Strengthening psychological resilience: the effectiveness of autogenic training of community pharmacists

Jačanje psihološke otpornosti: efikasnost autogenog treninga farmaceuta zaposlenih u javnim apotekama

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Abstract

Background/Aim. Psychological resilience is essential for healthcare professionals like community pharmacists. It enables them to navigate daily challenges effectively. Autogenic training (AT) has emerged as a promising psychological technique for enhancing resilience and reducing stress in this population. The aim of this study was to investigate the impact of AT on resilience among community pharmacists. **Methods.** The study recruited licensed pharmacists from community pharmacies. Participants received information about the aims and procedures of the research. Resilience was assessed using a scale that measured five domains: Confidence, Agility, Coping with Stress, Interpersonal Relationships, and Developmental Thinking. Using a controlled trial design, participants were randomly divided into two experimental groups, which underwent AT, and a control group, which did not undergo AT. Statistical analyses, including the Kruskal-Wallis and Wilcoxon rank-sum tests, were conducted to analyze the data. **Results.** Participants who underwent AT showed statistically significant improvements in resilience compared to the control group, particularly in the domains of Confidence, Coping with Stress, and Interpersonal Relationships. Furthermore, a notable shift towards higher resilience categories was observed in the experimental groups after the intervention. **Conclusion.** AT appears promising as an intervention to enhance resilience and reduce stress among community pharmacists. Integrating AT into pharmacist education and practice guidelines could significantly affect pharmacist welfare and patient care outcomes.

Key words:
autogenic training; community pharmacy service; pharmacists; resilience, psychological; stress psychological.

Apstrakt

Uvod/Cilj. Psihološka otpornost (PO) je od suštinskog značaja za zdravstvene radnike poput farmaceuta zaposlenih u javnim apotekama. Ona im omogućava da efikasno prevazilaze svakodnevne izazove. Autogeni trening (AT) se pojavio kao obećavajuća psihološka tehnika za unapređenje PO i smanjenje stresa u ovoj populaciji. Cilj rada bio je da se ispita uticaj AT na PO farmaceuta zaposlenih u javnim apotekama. **Metode.** U istraživanje su bili uključeni licencirani farmaceuti zaposleni u javnim apotekama. Učesnici su dobili informacije o ciljevima i postupcima istraživanja. PO je procenjivana korišćenjem skale koja je merila pet domena: Samopouzdanje, Agilnost, Savladavanje stresa, Međuljudske odnose i Razvojno mišljenje. Koristeći dizajn kontrolisanog ispitivanja, učesnici su nasumično podeljeni na dve eksperimentalne grupe, koje su bile podvrgnute AT, i na kontrolnu grupu, koja nije bila podvrgnuta AT. Statističke analize, uključujući Kruskal-Volisov test i Vilkoksonov test ranga, korišćene su za analizu podataka. **Rezultati.** Učesnici koji su prošli kroz AT pokazali su statistički značajno poboljšanje PO u poređenju sa kontrolnom grupom, posebno u domenima Samopouzdanje, Savladavanja stresa i Međuljudski odnosi. Takođe, primećen je značajan pomak ka višim PO kategorijama u eksperimentalnim grupama nakon intervencije. **Zaključak.** AT, kao intervencija za unapređenje PO i smanjenje stresa među farmaceutima zaposlenim u javnim apotekama, se čini obećavajućom. Uključivanje AT u smernice za praksu i obrazovanje farmaceuta može značajno uticati na dobrobit farmaceuta i ishode lečenja bolesnika.

Ključne reči:
autogeni trening; farmaceutske službe, komunalne; farmaceuti; rezilijentnost, psihološka; stres, psihički.

