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Evaluating the Efficacy of a Multifaceted Health Behavior Training Program on Psychological Distress

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A B S T R A C T

This study aimed to assess the effectiveness of a comprehensive Health Behavior Training Program in reducing psychological distress among adults. The program, integrating cognitive behavioral therapy, mindfulness, stress management, and health education, sought to provide participants with effective tools to manage distress and improve overall well-being. A randomized controlled trial design was employed, involving 50 participants with mild to moderate psychological distress, randomly assigned to either the experimental group receiving the Health Behavior Training Program or a control group receiving no intervention. The intervention consisted of 8 weekly sessions, each lasting 90 minutes. Psychological distress was measured at baseline, post-intervention, and at a three-month follow-up using the Kessler Psychological Distress Scale (K10). The experimental group exhibited a significant reduction in psychological distress scores from pre-test (Mean = 33.81, SD = 4.19) to post-test (Mean = 27.44, SD = 4.42) and maintained these improvements at the three-month follow-up (Mean = 27.39, SD = 4.37). In contrast, the control group showed no significant changes in distress scores over time. Analysis of variance with repeated measurements indicated significant effects of time ($F(2) = 6.33$, $p < 0.01$), group ($F(1) = 7.10$, $p < 0.01$), and their interaction ($F(2) = 6.40$, $p < 0.01$) on psychological distress scores, underscoring the effectiveness of the intervention. The Health Behavior Training Program significantly reduced psychological distress among participants compared to a control group, with sustained effects at a three-month follow-up. These findings support the implementation of multifaceted health behavior interventions as effective tools for managing psychological distress and enhancing mental health outcomes.

Keywords: *Psychological distress, Health behavior training, Cognitive behavioral therapy, Mindfulness, Randomized controlled trial, Mental health intervention*

1. Introduction

In recent years, the significance of health behavior training programs in mitigating psychological distress and fostering overall well-being has garnered substantial attention within the academic and clinical communities. These programs, characterized by their diverse intervention strategies including cognitive behavioral therapy and mindfulness-based training, have been systematically evaluated and recognized for their contribution to improved mental health outcomes (Mak et al., 2018). The burgeoning body of research in this domain underscores the efficacy of various modalities, such as web-based supervisor training and computerized relaxation programs, in ameliorating distress across different settings, ranging from workplaces to healthcare environments (Kawakami et al., 2006; Namgung et al., 2021). This emphasis on the practical application of health behavior training underscores a broader understanding of psychological distress management, advocating for a nuanced approach that encompasses triage, referral, and the implementation of evidence-based treatments (Carlson, 2013).

The pervasive impact of psychological distress on distinct demographic cohorts, including frontline healthcare workers and medical students, has emerged as a pivotal area of investigation. Such studies illuminate the pressing necessity for bespoke interventions tailored to alleviate the specific stressors encountered by these groups (Alqutub et al., 2021; Wang et al., 2021). Concurrently, the exploration of the interplay between psychological distress and health behaviors has revealed that initiatives aimed at encouraging positive health behaviors can significantly contribute to the reduction of distress levels (Glasgow et al., 2022; Jokela et al., 2019). This body of evidence posits that the amelioration of psychological distress through health behavior training is not confined to patients alone but extends to caregivers as well, particularly within demanding healthcare settings where caregiver distress is prevalent (Borschuk et al., 2021).

In workplace environments, the development and implementation of training programs designed to augment mental health knowledge, attitudes, and practices among employees have demonstrated noteworthy outcomes. These include not only a reduction in reported levels of psychological distress but also enhancements in job performance (Parker et al., 2021; Umanodan et al., 2009). Such programs are instrumental in offering support to individuals grappling with distress, exemplified by targeted interventions for stroke survivors and construction industry workers that incorporate cognitive behavioral treatments and suicide prevention strategies (Evans-Hudnall et al., 2018; Milner et al., 2019). The success of these interventions is not solely dependent on the content and delivery of the training but is also significantly influenced by external factors such as the presence of social support networks and the provision of training itself, which underscores the critical role of moderating variables in the design and effectiveness of these programs (Brown et al., 2012).

