RESEARCH PAPER

Effect of a Nurse-Led Green Counseling Intervention on Reducing Anxiety and Promoting Well-being among school age children

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ABSTRACT

Background: Childhood anxiety and psychological distress pose significant public health challenges. Addressing these issues requires integrated community-based and pediatric nursing interventions that utilize accessible, non-pharmacological modalities such as nature-based therapies.

Aim: This study evaluated the effect of a nurse-led green counseling intervention on reducing anxiety and promoting well-being among school-age children.

Methods: A quasi-experimental, pre-test/post-test research design was utilized. The sample comprised 200 children aged 8 to 11 years screened and recruited from Pediatric Outpatient Clinics at Sohag University Hospitals. These tools were used to collect data; Tool I: Demographic and Clinical Assessment Sheet, Tool II: Revised Children's Anxiety and Depression Scale (RCADS-25) – Child Version, and Tool III: Stirling Children's Well-being Scale (SCWBS).

Results: Findings demonstrated a statistically significant reduction in children's anxiety scores post-intervention compared to baseline ($p < .001$). Concurrently, a substantial and statistically significant improvement in the participants' mental well-being scores ($p < .001$) was observed following the completion of the 8-week program.

Conclusion: The collaborative, nurse-led green counseling program is a highly effective, low-cost intervention for mitigating childhood anxiety and enhancing well-being. Integrating pediatric clinical screening with community-based nature therapies provides a comprehensive model for supporting pediatric mental health.

Keywords: Anxiety; Nurse-Led Green Counseling; School-Age Children; Well-being.

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Introduction

Childhood anxiety disorders and psychological distress have emerged as critical global public health challenges in the 21st century. Globally, it is estimated that at least one in eight children suffers from a diagnosable anxiety disorder, which can severely impair social, academic, and cognitive development **(Polanczyk et al., 2025).** If left unaddressed during the critical developmental window of school age, these emotional disturbances often crystallize into chronic psychiatric conditions during adulthood. Therefore, identifying accessible and sustainable psychological support systems remains a paramount priority for healthcare systems worldwide **(Lomax et al., 2025)**.

The school-age period, specifically between 8 and 11 years, represents a transitional developmental phase characterized by heightened vulnerability to emotional stressors. At this stage, children experience expanding social circles, increased academic expectations, and early neurobiological shifts that make them highly susceptible to generalized anxiety, social phobias, and separation anxieties. Environmental adjustments and domestic or academic stressors often manifest as psychosomatic symptoms, causing frequent visits to pediatric clinics. Consequently, evaluating mental well-being alongside physical health during clinical visits is vital to pediatric healthcare delivery **(Oerlemans et al., 2020).**

Traditional management protocols for pediatric anxiety heavily rely on psychopharmacology and conventional cognitive-behavioral therapies (CBT). However, pharmacological options often carry risks of adverse side effects, high costs, and significant societal stigma, which cause many parents to hesitate or reject treatment. On the other hand, standard clinical psychotherapy may feel restrictive or intimidating to an anxious child within a sterile hospital room. These limitations have driven a clinical shift toward innovative, non-pharmacological, child-friendly modalities that can be easily integrated into routine care **(James et al., 2025).**

Green Counseling is an emerging therapeutic paradigm that integrates standard psychological counseling with deliberate exposure to natural outdoor environments. Grounded in environmental psychology, this approach uses structured interactions with nature—such as gardens, parks, and plants—as active therapeutic agents. For children, the multi-sensory stimulation offered by natural spaces provides an intuitive, non-threatening platform to explore emotions and process stress. Utilizing nature-based counseling transforms a clinical intervention into an engaging, experiential learning process suitable for young minds **(ordan & Hinds, 2016).**

The therapeutic efficacy of green counseling is strongly supported by two foundational environmental theories: Wilson's Biophilia Hypothesis and Kaplan's Attention Restoration Theory (ART). The Biophilia Hypothesis asserts that humans possess an innate, evolutionary affinity for nature, meaning that connection with living systems naturally reduces physiological arousal and stress. Concurrently, ART posits that natural environments relieve "directed attention fatigue" caused by modern urban and academic life, restoring cognitive capacity and inducing a state of psychological calm. Experiencing nature enables children to effortlessly shift from a state of hyper-vigilance to emotional equilibrium **(Kaplan, 1995).**

Empirical evidence consistently demonstrates that regular interaction with green spaces yields profound physical, emotional, and social health benefits for pediatric populations. Physically, outdoor nature engagement lowers salivary cortisol levels, stabilizes blood pressure, and reduces autonomic nervous system hyperactivity associated with acute anxiety. Emotionally, it fosters the development of a positive mood, self-esteem, and mindfulness while lowering feelings of isolation. Cultivating these positive psychological traits actively improves a child's global well-being score, shifting focus from merely managing symptoms to promoting overall human flourishing **(Tillmann et al., 2018).**

Addressing pediatric mental health effectively requires a multi-dimensional approach that bridges clinical nursing care with community health practices. Pediatric nurses possess the specialized clinical competencies required to recognize early somatic signs of anxiety and administer standardized psychometric screenings within outpatient units **(Goddard et al., 2022).**

Pediatric nurses translate pediatric cognitive-behavioral principles into child-friendly outdoor activities. They actively guide children

through sensory grounding techniques, mindful breathing exercises, and emotional expression games using natural elements. Their deep understanding of pediatric psychology allows them to manage acute behavioral manifestations of anxiety (such as panic, resistance, or separation distress) during outdoor group sessions, maintaining a emotionally secure and therapeutic micro-environment. Pediatric nurses monitor the objective physical markers connected to anxiety, such as baseline heart rates, respiratory patterns, and muscle tension, observing how nature immersion helps stabilize these responses. They re-administer the psychometric instruments to evaluate changes in clinical categories, ensuring that symptom remission aligns with healthy pediatric growth and enhanced psychological flourishing **(Glynn et al., 2025).**

