

The effect of mindful breathing on anxiety and emotional well-being among community-dwelling adults

Pengaruh Mindful Breathing Terhadap Tingkat Kecemasan dan Kesejahteraan Emosional Pada Dewasa Yang Tinggal di Komunitas

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ABSTRACT

Background: Anxiety is a maladaptive response commonly found in urban communities and can diminish emotional well-being. The rising prevalence of mental health issues necessitates simple yet effective non-pharmacological interventions.

Objective: This study aims to determine the effect of a single session of mindful breathing intervention on anxiety levels and emotional well-being among community-dwelling adults in Padasuka Village, Cimahi City, Indonesia.

Methods: This study employed a pre-experimental design with a one-group pretest-posttest approach conducted from February to March 2026. The sample consisted of 40 respondents aged 22–57 years, selected through purposive sampling. The mindful breathing intervention was conducted for 20 minutes. Anxiety levels were measured using the GAD-7 instrument, and emotional well-being was assessed using the WHO-5. Data were analyzed using the Wilcoxon Signed Rank Test and Effect Size calculation.

Results: The Wilcoxon test showed a significant decrease in anxiety scores ($p < 0.001$) from a mean of 9.35 to 3.43, with all respondents (100%) showing a decrease. Emotional well-being increased significantly ($p < 0.001$) from 68.40 to 89.70, with 92.5% of respondents showing improvement. The effect sizes were 1.98 for anxiety and 1.43 for emotional well-being.

Conclusion: A single session of mindful breathing was associated with changes in anxiety scores and emotional well-being among community-dwelling adults. These findings provide preliminary evidence of potential benefit; however, the one-group pretest-posttest design without a control group does not allow causal conclusions regarding intervention effectiveness.

Keywords: adult, anxiety, emotional well-being, community health nursing, health cadres, mindful breathing

ABSTRAK

Latar Belakang: Kecemasan merupakan respon maladaptif yang sering dijumpai di masyarakat perkotaan dan dapat menurunkan kesejahteraan emosional. Prevalensi masalah kesehatan mental yang terus meningkat memerlukan intervensi non-farmakologis yang sederhana namun efektif.

Tujuan: Penelitian ini bertujuan untuk mengetahui pengaruh intervensi mindful breathing satu sesi terhadap tingkat kecemasan dan kesejahteraan emosional pada dewasa yang tinggal di komunitas di Kelurahan Padasuka, Kota Cimahi, Indonesia.

Metode: Penelitian ini menggunakan desain pre-eksperimental dengan rancangan *one-group pretest-posttest* yang dilaksanakan pada Februari hingga Maret 2026. Sampel berjumlah 40

responden usia 22–57 tahun yang dipilih menggunakan teknik purposive sampling. Intervensi *mindful breathing* dilakukan selama 20 menit. Tingkat kecemasan diukur menggunakan instrumen GAD-7 dan kesejahteraan emosional menggunakan WHO-5. Data dianalisis menggunakan uji *Wilcoxon Signed Rank Test* dan penghitungan *Effect Size*.

Hasil: Hasil uji Wilcoxon menunjukkan penurunan signifikan pada skor kecemasan ($p < 0,001$) dari rata-rata 9,35 menjadi 3,43, dengan seluruh responden (100%) mengalami penurunan. Kesejahteraan emosional meningkat signifikan ($p < 0,001$) dari rata-rata skor 68,40 menjadi 89,70, dengan 92,5% responden mengalami peningkatan. Analisis effect size menunjukkan nilai sebesar 1,98 untuk kecemasan dan 1,43 untuk kesejahteraan emosional.

Kesimpulan: Satu sesi *mindful breathing* dikaitkan dengan perubahan skor kecemasan dan kesejahteraan emosional pada dewasa yang tinggal di komunitas. Temuan ini memberikan bukti awal mengenai potensi manfaat *mindful breathing*. Namun, desain one-group pretest-posttest tanpa kelompok kontrol tidak memungkinkan penarikan kesimpulan kausal mengenai efektivitas intervensi.