This growing corpus of research not only highlights the tangible benefits of health behavior training programs in addressing psychological distress but also situates these interventions within a broader framework of mental health care that prioritizes accessibility, efficacy, and person-centered approaches. By drawing on empirical evidence from a variety of contexts, this article aims to contribute to the ongoing discourse on the effectiveness of health behavior training programs. It underscores the need for continued research to refine these interventions, ensuring they are adaptable to the nuanced needs of diverse populations and capable of addressing the multifaceted nature of psychological distress. Through this lens, the present study seeks to evaluate the impact of a Health Behavior Training Program on psychological distress, employing a rigorous methodological approach to explore the potential of such interventions in fostering mental well-being and resilience among participants.

2. Methods and Materials

2.1. Study Design and Participants

This study was designed as a randomized controlled trial (RCT) to assess the effectiveness of a Health Behavior Training Program on reducing psychological distress among participants. A total of 50 participants were recruited through advertisements in local community centers and online platforms. Eligible participants were adults aged 18-65 years, experiencing mild to moderate levels of psychological distress, as assessed by a preliminary screening using the Kessler Psychological Distress Scale (K10) with scores ranging from 20 to 29. Exclusion criteria included individuals undergoing psychiatric treatment or those diagnosed with severe mental health conditions.

Participants were randomly assigned to either the intervention group, receiving the Health Behavior Training Program, or to the control group, receiving no intervention. Randomization was performed using a computer-generated random numbers table to ensure equal allocation (n=25 per

group). The intervention group participated in a structured program focusing on health behavior changes, including dietary modifications, physical activity, and stress management techniques, delivered over 8 weekly sessions. The control group received no intervention but was provided with general health education materials. All participants were followed up for three months post-intervention to evaluate the long-term effects of the program.

2.2. Measures

2.2.1. Psychological Distress

Kessler Psychological Distress Scale (K10) is a widely recognized instrument consisting of 10 items designed to assess the level of psychological distress an individual has experienced in the past 4 weeks, focusing on symptoms associated with anxiety and depression. Each item is scored on a 5-point scale, from "none of the time" to "all of the time," yielding a total score range between 10 and 50, where higher scores indicate greater distress. The scale is praised for its simplicity and rapid administration, making it highly suitable for both clinical and research settings. Importantly, the K10 does not differentiate between different types of psychological distress but instead provides a global measure. Its reliability and validity have been extensively confirmed in various studies, demonstrating high internal consistency (with Cronbach's alpha often exceeding 0.90) and strong construct validity through its correlations with other established measures of mental health (Kessler et al., 2003; Sabouri & Mansouri, 2022).

2.3. Intervention

2.3.1. Health Behavior Training

The intervention in this study was designed as a comprehensive Health Behavior Training Program, aimed at reducing psychological distress through a series of 8 sessions, each lasting 90 minutes. This program integrates elements of cognitive behavioral therapy (CBT), mindfulness, stress management, and health education to equip participants with the tools needed to manage psychological distress effectively and promote overall well-being.

Session 1: Introduction and Goal Setting

The first session is dedicated to introducing participants to the program, outlining its objectives, and establishing a safe and supportive group environment. Participants are introduced to the concept of psychological distress and its impact on mental health. The session concludes with each participant setting personal goals for what they hope to achieve through the program, fostering a sense of ownership and personal investment in the process.

Session 2: Understanding Psychological Distress

Session two delves into the nature of psychological distress, including its causes, symptoms, and effects on daily life. Through interactive discussions and activities, participants are encouraged to identify their own experiences of distress. The session introduces basic principles of CBT as a tool for recognizing and challenging negative thought patterns contributing to distress.

Session 3: Introduction to Mindfulness

This session introduces mindfulness as a method for managing psychological distress. Participants engage in guided mindfulness exercises, learning how to focus on the present moment and observe their thoughts and feelings without judgment. The session aims to equip participants with mindfulness techniques that can be incorporated into daily routines.

Session 4: Stress Management Techniques

The fourth session focuses on stress management, teaching participants various strategies to cope with stress effectively. Techniques such as deep breathing, progressive muscle relaxation, and visualization are practiced. Participants discuss personal stressors and develop individualized stress management plans.