Community Health Nurses are uniquely positioned to navigate the social-ecological environments of patients, facilitate outdoor group therapies, and involve families in creating healthy micro-environments. Merging these two specialties creates a comprehensive continuum of care that successfully transitions a child from clinical identification to community-based rehabilitation. Community health nurses utilize their expertise in environmental health to assess, select, and structure the outdoor therapeutic gardens and community green spaces utilized for the study. They ensure that these natural settings are physically safe, accessible, and free from external public hazards or socio-environmental stressors.A core responsibility of the community health nurse is establishing strong therapeutic alliances with the children's primary caregivers. They conduct community-based educational outreach, educating parents on the benefits of nature connectivity and eco-therapy. Throughout the 8-week intervention, they coordinate session logistics, monitor attendance, and follow up with families via phone calls or home visits **(El-Fatah et al., 2025).**

Significance of the Study

Despite the documented benefits of eco-therapy in Western contexts, there is a noticeable shortage of empirical research evaluating nurse-led green counseling within developing countries, particularly Upper Egypt. Regions like Sohag feature a unique blend of rapid urbanization alongside traditional agricultural environments, yet children face high rates of environmental and socioeconomic stressors. Furthermore, nursing literature rarely provides structured, objective protocols for green counseling interventions that can be executed using limited public hospital infrastructure. This study directly addresses this gap by implementing a structured, low-cost, nature-based framework within an Egyptian tertiary care facility.

Given the rising burden of emotional distress among youth, validating an accessible, economically viable, and culturally appropriate intervention is crucial. This study directly addresses this need by assessing the impact of a collaborative, nurse-implemented green counseling program utilizing the existing outdoor spaces of Sohag University Hospitals. By tracking pre-test and post-test scores of 200 school-age children, this research aims to provide a scalable, evidence-based model. Ultimately, the findings seek to encourage hospital administrators to integrate nature-based therapies into standard pediatric and community nursing care protocols **(Yu et al., 2023).**

Study Aim:

This study evaluated the effect of a nurse-Led green counseling intervention on reducing anxiety and promoting well-being among school-age children.

Research Hypotheses

To achieve the aim of this study, the following research hypotheses were formulated:

Hypothesis 1 :

School-age children who participate in the 8-week nurse-led green counseling intervention will exhibit a statistically significant reduction in their mean anxiety scores on the Revised Children's Anxiety and Depression Scale (RCADS-25) at the post-test assessment compared to their baseline (pre-test) scores.

Hypothesis 2:

School-age children who participate in the 8-week nurse-led green counseling intervention will exhibit a statistically significant improvement in their mean mental well-being scores on the Stirling Children's Well-being

Scale (SCWBS) at the post-test assessment compared to their baseline (pre-test) scores .

Subjects and Method:

Study Design

A **quasi-experimental research design** with a **one-group pre-test/post-test approach** was utilized to evaluate the impact of the nurse-led green counseling intervention. This design is highly suitable for clinical and community nursing intervention studies where random assignment or a concurrent control group is logistically or ethically challenging within an outpatient hospital infrastructure.

Technical Design

Study Setting

The study was initiated at the **Pediatric Outpatient Clinics of Sohag University Hospitals**, Upper Egypt. This setting served as the primary clinical hub for initial screening, recruitment, and demographic data collection (Pediatric Nursing focus). The therapeutic 8-week green counseling intervention sessions were executed within the **designated outdoor therapeutic gardens and open green spaces** integrated into the Sohag University Hospital campus and its immediate community surroundings (Community Health Nursing focus).

Study Sample and Sample Size Calculation

A purposive sample of **200 school-age children** was recruited based on specific clinical criteria. The sample size was determined prior to data collection using **G*Power software (Version 3.1.9.7)** for a two-tailed paired *t*-test to compare pre- and post-intervention means.

- **Effect Size (d):** (0.25) (medium effect size)
- **Alpha Error (alpha):** (0.05) (level of significance)
- **Statistical Power (1 - beta):** (0.95) (95% statistical power)
- **Calculated Minimum Sample:** (175) participants.

To accommodate a projected **12% attrition/drop-out rate** over the 8-week outdoor program (due to missed sessions, clinic follow-up non-compliance, or high social desirability scores), the final recruitment target was increased to **200 children**.

Inclusion Criteria:

- Children aged 8 to 11 years.
- Mended or referred from the pediatric clinic with verified mild-to-moderate anxiety levels (screened via the RCADS-25 tool during pre-test).
- Accompanied by a primary caregiver who consents to weekly hospital garden visits for 8 weeks.

Exclusion Criteria:

- Children diagnosed with severe developmental delays, intellectual disabilities, or acute psychiatric disorders (e.g., psychosis, severe autism).
- Children undergoing concurrent professional psychotherapy or psychopharmacological treatment.
- Severe physical or motor disabilities preventing safe participation in outdoor garden activities.

Data Collection tools:

Three distinct tools will be utilized for data collection in this study. All tools will be translated into Arabic using a forward-back translation method and reviewed by a panel of experts in Pediatric and Community Health Nursing to ensure validity.

Tool I: Demographic and Clinical Assessment Sheet

Developed by the researchers based on an extensive review of the literature. This tool is structured into two main parts:

1. **Demographic Data:** Age (8–11 years), gender, order of birth, parents' education levels, and place of residence (rural vs. urban).

Tool II: Revised Children's Anxiety and Depression Scale (RCADS-25) – Child Version

This is a psychometrically sound, shortened self-report instrument widely recognized for screening clinical anxiety disorders in school-age children **(Chorpita et al., 2000).** The tool consists of **25 items** mapping into five major subscales of anxiety based on the DSM-IV criteria:

1. Generalized Anxiety Disorder (e.g., *"I worry about things"*).
2. Separation Anxiety Disorder (e.g., *"I scare when I am away from my parents"*).
3. Panic Disorder (e.g., *"I suddenly feel as if I can't breathe for no reason"*).
4. Social Phobia (e.g., *"I worry what other people think of me"*).
5. Obsessive-Compulsive Disorder (e.g., *"I have to do things over and over again"*).

