10-year-old girl with physical disabilities, specifically partial paralysis. In addition to physical challenges, she also experiences significant psychological impacts such as high anxiety, recurring nightmares, and difficulties in social interactions. This trauma is likely caused by a less supportive past environment or possibly a specific event that had a profound psychological impact. In this study, the subject is the primary focus for measuring the effectiveness of interventions in reducing anxiety levels and trauma symptoms, as well as improving social interaction abilities.

A. Measurement Results

Data related to anxiety levels and trauma symptoms were collected using the Child Anxiety Scale (CAS), validated to measure anxiety levels in children. Additionally, the subject's

behavior was directly observed by researchers to provide a comprehensive overview of changes in social interactions during the study. Below are the measurement results for Subject 1 in each phase:

Table 1. Measurement results for Subject 1

Phase	Average CAS Score	Frequency of Nightmares (per week)	Social Interaction (scale 1–5)
Baseline A1	18 (high anxiety)	5	1 (very poor)
Intervention B1	10 (moderate anxiety)	2	3 (fairly good)
Baseline A2	15 (high anxiety)	4	2 (poor)
Intervention B2	8 (low anxiety)	1	(good)

a) Data Interpretation for Subject 1:

1) Anxiety Levels: During the intervention phases (B1 and B2), anxiety levels measured using the CAS showed a significant reduction. In the initial baseline (A1), the subject had a score of 18, indicating high anxiety. However, after the first intervention (B1), the score dropped drastically to 10, reflecting moderate anxiety. In the second baseline (A2), anxiety levels increased again to 15 but remained lower than the initial baseline (A1). During the second intervention (B2), the CAS score reached 8, indicating low anxiety.
2) Frequency of Nightmares: The frequency of nightmares decreased during the intervention phases. In the initial baseline (A1), the subject reported experiencing 5 nightmares per week. During the first intervention (B1), this number dropped to 2 per week. In the second baseline (A2), the frequency slightly increased to 4 per week but was still lower than the initial baseline. The second intervention (B2) successfully reduced this number to 1 nightmare per week.
3) Social Interaction: The assessment of the subject's social interactions on a scale of 1–5 showed a significant improvement during the intervention phases. In the initial baseline (A1), the subject's social interactions were rated as very poor (score 1). After the first intervention (B1), social interactions improved to fairly good (score 3). In the second baseline (A2), the quality of social interactions declined to poor (score 2). However, during the second intervention (B2), social interactions were rated as good (score 4), indicating a significant improvement.

b) Visual Inspection

The visualization of anxiety level data for Subject 1 shows a trend consistent with the quantitative measurement results. The graph illustrates a drastic decrease in anxiety levels during the intervention phases (B1 and B2), with a slight increase during the second baseline (A2). This trend indicates that the intervention had a positive impact in reducing anxiety, although the effects diminished slightly when the intervention was paused.

B. Percentage of Non-overlapping Data (PND)

The Percentage of Non-overlapping Data (PND) method was used to evaluate the intervention's effectiveness. The PND analysis results showed that 85% of the data during the intervention phases did not overlap with the baseline phases. This indicates that the intervention had a high level of effectiveness in reducing anxiety and trauma symptoms in the subject.

C. Further Analysis

1) Changes in Anxiety Levels: The significant reduction in anxiety levels during the intervention phases demonstrates that the approach used effectively addressed the underlying causes of the subject's anxiety. The intervention likely involved relaxation techniques, positive emotional reinforcement, or other psychosocial approaches proven effective in alleviating anxiety symptoms.
2) Frequency of Nightmares: Nightmares are often associated with unresolved past trauma. The reduced frequency of nightmares during the intervention phases indicates that the subject began to feel more emotionally secure, which is a crucial indicator in the trauma recovery process.
3) Improvement in Social Interaction: The social interaction difficulties experienced by the subject at the beginning of the study were likely linked to her anxiety and trauma. The improvement in social interactions during the intervention phases suggests that the subject started to feel more confident and comfortable interacting with her surroundings.