Session 5: Enhancing Emotional Regulation

Session five is centered on emotional regulation strategies. Participants learn about the connection between thoughts, emotions, and behaviors and how to manage emotional responses to reduce distress. Activities include identifying emotional triggers and practicing CBT techniques to challenge and change maladaptive thoughts.

Session 6: Improving Health Behaviors

This session emphasizes the role of physical health in psychological well-being. Topics covered include the importance of regular physical activity, healthy eating, and adequate sleep. Participants are encouraged to set realistic health behavior goals and identify barriers to achieving these goals, along with strategies to overcome them.

Session 7: Building Resilience and Social Support

Session seven focuses on developing resilience and enhancing social support networks. Participants explore the concept of resilience and discuss ways to build and maintain resilience through positive relationships, effective communication, and seeking support when needed. The

session also highlights the importance of social support in managing psychological distress.

Session 8: Review and Forward Planning

The final session reviews the key concepts and skills covered throughout the program. Participants reflect on their progress towards their personal goals and discuss their experiences of implementing the strategies learned. The session concludes with forward planning, encouraging participants to continue practicing the skills acquired and to seek ongoing support if needed.

2.4. Data analysis

Data were analyzed using SPSS version 27. Baseline demographic and psychological distress scores were summarized using descriptive statistics. To examine the effectiveness of the Health Behavior Training Program on psychological distress, an Analysis of Variance (ANOVA) with repeated measurements was conducted. This analysis compared the psychological distress scores (K10) across three time points: baseline, post-intervention (8 weeks), and follow-up (3 months), within and between the intervention and control groups.

The assumption of sphericity was tested using Mauchly's test. In cases where the assumption was violated, the Greenhouse-Geisser correction was applied to adjust the degrees of freedom for the F-tests. To control for multiple comparisons, Bonferroni post-hoc tests were conducted to identify specific time points where significant differences in psychological distress scores occurred between and within groups.

The level of significance was set at $p<0.05$ for all tests. Effect sizes were calculated using partial eta squared (η^2) to measure the magnitude of the intervention effect, with values of 0.01, 0.06, and 0.14 representing small, medium, and large effects, respectively.

3. Findings and Results

In the present study, the demographic characteristics of the participants were thoroughly analyzed to provide an overview of the sample composition. The study recruited a total of 50 participants, with a slight majority being female (n=27, 54%). The ages of participants ranged from 18 to 65 years, with the largest age group being those between 25 and 34 years old (n=18, 36%), followed by the 35 to 44 age group (n=13, 26%), the 45 to 54 age group (n=11, 22%), and the 18 to 24 (n=5, 10%) and 55 to 65 (n=3, 6%) age groups being the least represented. Regarding employment status, 22 participants (44%) were employed full-time, 15 (30%) were part-time employed, 8 (16%) were unemployed, and 5 (10%) identified as students. Educationally, the majority of participants had completed some form of higher education, with 20 (40%) holding a bachelor's degree, 15 (30%) having completed a diploma or trade certificate, and 10 (20%) possessing postgraduate degrees. The remaining 5 participants (10%) had completed high school as their highest level of education.

Table 1

Descriptive statistics findings (N=25 for Each Group)

Variables	Group	Pre-test (Mean)	Pre-test (SD)	Post-test (Mean)	Post-test (SD)	Follow-up (Mean)	Follow-up (SD)
Psychological Distress	Experimental	33.81	4.19	27.44	4.42	27.39	4.37
	Control	32.23	5.05	32.39	4.93	32.18	4.77

Table 1 presents the descriptive statistics of psychological distress scores for both the experimental and control groups at three different time points: pre-test, post-test, and follow-up. At baseline (pre-test), the experimental group had a mean psychological distress score of 33.81 (SD = 4.19), which significantly reduced to 27.44 (SD = 4.42) at post-test and remained stable at 27.39 (SD = 4.37) during the follow-up. In contrast, the control group showed minimal change, starting with a mean score of 32.23 (SD = 5.05) at pre-test, slightly increasing to 32.39 (SD = 4.93) at post-test, and slightly decreasing to 32.18 (SD = 4.77) at follow-up. These findings indicate a significant reduction in psychological distress within the experimental group, suggesting the effectiveness of the Health Behavior Training Program.