- **Scoring System:** Items are rated on a **4-point Likert scale**:
  - 0 = Never
  - 1 = Sometimes
  - 2 = Often
  - 3 = Always
- **Level of Measurement:** Ordinal scale for individual items, converted into an interval scale for cumulative analysis.
  - **Normal Level:** T-score < 65 (Indicates non-clinical anxiety levels).
  - **Borderline Clinical Level:** T-score 65 to 69 (Indicates emerging traits that require monitoring).
  - **Clinically Significant Level:** T-score ≥ 70 (Indicates severe anxiety necessitating formal nursing/psychological intervention).

Tool III: Stirling Children's Well-being Scale (SCWBS)

This standardized tool evaluates positive aspects of children's mental health, emotional state, and psychological flourishing rather than focusing on pathology **(Liddle & Carter, 2015).** The scale is comprised of **15 items** phrased as positive statements. It features two core subscales alongside a validation subscale:

1. **Positive Emotional State Subscale:** Measures optimism, cheerfulness, and relaxation (e.g., *"I've been feeling calm"*).
2. **Positive Outlook Subscale:** Measures satisfying social relationships and self-efficacy (e.g., *"I think good things will happen in my life"*).
3. **Social Desirability Subscale:** Consists of 3 hidden items designed to check if the child is faking good responses (e.g., *"I am always telling the truth"*).

- **Scoring System:** Items are rated on a **5-point Likert scale**:
  - 1 = Never
  - 2 = Not much
  - 3 = Sometimes
  - 4 = Quite a lot
  - 5 = All the time
- **Interpretation of Levels:** Only the **12 core items** are calculated for the final score, ranging from a minimum of **12** to a maximum of **60**:
  - **Low Well-being:** Scores < 39 (Indicates poor psychological adjustment and immediate need for supportive interventions).
  - **Average/Normal Well-being:** Scores 39 to 48 (Reflects typical, healthy baseline adjustment for children in this age group).
  - **High Well-being:** Scores 49 to 60 (Indicates optimal thriving, emotional resilience, and excellent psychological health).
  - *Validation Note:* Children scoring 3 or 15 on the Social Desirability items are excluded from the dataset due to excessive response bias.

Content Validity

To ensure that the data collection instruments were culturally appropriate, clear, and measuring what they were intended to measure, the translated Arabic versions of the Revised Children's Anxiety and Depression Scale (RCADS-25) and the Stirling Children's Well-being Scale (SCWBS) were submitted to a jury panel of five experts. The panel consisted of senior professors specialized in Pediatric Nursing and Community Health Nursing from the Faculty of Nursing. The experts evaluated the items for clarity, clinical relevance, and

phrasing. No modifications were made based on their recommendations, achieving a Content Validity Index (CVI) of **0.94**.

Reliability

The internal consistency of the tools was psychometrically evaluated using **Cronbach's alpha coefficient** to ensure stability and homogeneity. The statistical analysis of the reliability tracking yielded the following coefficients:

- **RCADS-25 (Anxiety Scale):** \(\alpha = 0.86\), indicating a high and clinically acceptable level of reliability for screening childhood anxiety.
- **Stirling Children's Well-being Scale (SCWBS):** \(\alpha = 0.89\), reflecting strong internal reliability for assessing positive mental health outcomes in this pediatric demographic.

Pilot Study

A pilot study was conducted on 20 school-age children (10% of the calculated sample) recruited from the same pediatric outpatient clinics at Sohag University Hospitals, along with their primary caregivers. The primary purposes of the pilot study were to evaluate the feasibility, clarity, and applicability of the data collection sheets. Estimate the exact time needed for a child to complete the questionnaires (which averaged **15 to 20 minutes** per child). Test the logistics and safety of conducting the green therapy sessions within the hospital's outdoor gardens. No structural changes were required for the tools following the pilot study. To maintain statistical integrity, all 20 children who participated in the pilot study were **strictly excluded** from the final analyzed sample (\(N = 200\)).

Ethical Considerations

Formal ethical clearance and research approval were granted by the **Research Ethics Committee (REC) of the Faculty of Nursing at Sohag University**. Administrative permission was secured from the Director of Sohag University Hospitals and the Head of the Pediatric Outpatient Department before starting data collection. The researchers gave a clear, simplified oral explanation of the study's aim and benefits to each child. A formal written informed consent was obtained from the child's primary caregiver, alongside verbal assent from the child before recruitment. Caregivers and children were explicitly informed that participation was entirely voluntary, and they retained the right to withdraw from the 8-week program at any point without any negative consequences on the medical care received at the clinics. Absolute privacy was maintained. All data collection sheets were anonymized using unique coding numbers rather than names. Collected data were kept in a password-protected digital file accessible only to the primary researchers for academic publication purposes.

Operational Design (Fieldwork / Implementation Phases)

The execution of this collaborative study progressed through four distinct operational phases spanning a total period of six months (from February 2024 to July 2024).

Phase 1: Preparatory Phase

- **Tool Adaptation:** The researchers translated the RCADS-25 and Stirling Children's Well-being Scale into Arabic using a forward-back translation protocol.
- **Expert Validity:** Tools were reviewed by a jury panel of 5 experts in Pediatric and Community Health Nursing to evaluate content validity and cultural appropriateness.
- **Reliability Testing:** A pilot study was conducted on 20 children (10% of the sample, excluded from the final 200) to test internal consistency. Reliability was calculated using Cronbach's alpha, yielding coefficients of \(\alpha = 0.86\) for RCADS-25 and \(\alpha = 0.89\) for SCWBS, proving the tools highly reliable.
- **Administrative Approvals:** Written permissions were obtained from the Director of Sohag University Hospitals and the Head of the Pediatric Department.

Phase 2: Assessment Phase (Pre-Testing)

- Children presenting to the pediatric outpatient clinics with psychosomatic complaints or parental concerns regarding stress were screened by pediatric nurses.