Kata kunci: dewasa, kecemasan, kesejahteraan emosional, keperawatan kesehatan komunitas, kader kesehatan, *mindful breathing*

INTRODUCTION

Anxiety is one of the most common psychological disorders experienced by adults, especially in the modern era characterized by career development, family formation, and economic independence achievement. The World Health Organization (WHO) states that approximately 4.4% of the global population lives with anxiety disorders, meaning around 359 million people experience anxiety globally.¹ Individuals with high anxiety tend to experience sleep disturbances, decreased concentration, and difficulty in building social relationships, thus reducing quality of life.²

In Indonesia, the trend of anxiety is also increasing. Based on the 2018 Riskesdas (Basic Health Research) data, the prevalence of emotional mental disorders in the population aged ≥ 15 years reached 9.8%, with the majority showing anxiety symptoms.³ Data from the Indonesian Ministry of Health (2023) reveals that anxiety is more often experienced by the productive age group due to work pressure and post-COVID-19 pandemic social instability.⁴ In West Java, about 7.5% of the adult population experiences mild to moderate anxiety symptoms.⁵

Emotional well-being is an important component of mental health, which includes the individual's ability to feel positive emotions, manage negative emotions, maintain healthy social relationships, and experience meaning and life satisfaction.⁶ However, various studies show that the emotional well-being of adults has declined in recent years. Gondek et al. found that adults, especially those aged 30-55 years, tend to report decreased life satisfaction, increased emotional stress, and emotional instability due to work, financial, and family pressures.⁷

Nurses in the context of mental health nursing have an important role in helping individuals manage anxiety and improve emotional well-being through promotive, preventive, curative, and rehabilitative approaches.⁸ Various non-pharmacological interventions such as deep breathing relaxation, cognitive behavioral therapy, music therapy, and counseling have been used, but their implementation often requires longer time, specific expert personnel, or is not always easy to apply independently by clients.⁹

One effective non-pharmacological approach is mindfulness therapy. Kabat-Zinn explains that mindfulness is awareness that arises by paying attention to the present moment without judgment. Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) have been proven to help reduce anxiety and improve emotion regulation.^{10,11} Lee & Chen found that an 8-week mindfulness program reduced anxiety by up

to 35% in the adult population.¹² In Indonesia, Hasanah et al. showed that 4 weeks of mindfulness practice improved emotional well-being.¹³

While multisession mindfulness programs (e.g., 4–8 weeks MBSR/MBCT) have demonstrated efficacy, they often pose significant barriers for community populations, including time commitment, cost, limited accessibility, and high dropout rates. In contrast, a single-session mindful breathing intervention offers a pragmatic alternative: it is low-cost, time-efficient, can be delivered by trained cadres, and requires no specialized facilities. Research on brief, single-session mindfulness interventions has shown promising acute effects on anxiety, stress, and emotional regulation.^{14,15} However, most of these studies have been conducted in laboratory or clinical settings, with limited evidence in community-dwelling populations, particularly among housewives in urban areas. This gap underscores the need for a simple, scalable intervention that can be integrated into existing community health programs.

Research on mindfulness therapy in Indonesia is still limited to students or clinical patients. Community-based studies on general adults have not been widely conducted. This study focuses on one mindfulness technique, namely mindful breathing, which was chosen because it is the simplest technique, easy for mental health nurses to teach, and can be done independently by the community. Unlike comprehensive mindfulness programs that require multiple sessions and long durations, this study assessed the effectiveness of a single session of mindful breathing intervention on changes in anxiety levels and emotional well-being before and after the intervention. This approach is relevant to the context of community mental health nursing that has time and resource limitations.

METHODS

Study design

This study used a pre-experimental design with a one-group pretest-posttest approach. This design aims to assess the effect of an intervention by comparing respondents' conditions before and after treatment in the same group, without involving a control group.^{14,24} The study was conducted from February to March 2026 in Padasuka Village, Cimahi City, West Java, Indonesia.

The population in this study was all adults (aged 18–59 years) living in Padasuka Village, Central Cimahi District, Cimahi City, with 1,023 productive age residents based on ILP Posyandu RW 09 data (January 2025). The sampling technique used was purposive sampling, which is selecting samples by considering certain characteristics that match the research objectives. The sample size was calculated using power analysis, with the parameters $\alpha = 0.05$ (two-tailed), power = 0.80, effect size $d_z = 0.50$, resulting in a minimum sample of 32 respondents. Considering a 10–15% dropout rate, the final sample was 40 respondents.