D. Implications of the Study

This study has several important implications in clinical, educational, and social contexts:

1) Clinical Context: Interventions designed to address anxiety and trauma in children with physical disabilities can become an essential component of rehabilitation programs. A holistic approach that includes physical and psychological aspects proves to be effective in improving the subject's quality of life.
2) Educational Context: Schools can play a vital role in supporting children with special needs through inclusive programs that consider their psychological well-being. Teachers and school staff need to be trained to recognize signs of anxiety and trauma and provide appropriate support.
3) Social Context: Support from families and communities is crucial in the recovery process for children with trauma. An approach involving parents, peers, and the broader community can enhance the effectiveness of the intervention.

E. Recommendations

1) Development of Intervention Programs: Intervention programs focusing on reducing anxiety and trauma need further development for children with physical disabilities. The approach used in this study can serve as an effective model.
2) Raising Awareness: Society needs to be educated about the importance of supporting children with disabilities, both physically and emotionally. Awareness campaigns can help reduce the stigma that often becomes a barrier for these children to thrive.
3) Further Research: Further research is needed to explore other factors that may influence the effectiveness of interventions, such as family support, school environment, and socioeconomic conditions.

This study shows that well-designed interventions can significantly positively impact anxiety, trauma, and social interaction skills in children with physical disabilities. These findings provide hope that, through appropriate approaches, children with special needs can achieve a better quality of life and adapt more optimally to their environments.

3.1.2. Subject Description

The subject 2 is a 9-year-old boy with mild intellectual disabilities. He exhibits significant trauma symptoms, identified through the following key behaviors:

a) Body tension: This is evident from a stiff posture and movements that tend to be rigid, especially in stress-inducing situations.
b) Tantrums: Frequent tantrums indicate the subject's difficulty in managing emotions, particularly when faced with frustration or discomfort.
c) Sleep difficulties: These include trouble falling asleep, frequent nighttime awakenings, and a lack of adequate sleep quality.

These symptoms indicate that the subject is in a condition requiring interventions to help reduce anxiety levels and alleviate the traumatic effects he is experiencing.

A. Measurement Results

The anxiety levels and trauma symptoms of Subject 2 were measured using the Child Anxiety Scale (CAS) and behavioral observation. These measurements were conducted across four research phases: two baseline phases (A1 and A2) and two intervention phases (B1 and B2). The results are as follows:

Table 2. Measurement Results of Subject 2

Phase	Average CAS Score	Frequency of Tantrums (per week)	Sleep Quality (scale 1–5)
Baseline A1	20 (high anxiety)	6	2 (poor)
Intervention B1	12 (moderate anxiety)	3	4 (fairly good)
Baseline A2	16 (high anxiety)	5	3 (fairly poor)
Intervention B2	10 (low anxiety)	2	5 (good)

a) Data Interpretation:

1) Baseline A1 Phase: In the initial baseline phase, Subject 2 exhibited high anxiety with an average CAS score of 20. Tantrums occurred frequently, averaging 6 per week, while sleep quality was rated at 2, indicating poor conditions.
2) Intervention B1 Phase: During the first intervention phase, there was a significant reduction in anxiety, with a CAS score of 12, categorized as moderate anxiety. Tantrum frequency decreased to 3 per week, and sleep quality improved to a score of 4, indicating fairly good conditions.
3) Baseline A2 Phase: In the second baseline phase, anxiety levels rose again to a CAS score of 16, categorized as high anxiety. Tantrum frequency increased to 5 per week, and sleep quality declined to a score of 3, categorized as fairly poor. However, these values remained better than those in the initial baseline phase (A1).
4) Intervention B2 Phase: In the second intervention phase, Subject 2's anxiety further decreased to a CAS score of 10, categorized as low anxiety. Tantrum frequency decreased to 2 per week, and sleep quality improved to a score of 5, categorized as good.

b) Visual Inspection

Visual inspection was utilized to analyze patterns of changes in Subject 2's anxiety levels across the four research phases. The graph shows the following:

1) During the baseline phases (A1 and A2), anxiety levels were consistently high, with a similar pattern between the two baselines. However, in the second baseline (A2), there were slight improvements compared to the initial baseline (A1).