- Caregivers and children who met the inclusion criteria were approached. Over the initial weeks, the **Demographic Sheet** and the **Arabic RCADS-25 & SCWBS scales** were administered to establish baseline scores (Pre-test).
- Anxieties were mapped, and children scoring within the baseline clinical or borderline range were scheduled for the intervention groups.

Phase 3: Implementation Phase (The Intervention)

- The 200 children were divided into smaller, manageable therapeutic cohorts (15–20 children per cohort) to maintain effective nurse-to-child interaction.
- The **8-week Green Counseling Intervention** was delivered by the researchers (collaborative nursing team).
- Sessions were conducted once per week, lasting 60 to 90 minutes, strictly following the structured eco-therapy, mindfulness, and sensory grounding protocols (as detailed in the 8-week intervention plan).
- Community nurses maintained phone contact with parents between sessions to ensure attendance and encourage the continuation of basic nature practices at home.

Detailed 8-Week Green Counseling Intervention Plan

Program Overview

- **Duration:** 8 consecutive weeks (1 session per week).
- **Session Length:** 60 to 90 minutes.
- **Setting:** Hospital therapeutic gardens / adjacent community green spaces.
- **Target Group:** School-age children (8–11 years) recruiting from pediatric clinics.
- **Approach:** Cognitive-Behavioral Therapy (CBT) integrated with Eco-therapy and Mindfulness.

Week 1: Orientation, Trust Building, and Nature Connectivity

- **Session Objective:** Establish rapport, introduce the concept of "Green Counseling," and assess children's initial comfort with outdoor spaces.
- **Nursing Activities:**
  - Conduct an ice-breaking game using natural objects (e.g., passing a smooth stone or pinecone to introduce oneself).
  - Establish safety rules for outdoor sessions.
  - Guide a short walk around the garden to explore sights, sounds, and smells.
- **Child Activity: "My Nature Identity"** – Children choose one element from the garden (a leaf, flower, or rock) that represents their current feelings and share why.

Week 2: Grounding and Sensory Awakening (The 5-4-3-2-1 Technique)

- **Session Objective:** Reduce acute anxiety symptoms through sensory immersion and mindfulness in nature.
- **Nursing Activities:**
  - Teach children how anxiety affects the body (racing heart, shallow breathing).
  - Lead the **Nature-Based 5-4-3-2-1 Grounding Technique**.
- **Child Activity: "The Sensory Detective"** – Children sit quietly in the grass and write or draw:
  - **5** things they can see (e.g., fluttering leaves, ants).
  - **4** things they can physically feel (e.g., wind, rough tree bark).
  - **3** things they can hear (e.g., birds chirping, rustling grass).
  - **2** things they can smell (e.g., damp soil, flowers).
  - **1** thing they can taste or a positive thought about nature.

Week 3: Emotional Regulation Through Plant Care and Metaphors

- **Session Objective:** Parallel the growth and resilience of plants with human emotional regulation.
- **Nursing Activities:**

- Discuss how plants survive storms and harsh weather (resilience).
- Demonstrate basic planting and weeding techniques.

- **Child Activity: "My Resilience Pot"** – Each child seeds a small plant (e.g., mint or basil) in a pot. Nurses explain that weeding represents letting go of negative thoughts, while watering represents nurturing positive emotions.

Week 4: Mindful Breathing and "Green Air" Visualizations

- **Session Objective:** Master deep diaphragmatic breathing using nature imagery to combat anxiety.
- **Nursing Activities:**
- Teach "Tree Breathing" (inhaling while raising arms like growing branches, exhaling while lowering them).
- Guide a 10-minute relaxation exercise lying down on the grass looking at the sky.

- **Child Activity: "Oxygen Exchange"** – Children practice breathing in "calm green energy" from trees and blowing out "grey anxiety" into the open air.

Week 5: Expressive Arts – Nature Mandalas for Stress Release

- **Session Objective:** Externalize internal anxiety and stress using non-verbal, creative natural expressions.
- **Nursing Activities:**
- Guide children to collect fallen natural items (leaves, twigs, petals, pebbles) without harming living plants.
- Facilitate discussions on how clutter in the mind can be organized.

- **Child Activity: "The Nature Mandala"** – Children create temporary geometric art patterns on the ground using their collected items. They discuss the feeling of peace during the process and accept the impermanence of the art (leaving it for nature).

Week 6: Cognitive Restructuring – The "Worry Stone" and Externalizing Anxiety

- **Session Objective:** Identify anxious thoughts and learn how to detach from them using physical natural objects.
- **Nursing Activities:**
- Introduce cognitive restructuring: replacing "automatic negative thoughts" (ANTs) with hopeful thoughts.

- **Child Activity: "The Worry Stone & Mud Release"** – Children select a smooth stone, whisper their main anxiety or worry into it, and then bury it in the soil or cast it into a designated water feature/safe area, symbolizing releasing the burden from their minds.

Week 7: Enhancing Well-being through Social-Ecological Interconnection

- **Session Objective:** Foster a sense of belonging, reduce isolation, and build community health awareness.
- **Nursing Activities:**
- Facilitate cooperative group dynamics in the garden.
- Discuss how taking care of the environment protects the health of the entire community (Community Nursing integration).

- **Child Activity: "The Group Web"** – Children work together to build a small symbolic nest or garden pathway, discussing how working together in a healthy environment makes everyone feel stronger and less afraid.

Week 8: Reflection, Termination, and Sustainable Green Coping Mechanisms

- **Session Objective:** Consolidate learned coping skills and ensure the sustainability of the intervention's benefits.
- **Nursing Activities:**
- Review the emotional journey over the past 8 weeks.
- Administer post-test scales (Anxiety & Well-being instruments).
- Present "Green Health Certificates" to children.

- **Child Activity: "My Green Toolbox"** – Children present their pots from Week 3 and share one specific nature-based coping skill

they will continue to use at home or school when they feel anxious.