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Inclusion criteria were: (1) age 18–59 years, (2) residing in Padasuka Village, (3) having mild to moderate anxiety levels (GAD-7 score 5–14), (4) willing to be a respondent by signing informed consent, and (5) able to follow the entire single session of mindful breathing intervention. Exclusion criteria were: (1) having severe anxiety or other severe mental disorders, (2) currently undergoing intensive psychological or pharmacological therapy, (3) having cognitive or communication impairments, (4) having acute medical conditions or respiratory disorders, and (5) not completing the entire research protocol.

Variables of the study

The independent variable was *mindful breathing* intervention (one session, 20 minutes). The dependent variables were anxiety level measured using GAD-7 and emotional well-being measured using WHO-5 Well-Being Index.

Measurement and instruments

Anxiety levels were measured using the Indonesian version of GAD-7 which has been tested for validity and reliability in the Indonesian population by Budikayanti et al. with a Cronbach's Alpha value of 0.867.¹⁶ The GAD-7 consists of 7 items with a 4-point Likert scale (0–3), measuring the frequency of anxiety symptoms over the past two weeks. The total score ranges from 0 to 21, with categories: 0–4 (no anxiety), 5–9 (mild anxiety), 10–14 (moderate anxiety), and 15–21 (severe anxiety).¹⁵ Emotional well-being was assessed using the WHO-5 Well-Being Index. The WHO-5 consists of 5 positively worded items rated on a 6-point Likert scale ranging from 0 (At no time) to 5 (All of the time). The raw total score ranges from 0 to 25. To facilitate clinical interpretation, the raw score was transformed into a percentage scale (0–100) by multiplying the raw score by 4 (Raw Score $\times$ 4). A score of 0 represents the worst possible well-being, and 100 represents the best possible well-being. Based on WHO guidelines, a percentage score of ≤ 50 indicates poor well-being, while a score > 50 indicates good well-being.¹⁶

Data collection procedure

Data collection was carried out twice, namely before the intervention (pretest) and after the intervention (posttest) on the same group of respondents. All 40 respondents were divided into 7 small groups of 5–6 people to facilitate supervision and ensure effective guidance. Each group received the intervention on different days and sessions according to a predetermined schedule.

Pretest: Before the intervention, respondents completed the GAD-7 and WHO-5 questionnaires through a self-administered method with direct supervision by the researcher to ensure understanding of each item and completeness of data. The researcher provided a brief explanation of the instructions for filling out the questionnaires and was available to answer questions.

Intervention: The *mindful breathing* intervention was conducted for approximately 20 minutes in a single session, guided directly by the researcher. The intervention consisted of: (1) a brief explanation of the concept of *mindful breathing* and the purpose of the exercise, (2) *mindful breathing* practice with focus on inhalation and exhalation in a non-judgmental manner (inhale 4 seconds hold 2 seconds exhale 6 seconds), and (3) a brief reflection on the respondent's experience after the practice. Respondents sat on mats in a cross-legged position, forming a circle facing the researcher to ensure clear instruction and a supportive group atmosphere. The head of the neighborhood (RW) and local health cadres were also involved to assist in guiding respondents, especially in correcting sitting positions and breathing techniques that were still incorrect at the beginning of the exercise.^{17,23}

Posttest: Immediately after the intervention, respondents completed the same GAD-7 and WHO-5 questionnaires with the same supervision procedure as the pretest. The posttest was conducted on the same day and session to capture the acute effects of the intervention.

Ethical Considerations

This study obtained ethical approval from the Health Research Ethics Committee of the Faculty of Health Sciences and Technology, Universitas Jenderal Achmad Yani (Number: 026/KEPK/FITkes-Unjani/III/2026). The research process adhered to the principles of respect for persons, beneficence, non-maleficence, and justice. Informed consent was obtained from all respondents prior to data collection.

Data analysis

Data analysis was performed using SPSS version 25 for Windows. Univariate analysis was conducted to describe respondent characteristics using frequency distributions and percentages for categorical data, and means, standard deviations, minimum maximum values, and 95% confidence intervals for continuous data.