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Introduction

Resilience in psychology refers to the ability of an individual to confront life challenges, stressors, or adverse conditions and emerge with positive adaptation and preserved mental well-being [1]. It involves adapting, recovering, or maintaining well-being despite facing challenges or adverse circumstances. This entails withstanding emotional or mental difficulties and confronting adversities with a positive perspective, thereby preserving mental health. Active coping, adaptation, and development of internal resources are crucial components in overcoming difficulties [2]. Resilience, combined with low levels of stress, predicts overall well-being, countering the negative impacts of stress on psychological health. Despite its crucial role, resilience remains insufficiently explored, particularly in relation to stress and psychological well-being [3]. While individual analyses on resilience, psychological well-being, and stress exist, a comprehensive study elucidating the intricate interplay among these concepts is notably absent. The intriguing nexus between stress, resilience, and psychological well-being warrants further inquiry [3]. Challenging life circumstances often present obstacles to maintaining psychological well-being, but responses to these adversities vary considerably. Some individuals navigate them with relative ease or even experience personal growth, exhibiting psychological resilience. Understanding the mechanisms of resilience is crucial both theoretically and practically. However, psychology's understanding of resilience remains incomplete, primarily due to a lack of precise conceptualization and limited integration between dominant approaches to resilience – managing stress and coping and regulating emotions [4]. In healthcare, efforts have been made to educate professionals about resilience, yet a clear understanding of responses to resilience and stress is still lacking [5]. Various methods such as autogenic training (AT), biofeedback, and occupational therapy are employed to manage stress effectively [6]. Developed by the renowned German psychiatrist Schultz, AT comprises six fundamental components aimed at inducing a state of deep relaxation and self-regulation. It involves focusing on sensations such as warmth and heaviness in different parts of the body, along with deep breathing and visualization techniques, to reduce stress and anxiety [7–9]. Interest in alternative health approaches is growing, with AT emerging as a promising method for community pharmacists, who are pivotal in holistic health care. AT, a self-guided relaxation method, enhances resilience [6]. Resilience, linked to stress reduction [10], requires further study, particularly regarding relaxation techniques. Understanding how AT and similar methods enhance resilience is vital for mental health promotion [11]. Exploring these avenues can bridge gaps in the literature and provide insights for comprehensive stress management. Nonetheless, given the acknowledged link between resilience and reduced stress levels, AT holds the potential to bolster resilience [6]. This study explores the impact of AT on resilience, stress reduction, and overall well-being, aiming to provide insights pertinent to community pharmacists'

practice in promoting comprehensive health and wellness. It examines AT effects and implications for community pharmacy practice.

The aim of this study was to investigate the impact of AT on enhancing resilience among pharmacists employed in community pharmacies. It pursued to deepen the understanding of how relaxation techniques like AT contribute to psychological resilience, emphasizing the interconnectedness between these phenomena.

Methods

The study was approved by the Ethics Committee of the Pharmaceutical Chamber of Serbia (No. 316/2-6, from March 8, 2022). Prior to participation, all pharmacists received detailed explanations about the study procedures, assurances of anonymity, and comprehensive information. Furthermore, all participants were provided with detailed information and explanations about the study procedures. No rewards or financial incentives were offered to any participant.

Study design

The target population for this research comprised licensed pharmacists employed in community pharmacies who were invited to participate in the education and application of AT aimed at enhancing resilience. The invitation to participate was extended to all registered pharmacists in the Pharmaceutical Chamber's database, providing every licensed pharmacist with an equal opportunity to respond. Eligible participants were required to be licensed pharmacists employed in community pharmacies who voluntarily agreed to take part in the research and provided informed consent. Exclusion criteria included pharmacists on medical leave, interns, and those who declined voluntary participation. This recruitment strategy facilitated the engagement of pharmacists from diverse demographic backgrounds. Pharmacists who expressed interest in participating in the study were contacted by phone to receive an explanation about the study's purpose and the entire procedure. The participants who confirmed their participation were given a week to sign an informed consent form.

The sample size was determined utilizing a suitable statistical method, specifically computed through the G-power program, version 3.1. The calculation was grounded on a significance level (α) set at 0.05 and an effect size of 0.5. Determining the sample size involved several steps. Initially, the minimum clinically important difference for the primary outcome was identified based on previous research, clinical expertise, or consensus among experts. This difference represents the smallest change in the outcome measure deemed clinically significant. Subsequently, specific statistical parameters such as effect size, α, and power were specified. The effect size indicates the magnitude of the difference between groups, while the α signifies the likelihood of making a Type I error (false positive). Lastly, the desired power level represents the

likelihood of detecting a true effect if present, with a commonly accepted value of 0.8 indicating a high probability of detecting meaningful effects.

In the study, power analysis was conducted as part of the data processing methods to calculate test power when applicable. This was crucial to ascertain the minimum sample size required to detect statistically significant effects, ensuring robust outcomes with the desired power level set at 80%. An effect size of 0.80 was utilized, indicating a substantial impact of the variable or intervention on the outcomes, thereby bolstering confidence in the significance and practical relevance of the results. Furthermore, *post hoc* analyses on existing samples confirmed the consistency and reproducibility of the findings across different subgroups and conditions, thus further validating the study's conclusions.