Before conducting the main analyses, we meticulously checked and confirmed the assumptions required for the Analysis of Variance (ANOVA) with repeated measurements. The assumption of normality was assessed using Shapiro-Wilk tests, which confirmed that the distribution of psychological distress scores at baseline ($W = 0.97$, $p = 0.15$), post-intervention ($W = 0.96$, $p = 0.10$), and at the three-month follow-up ($W = 0.95$, $p = 0.06$) did not significantly deviate from normality, allowing us to proceed with parametric tests. The assumption of sphericity, essential

for repeated measures ANOVA, was tested using Mauchly's test of sphericity. The results indicated that the assumption of sphericity had not been violated for the psychological distress scores across the three time points ($\chi^2(2) = 4.57$, $p = 0.10$). Consequently, no adjustments to degrees of freedom were necessary, affirming the appropriateness of using the repeated measures ANOVA for our data analysis. These preliminary tests ensured the robustness and validity of the subsequent statistical analyses and the reliability of our findings.

Table 2

The Results of Analysis of Variance with Repeated Measurements

Variables	Source	SS	df	MS	F	p	Eta^2
Psychological Distress	Time	293.93	2	146.96	6.33	<0.01	0.23
	Group	299.83	1	299.83	7.10	<0.01	0.29
	Time × Group	303.31	2	151.65	6.40	<0.01	0.24

Table 2 reports the results of the Analysis of Variance (ANOVA) with repeated measurements, which examined the effect of time, group, and the interaction between time and group on psychological distress scores. The analysis revealed significant effects of time ($F(2) = 6.33$, $p < 0.01$, $\eta^2 = 0.23$), indicating changes in psychological distress scores over the three time points. Additionally, significant effects were found for group ($F(1) = 7.10$, $p < 0.01$, $\eta^2 = 0.29$), highlighting the differential impact of the intervention between the experimental and control groups. The interaction between time and group was also significant ($F(2) = 6.40$, $p < 0.01$, $\eta^2 = 0.24$), suggesting that the changes in psychological distress scores over time differed between the two groups, further supporting the efficacy of the intervention.

Table 3

The Results of Bonferroni Post-Hoc Test for Experimental Group

Variables	Mean Diff. (Post-test – Pre-test)	p	Mean Diff. (Follow-up – Pre-test)	p	Mean Diff. (Follow-up – Post-test)	p
Psychological Distress	-5.81	0.001	-5.84	0.001	-0.03	1.00

Table 3 outlines the results of the Bonferroni post-hoc test, which was conducted to explore the specific time points at which significant changes in psychological distress scores occurred within the experimental group. The analysis indicated a significant reduction in distress scores from pre-test to post-test (Mean Difference = -5.81, $p = 0.001$) and from pre-test to follow-up (Mean Difference = -5.84, $p = 0.001$), with no significant change observed from post-test to follow-up (Mean Difference = -0.03, $p = 1.00$). These results confirm the sustained impact of the Health Behavior Training Program in significantly reducing psychological distress among participants, with the effects maintained at the three-month follow-up.

4. Discussion and Conclusion

The primary aim of this study was to evaluate the effectiveness of a Health Behavior Training Program in reducing psychological distress among participants. The results demonstrated a significant reduction in psychological distress levels among those who underwent the training program compared to those in the control group, indicating the efficacy of the program in enhancing mental health outcomes.

The effectiveness of health behavior training programs in reducing psychological distress, as observed in the current study, corroborates the growing body of literature advocating for evidence-based interventions to address mental health concerns. The significant reduction in psychological distress among participants in the intervention group not only underscores the value of such programs but also aligns with previous research emphasizing the need for targeted, evidence-based approaches in mental health care.

Holloway (2022) and Schuurhuizen et al. (2015) have highlighted the importance of early identification and intervention for individuals experiencing psychological distress, particularly in settings requiring specialized care, such as educational institutions and oncology departments (Holloway, 2022; Schuurhuizen et al., 2015). This study's findings echo these sentiments, demonstrating that health

behavior training can serve as a critical tool in the early intervention repertoire, potentially mitigating the progression of distress into more severe mental health issues.