Before bivariate analysis, a normality test was conducted using the Shapiro-Wilk test (because $n < 50$). The results showed that anxiety and emotional well-being data were not normally distributed ($p < 0.05$). Therefore, the bivariate analysis used the non-parametric Wilcoxon Signed Rank Test to determine differences in scores before and after the intervention.

To assess the practical significance (clinical relevance) of the intervention, the effect size was calculated using Cohen's d formula for paired samples. Although Cohen's d is typically used for parametric data, it is widely accepted as a standardized measure of effect magnitude for pre-post intervention studies, including those using non-parametric tests, to allow for comparison across studies. The use of Cohen's d in this context is justified because it provides a metric of the magnitude of change that is independent of sample size, complementing the p -value from the Wilcoxon test. The interpretation of Cohen's d followed Cohen's criteria: 0.2 = small effect, 0.5 = medium effect, and >0.8 = large effect.¹⁸ All statistical tests were two-tailed with a significance level set at $\alpha = 0.05$.

RESULT

Respondent characteristics

The respondents in this study were 40 adults aged 22-57 years residing in Padasuka Village, Cimahi City. Table 1 presents the distribution of respondent characteristics.

Table 1. Distribution of Respondent Characteristics (n=40)

Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	22-35	22	55.0
	36-57	18	45.0
	Mean $\pm$ SD	35.48 $\pm$ 11.531	
	Min-Max	22-57	
Gender	Male	1	2.5
	Female	39	97.5
Education	Elementary school	3	7.5
	Junior high school	8	20.0
	Senior high school	22	55.0
	Bachelor's degree	7	17.5
Employment status	Housewife	38	95.0
	Private employee	1	2.5
	Civil servant	1	2.5
Marital status	Unmarried	1	2.5
	Married	37	92.5
	Widow	2	5.0

The majority of respondents were in the early adult age group (22–35 years) and were female (97.5%). Most respondents were housewives (95%) and married (92.5%).

Anxiety Levels Before and After Intervention

Table 2. Distribution of Anxiety Scores Before and After Intervention (n=40)

Variable	Measurement	Mean	SD	Min-Max	95% CI
Anxiety (GAD-7)	Before	9.35	2.966	5-14	8.40-10.30
	After	3.43	1.583	1-7	2.92-3.94

Before the intervention, the mean anxiety score was 9.35 (SD = 2.97), indicating mild to moderate anxiety. After a single 20-minute session of *mindful breathing*, the mean score dropped to 3.43 (SD = 1.58), which falls within the normal range. The mean reduction of 5.92

points represents a clinically meaningful improvement, with all 40 respondents (100%) showing a decrease in anxiety scores.

Table 3. Distribution of Anxiety Level Categories Before and After *Mindful Breathing* Intervention (n=40)

Anxiety Level	Before (n)	Percentage (%)	After (n)	Percentage (%)
No anxiety	0	0	30	75.0
Mild anxiety	21	52.5	10	25.0
Moderate anxiety	19	47.5	0	0
Severe anxiety	0	0	0	0

Clinically, the proportion of respondents with moderate anxiety dropped from 47.5% to 0%, while 75% of respondents moved to the "no anxiety" category. This shift indicates a reduction in clinically significant anxiety symptoms between pretest and posttest.

Emotional Well-Being Levels Before and After Intervention

Table 4. Distribution of Emotional Well-Being Scores Before and After Intervention (n=40)

Variable	Measurement	Mean	SD	Min-Max	95% CI
Emotional Well-Being (WHO-5)	Before	68.40	11.873	40-88	64.60-72.20
	After	89.70	9.098	60-100	86.79-92.61

The mean emotional well-being score increased by 21.30 points between pretest and posttest. This finding indicates a change in measured scores, although the contribution of the intervention cannot be isolated without a control group.

Table 5. Distribution of Emotional Well-Being Categories Before and After *Mindful Breathing* Intervention (n=40)

Emotional Well-Being	Before (n)	Percentage (%)	After (n)	Percentage (%)
Low well-being	3	7.5	0	0
Good well-being	37	92.5	40	100

Before the intervention, 3 respondents (7.5%) had low well-being. After the intervention, all respondents (100%) achieved good well-being, with 37 respondents (92.5%) showing an increase in scores.