Resilience Scale

This study utilized a meticulously developed Resilience Scale (RS) to assess participants' resilience levels (RLs). Prior to administering the scale, its validity and internal consistency (IC) were evaluated. Expert panelists, selected based on their qualifications and expertise in resilience-related fields, including two psychologists, three pharmacy experts, and a scale development specialist, were recruited to assess item relevance and clarity. These experts evaluated the scale items using predefined rating scales and provided written feedback where necessary. Following this assessment by the expert panel, the scale underwent content and face validation processes. In addition, a group of test respondents recruited through targeted sampling methods, assessed the clarity and comprehensibility of the scale items. The resulting indices, including the Content Validity Index (CVI) and Face Validity Index (FVI), were calculated to ensure the robustness and clarity of the scale. Items not meeting the predefined thresholds were either revised or removed to enhance the scale's quality and clarity. Finally, the validated scale was distributed to a larger sample of respondents for further review and feedback. Moreover, factor analysis confirmed the proposed five-factor structure of the scale, validating the significance of each component. These components, including Confidence, Agility, Coping with Stress, Interpersonal Relationships, and Developmental Thinking, were integral to the assessment.

Through this meticulous development process, the reliability and validity of the scale in evaluating resilience across multiple dimensions were ensured. Comprising 30 items, the scale utilized a 5-point Likert scale ranging from "Never" to "Always". The total score range of the scale used in the study spans from 30 to 150. Aggregating scores across all items allowed for the categorization of individuals into specific RLs: low resilience (scores ranging from 30 to 90), moderate resilience (scores ranging from 91 to 120), and high resilience (scores ranging from 121 to 150).

Procedure

An open controlled trial was conducted. The study was conducted from November 2022 to April 2023, with the AT itself being implemented from February 1 until the end of March. There were 60 participants in total divided into two experimental groups [experimental group 1 (E1) and experimental group 2 (E2)] and one control group (C), each consisting of 20 participants. The participants were randomly assigned to either the control or the experimental groups. From a pool of 60 participants, every third individual was selected for the control group, resulting in a cohort of 20 participants. The remaining 40 participants were further divided into two subgroups within the experimental group: every odd-numbered participant was allocated to E1, while every even-numbered participant was assigned to E2. This random allocation method was implemented to minimize potential biases and ensure a balanced representation of participants across groups, thus enhancing the reliability of the study's outcomes.

Participants in the experimental groups underwent AT sessions, whereas those in the control group did not engage in AT. Due to group dynamics and recommended session sizes, participants were divided into two experimental groups. This division aimed to accommodate the maximum number of participants *per* group, facilitating the successful adoption of AT techniques. Participants were guided through AT sessions by a certified professional with expertise in this area. The professional leading the sessions, a psychologist by primary education, had 13 years of experience delivering individual and group AT practices. Their extensive background included specialized education and training in autogenic therapy, ensuring they were well-qualified to deliver the sessions safely and effectively. Participants in the experimental groups underwent AT, totaling eight sessions with a professional, each lasting 60 minutes. To mitigate attrition and ensure the participation of individuals from various regions across the country, a segment of the skill acquisition was conducted online *via* the Teams platform. Over the 8-week training period, the participants practiced AT three times a day individually and maintained personal daily logs to record their experiences with AT. Additionally, their AT-licensed professional was consistently available for consultations throughout the training period. Resilience was assessed using RS before the commencement of AT and again after eight weeks of AT implementation. The control group did not receive AT. However, resilience was also assessed in control group participants at the beginning and after eight weeks.

AT consists of six main exercises, each focusing on inducing relaxation and promoting self-awareness. These exercises are the following: heaviness – participants focus on a specific body part and imagine it becoming heavy, sinking into a state of deep relaxation; warmth – participants concentrate on a particular body area, visualizing warmth spreading throughout, promoting relaxation and comfort; heartbeat – by directing attention inward, individuals focus on their heartbeat, fostering a sense of calmness and tranquility; breathing – this exercise involves deep and rhythmic breathing, promoting relaxation and reducing tension; abdominal warmth – participants visualize warmth spreading in the abdominal area, promoting relaxation and soothing any tension; coolness

– participants imagine a cool sensation, promoting relaxation and reducing any remaining stress or tension. These exercises are practiced sequentially, allowing participants to progressively deepen their state of relaxation and enhance their overall well-being [6, 7].