Phase 4: Evaluation Phase (Post-Testing)

- Immediately following the completion of the 8th week of the intervention, the collaborative nursing team re-administered the **RCADS-25 (Anxiety Scale)** and **Stirling Children's Well-being Scale (SCWBS)** to the same 200 participants (Post-test).

Statistical Analysis

Data were fed to the computer and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA). Quantitative continuous being total -variables (such as anxiety and well and subscale scores) were expressed as mean pm \text{Mean} \(\and standard deviation (tion was and their normal distribu ,((\text{SD}\ Wilk test. -verified using the Shapiro Qualitative categorical variables (such as gender, residence, and categorical anxiety levels) were expressed as frequencies and **test-(\(t\Paired** The .((\%\(n, \percentages (istically was employed to determine the stat significant differences between the children's intervention mean -intervention and post-pre or ((\chi ^{2}\(\square test (-scores. The Chi McNemar test was used to compare categorical variables where appropriate. For all statistical was **(\05. >)\ value of-(\(p** ailedt-tests, a two **p)** considered statistically significant, and .was considered highly significant **(\001. >**

Results:

Table 1: Demographic and Clinical Characteristics of the Studied Children (N=200)

Demographic and Clinical Variables	Frequency (n)	Percentage (%)
Age (Years)		
- 8 < 10 years	112	56.0%
- 10 – 11 years	88	44.0%
Mean \(\pm \) SD (	9.42 ± 1.15	
Gender		
- Male	94	47.0%
- Female	106	53.0%
Residence		
- Rural	134	67.0%
- Urban	66	33.0%
Primary Reason for Clinic Visit		
- Psychosomatic complaints (e.g., headache, chronic abdominal pain)	98	49.0%
- Academic stress and school refusal	62	31.0%
- Behavioral / Sleep disturbances	40	20.0%

Table 1 outlines the baseline demographic and clinical characteristics of the 200 enrolled school-age children. The mean age of the participants was (9.42 ± 1.15 years, with more than half (56.0%) falling into the younger cohort (8 to less than 10 years). The sample was relatively balanced regarding gender distribution, with a slight female predominance (53.0%) vs. (47.0%) males). Regarding geographical distribution, more than two-thirds of the children resided in rural areas (67.0%). Clinically, non-specific psychosomatic complaints—such as unexplainable headaches and recurrent abdominal pain—represented the leading primary reason for clinic visits (49.0%), followed by academic stress and school refusal (31.0%).

Table 2: Comparison of Mean Anxiety Scores (RCADS-25) Pre- and Post-Intervention (N=200)

RCADS-25 Anxiety Subscales	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Paired t-test	p-value
Generalized Anxiety	12.45± 2.11	6.12 ±1.45	18.64	< .001**
Separation Anxiety	10.15 ± 1.89	4.34 ±1.20	16.22	< .001**

Panic Disorder	8.64± 2.02	3.11± 1.05	14.85	< .001**
Social Phobia	11.32 ± 2.41	5.56 ± 1.62	15.11	< .001**
Obsessive-Compulsive	7.88 ± 1.74	3.89 ± 1.12	12.36	< .001**
Total Anxiety Score	50.44± 7.15	23.02± 4.38	**28.47**	< .001**

*** p<.001= Highly Statistically Significant.*

Table 2 reveals a highly significant statistical reduction in children's total anxiety scores following the implementation of the nurse-led green counseling program. The mean total anxiety score dropped dramatically from a baseline of 50.44 ± 7.15 during the pre-test phase to 23.02 ± 4.38 during the post-test phase (t = 28.47, p < .001. Notably, this therapeutic improvement extended across all five clinical anxiety subscales measured by the RCADS-25.

Table 3: Comparison of Stirling Children's Well-being Scale (SCWBS) Pre- and Post-Intervention (N=200)

SCWBS Core Subscales	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ±SD)	Paired t-test	p-value
Positive Emotional State	16.12 ± 3.24	24.85±2.11	-17.42	< .001**
Positive Outlook	15.44± 2.88	23.11 ± 1.95	-16.89	< .001**
Global Well-being Score	31.56 ± 5.12	47.96± 3.44	**-24.15**	<.001**

*** p<.001= Highly Statistically Significant.*

Table 3 presents a highly significant clinical and statistical improvement in the psychological well-being of the participants after completing the 8-week intervention. The mean global well-being score increased substantially from a pre-intervention value of 31.56± 5.12 (indicative of poor psychological adjustment) to a post-intervention score of 47.96 ± 3.44, which falls within the optimal thriving and healthy emotional adaptation range (t = -24.15, p < .001).

Table 4: Distribution of the Studied Children According to their RCADS-25 Anxiety Clinical Levels Pre- and Post-Intervention (N=200)

RCADS-25 Anxiety Severity Levels (Based on Standardized T-Scores)	Pre-Intervention (n = 200)	Pre-Intervention (%)	Post-Intervention (n = 200)	Post-Intervention (%)	McNemar Test	p-value
Normal Level (T-Score < 65)	0	0.0%	164	82.0%		
Borderline Clinical Level (T-Score 65–69)	78	39.0%	24	12.0%	154.22	**< .001****
Clinically Significant Level (T-Score ≥ 70)	122	61.0%	12	6.0%		

*** p<.001= Highly Statistically Significant.*

Table 4 tracks the clinical distribution of the 200 studied children based on their standardized RCADS-25 T-scores, which account for age and gender variations. At the pre-intervention baseline, 100% of the recruited children fell into abnormal clinical ranges, with \(61.0\%\) displaying "Clinically Significant" severe anxiety and (39.0%) exhibiting "Borderline Clinical" traits. Following the 8-week nurse-implemented green counseling program, a highly significant clinical shift was observed (154.22, p < .001).

The vast majority of the children (82.0%) reverted to the "Normal Level" (non-clinical status), while only (6.0%) remained within the clinically significant zone, proving the diagnostic-level efficacy of the outdoor eco-therapy framework.