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Table 6. Results of the Wilcoxon Signed Rank Test

Variable	Measurement	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Anxiety	Negative Ranks (Post < Pre)	20.50	820.00	-5.521	p < 0.001
	Positive Ranks (Post > Pre)	0.00	0.00		
	Ties (Post = Pre)	0			
Emotional Well-Being	Negative Ranks (Post < Pre)	2.50	2.50	-5.350	p < 0.001
	Positive Ranks (Post > Pre)	19.96	738.50		
	Ties (Post = Pre)	2			

Table 7. Effect Size of *Mindful Breathing* Intervention

Variable	Z-Score	P-value	Mean Difference	SD of Difference	Cohen's d
Anxiety	-5.521	p < 0.001	5.92	2.99	1.98
Emotional Well-Being	-5.350	p < 0.001	21.30	14.87	1.43

The Wilcoxon test showed that all 40 respondents (100%) experienced a reduction in anxiety scores (Negative Ranks = 40, Z = -5.521, p < 0.001). For emotional well-being, 37

respondents (92.5%) showed improvement (Positive Ranks = 37, $Z = -5.350$, $p < 0.001$). No respondents had increased anxiety, indicating a consistent decrease in anxiety scores following the intervention.

Effect Size Calculation and Interpretation

To assess the practical significance of the intervention, Cohen's d effect size was calculated using the formula for paired samples:

Formula:

Cohen's d = Mean difference / Standard deviation of the difference

Interpretation:

The calculated Cohen's d values were 1.98 for anxiety and 1.43 for emotional well-being. These values indicate substantial standardized changes between pretest and posttest scores. However, the magnitude of the observed changes should be interpreted cautiously because the study used a one-group pretest-posttest design without a control group.¹⁷

DISCUSSION

The results of this study suggest that a single session of *mindful breathing* may reduce anxiety and improve emotional well-being among adults in a community setting. The discussion will elaborate on these findings, link them to existing evidence, and explore their implications for community mental health nursing, while acknowledging the methodological limitations of the pre-experimental design.

Anxiety reduction

The mean anxiety score before the intervention (9.35; mild to moderate category) is consistent with global reports indicating a high prevalence of anxiety in productive-age adults. The majority of respondents were housewives (95%). This demographic often faces unique stressors, such as monotonous routines, financial dependence, lack of social recognition, and constant caregiving demands, which can contribute to chronic, low-grade anxiety.¹⁸

The observed reduction in anxiety scores from 9.35 to 3.43 after the 20-minute session indicates a substantial change in anxiety scores between pretest and posttest. This finding is consistent with previous studies reporting improvements following brief mindfulness practices. However, because the present study did not include a control group, the observed change cannot be attributed solely to the mindful breathing intervention.^{19,25}

The physiological mechanism likely involves stimulation of the vagus nerve through slow, paced breathing (4-2-6 seconds), which shifts autonomic balance from sympathetic ("fight-or-flight") to parasympathetic ("rest-and-digest") dominance.¹⁶ This may explain the rapid reduction in somatic symptoms of anxiety such as palpitations and rapid breathing.

Emotional well-being improvement

The improvement in emotional well-being, from a mean score of 68.40 to 89.70, is also noteworthy. Although 92.5% of respondents were already in the "good well-being" category at baseline, the significant increase in scores indicates a change in emotional well-being between pretest and posttest. However, this change cannot be attributed solely to the mindful breathing intervention because the study did not include a control group.²³

Interpretation within roy adaptation model

This finding can be interpreted through the lens of the Roy Adaptation Model (RAM).²¹ According to RAM, humans are biopsychosocial beings who constantly interact with environmental stimuli. Anxiety is considered a maladaptive response to focal and contextual stimuli (e.g., financial stress, family responsibilities). The *mindful breathing* intervention may have acted as a *coping mechanism* that strengthened the individual's *cognator subsystem*, which is responsible for cognitive and emotional processing. By focusing on the breath and observing thoughts without judgment, respondents may have learned to reappraise stressors, breaking the cycle of negative automatic thoughts.²³ The improvement in emotional well-being

may reflect a positive adaptive response, moving the individual toward a state of physiological, psychological, and social integrity.