The study aimed to investigate whether participants' RS scores changed between Time 1 (baseline) and Time 2 (after eight weeks of AT), as well as to identify any differences among participants in the control group (who did not undergo AT) and the two experimental groups (who underwent AT).

Statistical analysis

Prior to conducting statistical analyses, the normality of the distribution was checked, revealing a statistically significant deviation from normality (Kolmogorov-Smirnov test, $p < 0.001$). Consequently, non-parametric techniques were employed, namely the Kruskal-Wallis and the Wilcoxon rank-sum tests. These tests were employed to assess inter-group differences and mitigate potential confounding variables when fundamental statistical assumptions were unmet. Both the Kruskal-Wallis and Wilcoxon tests were used to examine differences between the experimental groups overall and the control group (Kruskal-Wallis), as well as between all pairs of groups (two experimental individually and one control) using the Wilcoxon test, thus eliminating any potential biases in the conclusions.

Statistical analyses were performed utilizing the SPSS software package, with a specific focus on version 29.0.1.

Results

Of all the respondents invited, 95 participants expressed their willingness to participate, with 89 participants confirming their participation after receiving detailed information and providing informed consent. Five participants did not return the signed informed consent, resulting in 84 participants initially being assessed using RS. Prior to the commencement of the education, 24 participants withdrew, leaving a total of 60 participants who were randomly assigned to two experimental groups, both of which completed the resilience test after three months, and one control group that did not undergo AT but also completed the resilience test three months later. The flowchart illustrating the sample formation procedure is presented in Figure 1.
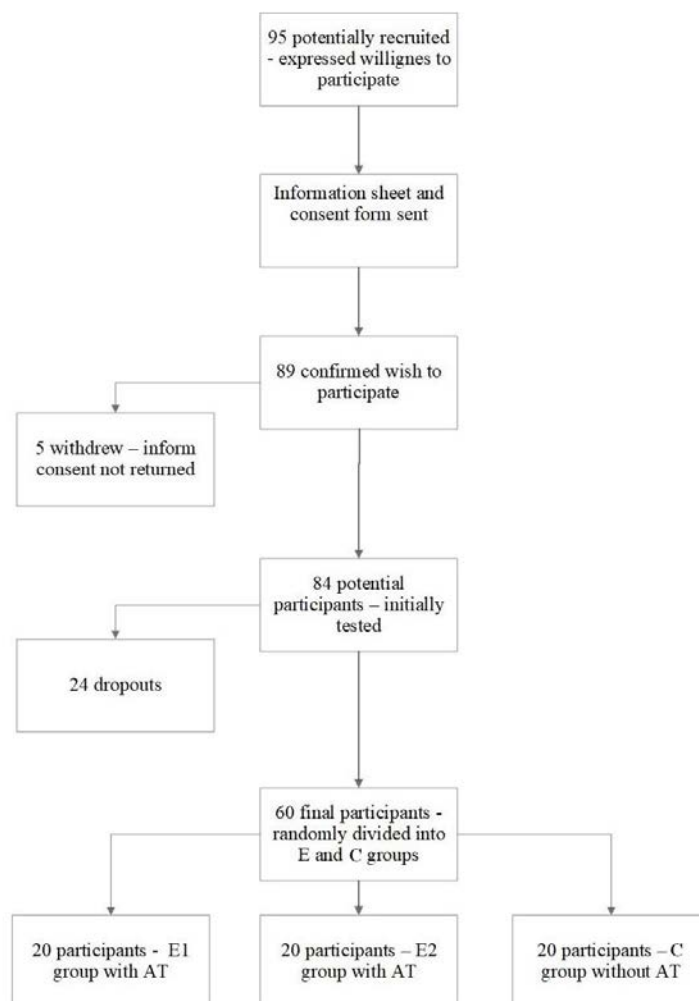

Fig. 1 – Flowchart of sample formation procedure (values represent the number of participants).
E – experimental group; C – control group; AT – autogenic training.
Description of the groups is given in the paragraph Methods.