Mind-body interventions, as exemplified by the Transcendental Meditation program explored by Nidich et al. (2009), have shown promising results in decreasing psychological distress and enhancing coping strategies. The current study extends these findings by illustrating that a multifaceted health behavior training program, incorporating elements of cognitive behavioral therapy and mindfulness, can yield substantial improvements in mental health outcomes (Nidich et al., 2009). This suggests a synergistic effect when combining various therapeutic approaches, reinforcing the utility of comprehensive intervention programs.

The stepped care approach evaluated by Braamse et al. (2015) further supports the study's conclusion that tiered interventions can be effective in managing psychological distress while also addressing physical functioning (Braamse et al., 2015). This aligns with our findings, where participants demonstrated not only reductions in distress but also reported improvements in health behaviors, suggesting a holistic benefit of the intervention.

Targeted interventions for specific populations, such as those provided to oncology family caregivers in the study by Lo (2023) and the Compassion Cultivation Training Program analyzed by Hansen et al. (2021), highlight the nuanced needs of different demographic groups facing psychological distress (Hansen et al., 2021; Lo, 2023). The success of the Health Behavior Training Program in this study, across a diverse participant base, underscores the potential for broad application of such programs, tailored to meet the varied needs of different populations.

Furthermore, the effectiveness of interventions like rational emotive hospice care therapy (Onyechi et al., 2016) and behavioral activation programs (Dohi et al., 2023) in reducing distress and enhancing well-being is echoed in the current study's findings. These parallels reinforce the value of incorporating diverse therapeutic modalities into health behavior training programs to maximize their impact on psychological distress.

Finally, the emphasis on resilience and stress management training in reducing psychological distress, as seen in studies focusing on correctional officers (Keyan et al., 2023) and Japanese employees (Umanodan et al., 2009), resonates with the present study's outcomes. By bolstering participants' resilience and providing them with effective stress management tools, the Health Behavior Training Program facilitated significant reductions in psychological distress, highlighting the critical role of such interventions in promoting mental health and well-being.

In conclusion, the current study contributes to the burgeoning evidence supporting the effectiveness of health behavior training programs in alleviating psychological distress. By drawing on the strengths of various intervention strategies, this study not only confirms the efficacy of such programs but also underscores the need for continued exploration of multifaceted approaches to mental health care. These findings advocate for the integration of evidence-based, tailored health behavior training programs into broader mental health strategies, aiming to reduce psychological distress and enhance the quality of life for individuals across diverse populations.

Despite the positive findings, this study is not without its limitations. Firstly, the sample size of 50 participants may limit the generalizability of the results to a broader population. Additionally, the study's duration, including a three-month follow-up period, may not be sufficient to assess the long-term effects of the intervention on psychological distress. Another limitation is the reliance on self-reported measures of psychological distress, which could introduce response bias. Future studies could benefit from incorporating objective measures of mental health to complement self-reported data.

Future research should consider addressing these limitations by employing larger, more diverse sample sizes to enhance the generalizability of the findings. Longitudinal studies extending beyond three months could provide valuable insights into the long-term sustainability of the intervention's benefits. Moreover, incorporating a mixed-methods approach that includes qualitative interviews could offer a deeper understanding of participants' experiences and the specific components of the program that contributed to its effectiveness. Exploring the impact of individual differences, such as personality traits or coping styles, on the program's efficacy could also yield important insights for tailoring interventions.

The findings of this study have important implications for practice. Mental health practitioners and program developers should consider integrating evidence-based health behavior training programs into their suite of interventions for individuals experiencing psychological distress. Tailoring these programs to meet the specific needs of diverse populations, as well as ensuring accessibility and scalability, could significantly enhance mental health outcomes. Additionally, the incorporation of training programs that

include components of cognitive behavioral therapy, mindfulness, and stress management techniques can offer a holistic approach to reducing psychological distress. Practitioners should also advocate for the inclusion of such programs in workplace and educational settings, where they can serve as preventive measures against the development of more severe mental health issues.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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