Practical significance (effect size)

The observed effect sizes were Cohen's $d = 1.98$ for anxiety and 1.43 for emotional well-being. These values indicate substantial standardized changes between pretest and posttest scores. However, the magnitude of these changes should be interpreted cautiously because the study used a one-group pretest-posttest design without a control group.²² Several factors may have contributed to the observed changes rather than the intervention alone. The sample was relatively homogeneous, consisting predominantly of housewives with mild-to-moderate anxiety and no prior mindfulness experience, which may have reduced variability and amplified the measured change. The intervention was also delivered in a supportive small-group setting, where peer modeling by health cadres and shared experience may have contributed to the observed response. In addition, the posttest was administered immediately after the intervention, which may have captured an acute response or a placebo effect rather than a sustained effect.

Study limitations

Several methodological limitations must be acknowledged before drawing definitive conclusions. The one-group pretest-posttest design lacks a control group, making it impossible to definitively rule out alternative explanations such as placebo effects, regression to the mean, and history or maturation effects. Respondents may have improved simply because they expected the intervention to help, while those with higher initial anxiety may have naturally moved toward average scores over time. In addition, external events, such as changes in daily routines or social support, may have influenced the outcomes during the study period. Therefore, the findings should be interpreted as preliminary evidence of efficacy rather than definitive proof, and causality cannot be inferred from this design.

Another limitation concerns the use of the GAD-7 and WHO-5 instruments, which assess symptoms and well-being over the past two weeks, whereas the posttest was administered immediately after the 20-minute intervention. This creates a temporal mismatch between the measurement period and the timing of the intervention. Although respondents were expected to answer based on their immediate state, this remains a methodological weakness. Future studies should consider using state-specific instruments, such as the State-Trait Anxiety Inventory (STAI-S) or visual analogue scales, to more accurately capture acute changes.

The sample was also relatively homogeneous, with 97.5% female respondents and 95% housewives. Although this characteristic provides a relatively specific description of the population studied, it limits the generalizability of the findings to other adult populations, such as males, working professionals, or individuals from different socio-economic backgrounds. Furthermore, the study only measured acute effects, and no follow-up assessment was conducted. Consequently, the long-term sustainability of the observed improvements remains unknown, and further research is needed to determine whether these benefits are maintained over several weeks or months. The use of purposive sampling is another limitation, as this non-probability sampling technique may introduce selection bias and further limit the generalizability of the findings to the broader adult population.

Implications for Community Mental Health Nursing (CMHN)

Despite these limitations, the findings offer preliminary support for the use of *mindful breathing* as a simple, low-cost, and potentially scalable intervention that could be integrated into existing community health programs, such as *posyandu* (integrated health posts) or chronic disease management groups. Mental health nurses may consider further evaluating mindful breathing as a potential supportive practice in community health programs. However, its clinical effectiveness should be established through controlled studies before it is recommended as a first-line intervention.

This aligns with the global push for task-shifting and integrating mental health into primary care. However, it is important to emphasize that these findings require replication in randomized controlled trials before the intervention can be recommended for widespread implementation.

Suggestions for future research

Future studies should employ randomized controlled trials with active control groups (e.g., progressive muscle relaxation or sham breathing) to isolate the specific effects of *mindful breathing*. Additionally, researchers should: Use state-specific anxiety measures to accurately capture acute changes, Include follow-up assessments (e.g., 2–4 weeks post-intervention) to evaluate long-term effects, Recruit more diverse samples (including males and different occupational groups) to enhance generalizability and Consider measuring physiological parameters (e.g., heart rate variability, cortisol levels) to strengthen objective evidence.

CONCLUSION

This study provides preliminary evidence that a single 20-minute session of mindful breathing was associated with changes in anxiety and emotional well-being among community-dwelling adults in Cimahi, Indonesia. The observed changes were statistically significant, with Cohen's *d* values of 1.98 for anxiety and 1.43 for emotional well-being. However, these findings should be interpreted with caution because the study used a one-group pretest-posttest design without a control group. Therefore, alternative explanations such as placebo effects, regression to the mean, and external events cannot be ruled out, and causality cannot be inferred. The findings provide initial support for the potential role of mindful breathing as a simple and low-cost approach that may be integrated into community mental health nursing practice. Nevertheless, further research using randomized controlled designs, more diverse samples, state-specific measures, and longer follow-up periods is needed to confirm the observed changes and determine their sustainability.

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