Descriptive statistics outline key characteristics in both control and experimental groups. In the control group (n = 20), the mean age was 37.30 years [standard deviation (SD) = 7.58], average years of service were 11.50 years (SD = 7.18), and study duration was 5.48 years (SD = 0.55). In the experimental groups (n = 40), the mean age was 42.47 years (SD = 12.35), average years of service were 16.69 years (SD = 12.53), and study duration was 5.83 years (SD = 1.66). Further details are available in Table 1.

The process of checking the validity and IC of the scale for assessing resilience showed that the scale that was used demonstrated strong validity, with both the CVI and FVI exceeding 0.80. Additionally, the scale exhibited robust IC, as indicated by a Cronbach's alpha coefficient of over 0.9.

Table 2 provides a comparison of mean scores for RS and its respective subscales between the control group and experimental groups at two key time points: at baseline and after eight weeks of AT.

At baseline, the mean resilience score for the control group was 117.05, while for the experimental groups, it was slightly lower, 106.08. However, after eight weeks of AT, there is a noticeable increase in the mean resilience score for the experimental groups, rising to 118.05, whereas the mean resilience score of the control group remains relatively stable. This pattern was consistent across all subscales, where the control group generally had higher mean scores than the experimental groups at the start of the study. However, after eight weeks, there was a trend of improvement in mean scores for the experimental groups across most subscales, with some reaching or approaching the mean scores of the control group. For instance, in the Confidence subscale, the mean score for the experimental groups increased from 20.7 to 23.45, approaching the control group's mean score of 22.95. Notably, there were consistent improvements in mean scores for the experimental groups in the Coping with Stress and Interpersonal Relationships subscales after eight weeks, indicating the potential benefits of the intervention in these areas.

Table 1

Demographic characteristics of study participants

Characteristics	Control group	Experimental groups
Gender		
female	19 (95)	37 (92.5)
male	1 (5)	3 (7.5)
Marital status		
single	5 (25)	11 (27.5)
married	15 (75)	26 (65)
divorced	0 (0)	3 (7.5)
Shift work distribution		
alone in shift	5 (25)	9 (22.5)
with a pharmacist	4 (20)	2 (5)
with a pharmacy technician	3 (15)	20 (50)
with more colleagues in a shift	8 (40)	9 (22.5)
Postgraduate education category		
master	2 (10)	2 (5)
specialization	5 (25)	5 (12.5)
doctoral degree	1 (5)	1 (2.5)
no postgraduate education	12 (60)	32 (80)
Branch of the Pharmaceutical Chamber of Serbia		
Belgrade	6 (30)	16 (40)
Kragujevac	5 (25)	9 (22.5)
Niš with Kosovo and Metohija	3 (15)	5 (12.5)
Vojvodina	6 (30)	10 (25)
Type of pharmacy		
independent pharmacy (1 pharmacy)	1 (5)	5 (12.5)
small chain (2–100 pharmacies)	12 (60)	15 (37.5)
medium chain (100–200 pharmacies)	3 (15)	10 (25)
large chain (more than 200 pharmacies)	4 (20)	10 (25)
Managerial position		
yes	13 (65)	24 (60)
no	7 (35)	16 (40)
Job satisfaction		
yes	12 (60)	20 (50)
no	8 (40)	20 (50)

All results are given as numbers (percentages) of participants.

Table 2

Comparison of mean scores of the Resilience Scale and subscales between the control and experimental groups of participants at baseline and eight weeks after autogenic training

Scale and subscales	Control group (n = 20)	Experimental groups (n = 40)
Resilience Scale		
baseline	117.050 ± 17.470	106.080 ± 28.764
eight weeks	116.350 ± 20.638	118.050 ± 24.225
Confidence subscale		
baseline	22.950 ± 4.559	20.700 ± 6.297
eight weeks	22.350 ± 4.626	23.450 ± 4.851
Agility subscale		
baseline	24.950 ± 3.913	21.875 ± 6.907
eight weeks	24.150 ± 4.660	23.275 ± 5.344
Coping with Stress subscale		
baseline	28.650 ± 6.089	26.725 ± 8.277
eight weeks	29.700 ± 6.174	30.300 ± 7.484
Interpersonal Relationships subscale		
baseline	12.300 ± 1.593	11.300 ± 2.972
eight weeks	12.050 ± 2.585	12.300 ± 2.312
Developmental Thinking subscale		
baseline	28.200 ± 3.488	25.475 ± 6.733
eight weeks	24.400 ± 3.844	24.900 ± 4.618

All values are given as mean ± standard deviation.