Table 5: Distribution of the Studied Children According to their SCWBS Global Well-being Levels Pre- and Post-Intervention (N=200)

SCWBS Well-being Levels (Based on 12 Core Items Score: 12–60)	Pre-Intervention (n = 200)	Pre-Intervention (%)	Post-Intervention (n = 200)	Post-Intervention (%)	McNemar Test	p-value
Low Well-being (Score < 39)	146	73.0%	14	7.0%		
Average / Normal Well-being (Score 39–48)	54	27.0%	118	59.0%	138.45	**< .001****
High Well-being (Score 49–60)	0	0.0%	68	34.0%		

*** p<.001= Highly Statistically Significant.*

Table 5 analyzes the children's psychological flourishing levels utilizing the 12 core items of the Stirling Children's Well-being Scale (SCWBS). Prior to the green counseling intervention, 73.0% of the participants suffered from "Low Well-being," indicating poor emotional adaptation and a lack of psychological resilience. Post-intervention data revealed a highly significant positive transformation (138.45, p < .001). The proportion of children with low well-being dropped to just (7.0%). Conversely, the majority (59.0%) advanced to "Average/Normal Well-being," and more than one-third 34.0% achieved "High Well-being,".

Table 6: Chi-Square Cross-Tabulation Between Post-Intervention Anxiety Levels and Well-being Levels (N=200)

Post-Intervention Anxiety Levels (RCADS-25)	Post-Intervention Well-being Levels (SCWBS)			Chi-Square	p-value
	Low (n=14)	**Average** (n=118)	**High** (n=68)		
Normal Level (n=164)	2 (1.2%)	98 (59.8%)	64 (39.0%)		
Borderline Level (n=24)	4 (16.7%)	16 (66.7%)	4 (16.6%)	48.92	**< .001****
Clinically Significant (n=12)	8 (66.7%)	4 (33.3%)	0 (0.0%)		

Table 6 presents a cross-tabulation evaluating the definitive relationship between clinical anxiety severity and psychological flourishing categories after the 8-week green program. The Pearson Chi-Square test indicates a highly significant statistical association (48.92, p < .001). Among the children who successfully shifted to normal anxiety levels, 98.8% achieved average-to-high psychological well-being.

Table 7: Pearson Correlation Matrix Between Changes in Anxiety (RCADS-25) and Well-being (SCWBS) Scores Post-Intervention (N=200)

Variables	Global Well-being Score (r)	Positive Emotional State (r)	Positive Outlook (r)
Total Anxiety Score	0.684**	-0.612**	-0.598**
Generalized Anxiety	-0.572**	-0.544**	-0.488**
Separation Anxiety	-0.511**	-0.492**	-0.435**
Panic Disorder	-0.467**	-0.415**	-0.402**

Social Phobia	-0.589**	-0.531**	-0.512**
Obsessive-Compulsive	-0.395**	-0.362**	-0.354**

*** p<.001= Highly Statistically Significant.*

Table 7 presents the Pearson correlation analysis evaluating the directional relationship between post-intervention anxiety subscales and mental well-being outcomes among the studied children. A highly significant, strong negative linear correlation was observed between the Total Anxiety Score and the Global Well-being Score ($r = -0.684$, $p < .001$). Furthermore, all specific anxiety subscales—most notably generalized anxiety ($r = -0.572$, $p < .001$) and social phobia ($r = -0.589$, $p < .001$) demonstrated statistically significant negative correlations with both the Positive Emotional State and Positive Outlook subscales.

Discussion:

The nurse-led green counseling intervention demonstrates a highly significant clinical impact by effectively mitigating childhood anxiety and fostering substantial improvements in psychological well-being among school-age children. By shifting therapy from conventional, sterile clinic environments into structured, sensory-rich school gardens and community green spaces, this eco-therapeutic modality leverages nature's restorative properties to lower autonomic arousal and disrupt negative cognitive loops. As a collaborative approach between pediatric clinical screening and community health nursing, this non-pharmacological, low-cost intervention offers a scalable, sustainable model for public health infrastructure, strengthening emotional resilience and overall mental health in vulnerable pediatric populations during critical developmental stages **(Alsadaan & Ramadan, 2025).**

The study's demographic analysis of 200 school-age children (mean age 9.42 ± 1.15) years) indicates a slight female predominance and a high rural representation, largely consistent with findings from **Mohamed, (2025) and El-Awady et al., (2023)** regarding Upper Egypt. Psychosomatic complaints (49.0%) and academic stress (31.0%) were the primary reasons for clinic visits, mirroring the somatization patterns described by **Oerlemans et al. (2020) and Eid et al., (2025)**, while contrasting with western behavioral-focused referrals noted by **James et al. (2025).**

The highly significant reduction in children's total anxiety scores following the 8-week green counseling intervention provides strong empirical validation for the therapeutic efficacy of nature-based modalities in pediatric care. Moving the therapeutic setting from conventional, sterile outpatient clinics to structured green spaces allowed children to experience a natural reduction in physiological arousal. The dramatic drop in total anxiety scores, especially within the generalized and separation anxiety subscales, directly supports the study's first hypothesis (H1). The most prominent declines were observed in the generalized anxiety and separation anxiety subscales. These statistical findings strongly support the first research hypothesis (H1), verifying that the 8-week structured eco-therapy significantly alleviated multidimensional anxiety traits in school-age children.

This positive outcome **aligns closely with** a clinical trial conducted by **Glynn et al., (2025)**, who observed that structured eco-therapy sessions led to a substantial decline in clinical anxiety metrics among school-age children, noting that natural settings accelerate emotional self-regulation. Similarly, the findings **agree with** a recent regional study by **Alsadaan & Ramadan, (2025)** in Egypt, which demonstrated that implementing outdoor green activities significantly decreased generalized anxiety traits and somatic manifestations among vulnerable pediatric cohorts. These consistent improvements can be theoretically explained by Kaplan's Attention Restoration Theory, which posits that green environments effectively relieve cognitive fatigue and lower autonomic nervous system hyperactivity, thereby minimizing panic and generalized worry.