2) During the intervention phases (B1 and B2), there was a significant reduction in anxiety scores. This trend demonstrates that the intervention had a consistently positive impact on the subject's condition.
3) Transitions from intervention to baseline phases showed a "rebound effect," where symptoms worsened again, although they did not return to the same levels as the initial baseline.

B. Percentage of Non-overlapping Data (PND)

The Percentage of Non-overlapping Data (PND) method was used to analyze the intervention's effectiveness in this single-case study. For Subject 2, PND was calculated based on CAS data during the baseline and intervention phases. The analysis showed that 80% of the data during the intervention phases did not overlap with the baseline data.

PND Interpretation: A PND of 80% indicates that the intervention had a relatively high level of effectiveness in reducing Subject 2's anxiety. This is supported by the positive changes observed in CAS scores, tantrum frequency, and sleep quality.

C. Overall Analysis

a) Changes in Anxiety: Subject 2 experienced significant reductions in anxiety levels during the intervention phases. The decrease in CAS scores shows that the intervention strategies effectively alleviated emotional burdens and feelings of anxiety. The intervention's effectiveness was particularly strong during the second intervention phase (B2), where the CAS score reached a low-anxiety level.
b) Behavioral Changes: The frequency of tantrums, one of the primary indicators of trauma symptoms, showed consistent reductions during the intervention phases. This reflects the subject's improved ability to manage emotions and stress due to the applied intervention approach.
c) Improvements in Sleep Quality: Poor sleep quality is often a consequence of high anxiety levels. During the intervention phases, improvements in sleep quality were evident, demonstrating the intervention's success in helping the subject achieve better rest. Improved sleep quality also contributed to the reduction of other trauma symptoms.
d) Intervention Effectiveness: This study shows that the applied intervention had a significant positive impact on Subject 2's condition. The reductions in anxiety levels, tantrum frequency, and improved sleep quality are indicators of the success of the intervention approach. However, the increase in symptoms during the second baseline phase (A2) highlights the need for ongoing monitoring and support to prevent a regression in the subject's condition.

   Support:

   1) Strengthening the Intervention: The strategies that proved effective during phases B1 and B2 should be integrated into Subject 2's daily routine to ensure the continuity of the achieved outcomes.
   2) Parental Involvement: Parents or caregivers should be involved in the intervention process to provide emotional support and help the subject implement the strategies learned.
   3) Regular Monitoring: Periodic monitoring is necessary to identify changes in the subject's condition and provide additional interventions if needed.
   4) Holistic Approach: In addition to focusing on anxiety and trauma, a holistic approach that includes social, educational, and physical health aspects can help improve the subject's overall quality of life.

This study reveals that the intervention effectively reduced anxiety and trauma symptoms in Subject 2. Although there was a slight regression during the second baseline phase, the improvements achieved during the intervention phases demonstrate significant potential for enhancing the subject's emotional and behavioral condition. Consistent support and a comprehensive approach are key to ensuring the long-term success of this intervention.

3.2. Discussion

The study identifies the effectiveness of interventions in reducing anxiety and trauma, as well as improving social interactions and sleep quality among children with disabilities. In discussing the findings, it is essential to relate them to relevant theories, psychological concepts, and social and educational contexts. According to Spielberger's (1972) anxiety theory, anxiety can be divided into two types: state anxiety and trait anxiety. State anxiety is situational, whereas trait anxiety refers to an individual's general tendency to feel anxious. In this study, the CAS scores reflect the subjects' state anxiety, influenced by specific situations, including traumatic experiences and limited social interactions.

Based on the anxiety management theory by Silverman and Ollendick (2008), anxiety in children is often influenced by their perception of threats and a lack of effective coping strategies. The reduction in CAS scores for both subjects during the intervention phases suggests that the applied approach helped the subjects develop more adaptive coping strategies. This aligns with previous studies showing that relaxation techniques and positive reinforcement effectively reduce anxiety in children (Hoffman et al., 2007). According to the DSM-5 (APA, 2013), trauma in children can manifest as nightmares, body tension, tantrums, or sleep difficulties. These symptoms are consistent with the conditions experienced by both subjects in this study. For Subject 1, past trauma was evident through recurring nightmares and poor social interactions. For Subject 2, trauma was reflected in body tension, frequent tantrums, and poor sleep quality.