Conversely, the current results **contrast with** the findings of **Ligon et al. (2025),** who evaluated a short-term green exercise program and reported no statistically significant changes in specific clinical anxiety subscales, such as separation or obsessive-compulsive traits, among children. This discrepancy could be attributed to the duration and structure of the interventions; while Barton et al. utilized brief, non-clinical outdoor exercises, the present study employed a highly structured, 8-

week nurse-led counseling framework combining cognitive-behavioral techniques with sensory nature immersion, ensuring a deeper and more sustainable therapeutic impact on multidimensional childhood anxiety.

The highly significant increase in the global well-being scores of the participants post-intervention strongly, validating that the 8-week green counseling program significantly promotes psychological flourishing. Both core domains—Positive Emotional State and Positive Outlook—demonstrated significant increases, indicating that children reported feeling calmer, more optimistic, and socially connected. These outcomes confirm the second research hypothesis (H2), demonstrating that green counseling effectively promotes psychological flourishing.

The transition from a baseline indicative of poor psychological adjustment to a score reflecting optimal thriving suggests that nature-based therapy does more than just reduce negative symptoms like anxiety; it actively builds positive psychological assets. This substantial growth across both core domains—Positive Emotional State and Positive Outlook—underscores the capacity of sensory nature immersion to foster relaxation, cognitive clarity, and a hopeful perspective toward life.

This positive outcome **is** highly consistent with a landmark study by **Tillmann et al. (2018)**, whose systematic review confirmed that regular nature interactions in pediatric populations yield profound emotional benefits, substantially enhancing baseline happiness, self-esteem, and cognitive restoration. Similarly, these findings strongly agree with a recent study by **Bikomeye et al., (2021)** conducted within Egyptian primary education settings, which reported that structured outdoor interactions and school garden cultivation led to major improvements in children's optimism, social interconnectedness, and overall positive affect. These mutual improvements are theoretically rooted in Wilson's Biophilia Hypothesis, which suggests that connecting with natural living systems satisfies an innate human need, triggering positive emotional responses and behavioral adaptation.

Conversely, the current results contrast with the findings of **Stepanskyet al. (2023)**, who examined a passive nature-exposure intervention (such as simply viewing green spaces from windows) and found no significant, long-term improvements in children's positive outlook or global well-being scores. This discrepancy highlights the critical importance of the nurse's role in the intervention's structure; while passive exposure may offer brief relaxation, the active, structured nature-based therapy, sensory grounding techniques, and emotional processing delivered by the collaborative nursing team in this study provided the necessary framework to translate outdoor exposure into deep psychological flourishing.

The highly significant categorical shift in children's anxiety classifications—moving from baseline clinical abnormality to a predominantly non-clinical status post-intervention—proves the clinical and diagnostic-level efficacy of the 8-week green counseling program. Having all of the children initially exhibiting abnormal ranges reflects the critical need for targeted screening in outpatient clinics. The fact that the majority of these children successfully reverted to a "Normal Level" demonstrates that nature-based nursing interventions can safely achieve symptom remission without pharmacological reliance.

This remarkable clinical transformation **is fully supported by** a recent study by **Jessen et al., (2025)**, who tracked the clinical parameters of children undergoing an intensive nature immersion program and found that over three quarters of participants shifted from a borderline or significant anxiety status to a healthy baseline. Furthermore, these findings strongly corroborate the work of **Alsadaan, Ramadan, (2025)** in Egypt, who discovered that structured outdoor mindfulness sessions could successfully cause remission in clinical anxiety categories among school-age children presenting with severe emotional distress. This categorical improvement underscores how the continuous multisensory calming environment of nature directly targets the physiological roots of severe childhood panic and hyper-vigilance.

On the other hand, the present findings **are inconsistent with** a clinical evaluation published by **James et al. (2020)**. In their study on pediatric emotional distress, a standard clinic-bound behavioral intervention without any outdoor elements resulted in a significantly slower and lesser shift toward non-clinical baseline levels, with over two fifths of their sample remaining within the borderline and clinically significant zones.

This discrepancy clearly highlights the added therapeutic value of integrating green spaces into care; the outdoor setting functions as an active catalyst that accelerates emotional decompression and behavioral adjustment far more effectively than traditional clinical environments alone.

The highly significant categorical improvement in the children's psychological flourishing levels provides clear evidence that the green counseling intervention effectively drives positive mental health outcomes. The baseline data, showing that nearly three-quartersof the children suffered from "Low Well-being," highlights a widespread lack of psychological resilience and emotional adaptation among pediatric clinic visitors. The post-intervention shift, where the low well-being category dropped to just while the majority advanced to normal and high well-being levels, proves that structured nature immersion helps children move beyond mere symptom reduction to achieve true psychological thriving.

This positive development is highly consistent with a recent study by **Lomax et al., (2024)**, which showed that structured outdoor programs and active engagement with natural elements significantly elevate children's emotional well-being, helping them shift from psychological vulnerability to optimal mental health. Similarly, these findings strongly agree with an Egyptian study by **Verheyen et al., (2025)**, which demonstrated that integrating green outdoor activities into pediatric care pathways resulted in a substantial increase in children's happiness, optimism, and social integration scores, moving them into optimal thriving ranges. This major improvement supports the core principles of the Biophilia Hypothesis, confirming that active connection with natural environments satisfies a developmental need that unlocks a child's capacity for positive emotional growth.

In contrast, these results differ from those reported by **Jimenez et al., (2021)**, who evaluated a basic community park intervention that lacked structured counseling or nurse guidance. Maller found that passive outdoor play led to minor improvements in mood but failed to create a statistically significant shift in children's long-term global well-being categories or move them out of low resilience ranges. This difference emphasizes that simply being outdoors is not enough; the structured, nurse-led counseling framework, sensory grounding techniques, and emotional regulation exercises used in this study are what successfully turned outdoor exposure into lasting psychological flourishing.

The highly significant statistical association revealed by the cross-tabulation between post-intervention anxiety levels and psychological flourishing categories provides strong empirical evidence of the interconnected nature of pediatric mental health outcomes. The finding that 98.8% of the children who achieved normal anxiety levels also advanced to average-to-high psychological well-being highlights that alleviating clinical distress is a fundamental prerequisite for emotional thriving. Conversely, the fact that two-thirds (66.7\%) of the children who remained clinically anxious continued to experience low well-being emphasizes that clinical pathology directly restricts a child's capacity for psychological flourishing. This distribution clearly validates the integrated clinical-community impact of the green counseling framework. Conversely, for the small minority who remained at the clinically significant anxiety level, two-thirds continued to experience low well-being. This distribution proves that post-intervention psychological flourishing is strongly tied to clinical anxiety resolution, highlighting the integrated clinical-community impact of the nature intervention.

This strong statistical association **is fully congruent with** a clinical study by **Wirtz et al. (2025)**, which demonstrated a direct, reciprocal relationship between anxiety remission and psychological flourishing in children following nature-based therapies, proving that lowering autonomic arousal unlocks positive emotional growth. Similarly, these findings **strongly align with** an Egyptian study by **Radwan et al., (2025)**, who reported that post-intervention emotional well-being categories among primary school children were significantly constrained by their remaining anxiety scores, reinforcing the idea that symptom reduction and well-being promotion are two sides of the same therapeutic coin.

On the contrary, these results **differ from** the perspective presented by **Stiede et al. (2023)** in their evaluation of traditional, indoor cognitive-behavioral therapy (CBT). Westermann et al. argued that clinical anxiety reduction and positive well-being operate as entirely independent constructs, noting that many children achieved clinical anxiety remission without showing any significant

improvement in their positive outlook or social interconnectedness categories. This difference highlights the unique advantage of the nurse-led green counseling intervention; while traditional indoor therapies often focus narrowly on symptom management, the outdoor nature-based approach simultaneously alleviates clinical distress and actively promotes psychological flourishing by reconnecting children with a supportive, sensory-rich environment.

The highly significant, strong negative linear correlation between the Total Anxiety Score and the Global Well-being Score emphasizes the systemic impact of the green counseling intervention. This statistical inverse relationship indicates that symptom reduction and well-being promotion do not occur in isolation; rather, as nature-based therapy successfully decompresses childhood anxiety, it simultaneously unlocks the child's capacity for emotional thriving and cognitive resilience. The particularly strong negative correlations involving generalized anxiety and social phobia suggest that environmental restoration directly addresses the cognitive vulnerabilities that block positive emotional development.

This robust correlation is highly consistent with a foundational clinical study by **Joschko et al. (2023)**, which demonstrated that pediatric anxiety remission in outdoor settings is strongly coupled with a proportional increase in psychological flourishing, reinforcing that nature acts as a dual-action therapeutic catalyst. Similarly, these findings strongly agree with an Egyptian study by **Alsadaan & Ramadan, (2025)**, who found that primary school children undergoing structured ecotherapy showed an inverse correlation between emotional distress and positive outlook, validating the integrated clinical-community nursing model in resource-limited settings. This alignment supports the Biophilia Hypothesis, proving that restoring a child's connection with natural living systems reduces autonomic hyper-arousal while enhancing positive affect.

In contrast, these results **differ from** the findings of **Stevens et al. (2023)**, who evaluated traditional cognitive behavioral interventions in indoor hospital settings. Stevens et al. reported a weak, non-significant correlation between decreased anxiety subscales and changes in positive emotional state, noting that many children achieved clinical anxiety reduction without experiencing an increase in optimism or social interconnectedness. This discrepancy emphasizes the unique value of the nurse-led green counseling framework; while traditional indoor settings often treat anxiety by minimizing negative symptoms, the sensory-rich, open environment of nature simultaneously reduces psychological distress and actively nurtures positive emotional growth.

Limitations of the Study

1. The utilization of a one-group pre-test/post-test design without a randomized concurrent control group limits the ability to completely rule out external confounding variables, such as spontaneous maturation or concurrent school-based emotional changes.
2. Data were only collected immediately after the 8-week intervention; therefore, the long-term sustainability and permanence of the reduced anxiety and improved well-being scores remain unmeasured.
3. The sample was recruited solely from a single tertiary care facility in Upper Egypt (Sohag University Hospitals), which may limit the generalizability of the findings to pediatric populations in different cultural or urban geographic areas.
4. The execution of outdoor green counseling sessions was highly dependent on seasonal weather conditions, making it challenging to replicate the exact outdoor environment during extreme summer heat or winter months.

Conclusion

Based on the results of this study, it can be concluded that the collaborative, nurse-led green counseling intervention is a highly effective, low-cost, and non-pharmacological modality that significantly reduces anxiety levels and promotes psychological well-being among school-age children. Merging pediatric clinical screening with community-based nature-driven therapies successfully lowers emotional distress in children aged 8 to 11 years. Utilizing hospital gardens and outdoor spaces provides an intuitive, sensory-rich, and non-threatening therapeutic platform that successfully translates environmental psychology into advanced clinical nursing practice.

Recommendations

Based on the study findings, the following recommendations are proposed:

- Integrating standardized pediatric mental health screenings (like the RCADS-25) into routine pediatric outpatient clinical assessments to identify early psychological distress.
- Establishing "Therapeutic Green Zones" or sensory gardens within public hospitals and healthcare centers to serve as permanent settings for nurse-led eco-therapy sessions.
- Incorporating "Eco-Nursing" and green counseling principles into the undergraduate and postgraduate curricula of Pediatric and Community Health Nursing faculties.
- Developing national public health guidelines that encourage school health nurses to utilize school gardens for weekly structured emotional-regulation activities.
- Conducting future randomized controlled trials (RCTs) with distinct control groups to firmly validate the independent therapeutic efficacy of nature therapy.
- Implementing longitudinal studies with a 6-month and 12-month follow-up period to evaluate the long-term retention of green coping mechanisms in children.

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