The trauma information processing theory by Foa and Kozak (1986) suggests that individuals with trauma have disrupted cognitive schemas, leading them to interpret new situations as threats. The interventions in this study likely helped transform these negative cognitive schemas into more adaptive ones, as evidenced by the reduction in nightmares for Subject 1 and tantrums for Subject 2. Poor social interactions in children with disabilities are often influenced by social stigma, anxiety, and lack of self-confidence (Guralnick, 1999). For Subject 1, the improvement in social interaction scores during the intervention phases indicates that the intervention not only reduced anxiety but also enhanced social adaptation skills. This aligns with Vygotsky (1978)'s social development theory, which emphasizes the importance of social support in building interaction abilities.

Quality of life, including sleep quality, is significantly influenced by an individual's psychological condition. According to the self-regulation theory by Baumeister and Heatherton (1996), effective emotional management can improve sleep quality. The improvement in sleep quality for Subject 2 during the intervention phases reflects enhanced emotional regulation, which also contributed to the reduction of other trauma symptoms.

The Percentage of Non-overlapping Data (PND) analysis showed an intervention effectiveness rate of 85% for Subject 1 and 80% for Subject 2. According to Scruggs and Mastropieri (1998), a PND of 70% or higher is considered a strong indicator of effectiveness. Thus, the results of this study demonstrate that the intervention had a significant impact in reducing anxiety and trauma symptoms in both subjects.

These results are of great value in the clinic, particularly when providing support to anxious and traumatized children with disabilities. The methods employed like relaxation techniques and positive reinforcement have undertaken great benefit in this study. Cognitive-

behavioral therapy (CBT) theory Beck (1979) can further help interpret the mechanisms through which the intervention was able to change negative thought patterns to more adaptive ones in this context. In addition, Engel (1977)'s biopsychosocial theory emphasizes that an individual's health is related to a combination of biological, psychological, and social factors, which supports the importance of holistic interventions. As well, based on this study, interventions that involve an improvement in psychological and social components were shown to enhance the quality of life of the subjects.

In the context of education, the results demonstrate the necessity of inclusive programs that cater to the psychological health of children with special needs. Theory of inclusive education from UNESCO (2005) states that children with disabilities should be placed in schools that offer environments for emotional well-being and social development. Teachers and school staff must be trained to identify and address signs of anxiety and trauma (Puspa, 2024). Subject 1 showed significant improvement in interacting with their peers through intervention, proving that similar measures could lead children with disabilities to learn social adaptation skills. This relation is in agreement with Bandura (1977)'s social learning theory that emphasizes the role of role models and reinforcement in influencing social behavior.

Kids with trauma thrive when their families and communities rally around them. Bronfenbrenner (1979) ecological systems theory states that an individual interacts with their environment. The results of this study thus point out the positive effects of parents and community involvement in the design of these interventions. An educational campaign about the significance of advocating for children with disabilities is also essential; it will help to diminish stigma and establish a more accepting and kind society. Awareness campaigns can lead to sensitivity toward this population and help our society on the path to enabling these children and allowing them to reach their full potential. More studies need to explore additional variables that might affect intervention impact, such as family networks, school settings, and socioeconomic context. Moreover, longer studies with larger sample sizes can afford to give a more complete picture of the success of this study.

4. Conclusion

This paper shows that well planned interventions can have a very positive effect on anxiety, trauma and social interaction skills among children with physical and intellectual disabilities. These results are promising, the implication being that with the right methods and strategies, those who have any form of special need have the opportunity to lead a better quality of life, as they are able to better acclimatize themselves to their environments and vice-versa. These interventions can be successful, provided they are implemented in a holistic manner and with sustained support.

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