Table 3 illustrates the RS according to three categories observed in both the control and experimental groups at two key time points: at baseline and after eight weeks.

Initially, at baseline, the control group exhibited resilience distributions similar to those of the experimental groups. However, after the eight-week AT period, notable differences emerged. While the control group's RLs remained relatively stable, the experimental groups displayed distinct changes. Notably, the experimental groups showed a reduction in the number of individuals classified in the Low resilience category after eight weeks, indicating potential positive effects of the intervention on enhancing resilience. Conversely, there was a noticeable increase in individuals categorized under Moderate and High RLs within the experimental groups post-intervention, suggesting potential improvements in resilience over the eight weeks compared to the control group.

The Kruskal-Wallis test revealed a statistically significant difference in RLs among three distinct groups [experimental groups (E1 and E2), and control group (C)], χ^2 (2, n = 60) = 5.7–18.3, $p < 0.05$. These differences were shown on the scale as a total Resilience Score, and on all subscales at the beginning (baseline) and after eight weeks of AT (Table 4).

A difference in the levels of resilience was observed on the Scales and subscales measured at baseline and after eight weeks of AT. This difference was statistically significant in the experimental groups (Asymp. Sig. < 0.05), except on the Developmental Thinking subscale, and not statistically significant in the control group (Asymp. Sig. > 0.05) (Table 5).

At baseline, the control and the experimental groups displayed similar median resilience scores, with experimental groups showing a slightly higher 75th percentile score. After eight weeks of AT, the experimental groups exhibited noticeable improvements in resilience, as evidenced by higher median and 75th percentile scores compared to their scores at baseline and from the control group. Across all subscales, the experimental groups generally showed higher median scores than the control group at baseline and after eight weeks of AT. After eight weeks of AT, the experimental groups demonstrated consistent improvements in most subscales, indicated by higher median and 75th percentile scores compared to their scores at baseline and from the control group. There was a statistically significant difference between the Resilience Score after eight weeks of AT compared to baseline within the experimental groups (Z = -5.136, $p < 0.001$). In contrast, there was no statistically significant

Table 3

Comparison of Resilience Scale scores between the control and experimental groups at baseline and eight weeks after autogenic training

Parameters	Control group		Experimental groups	
	baseline	eight weeks	baseline	eight weeks
Resilience (score)				
Low (30–90)	2 (10)	2 (10)	17 (42.5)	4 (10)
Moderate (91–120)	9 (45)	9 (45)	8 (20)	16 (40)
High (121–150)	9 (45)	9 (45)	15 (37.5)	20 (50)
Total	20 (100)	20 (100)	40 (100)	40 (100)

All results are given as numbers (percentages) of participants.

Table 4

The Kruskal-Wallis test: difference in resilience levels between the control and experimental groups

Scale and subscales	H	df	Asymp. Sig.
Resilience Scale			
baseline	8.065	2	0.018
eight weeks	8.740	2	0.013
Confidence subscale			
baseline	8.101	2	0.017
eight weeks	5.697	2	0.058
Agility subscale			
baseline	7.288	2	0.026
eight weeks	8.002	2	0.018
Coping with Stress subscale			
baseline	6.869	2	0.032
eight weeks	9.450	2	0.009
Interpersonal Relationships subscale			
baseline	18.304	2	< 0.001
eight weeks	9.831	2	0.007
Developmental Thinking subscale			
baseline	7.148	2	0.028
eight weeks	7.706	2	0.021

H – difference between group ranks; df – degree of freedom; Asymp. Sig. – asymptotic significance.

Table 5

Statistical significance of differences in Wilcoxon signed-rank test scores for Resilience Scale and related subscales between the control and experimental groups

Scale and subscales	Experimental groups		Control group	
	Z	Asymp. Sig. (2-tailed)	Z	Asymp. Sig. (2-tailed)
Resilience Scale				
eight weeks baseline	-5.136[a]	< 0.001	-0.168[a]	0.866
Confidence subscale				
eight weeks baseline	-4.467[a]	< 0.001	-1.624[a]	0.104
Agility subscale				
eight weeks baseline	-2.967[a]	0.003	-1.853[a]	0.064
Coping with Stress subscale				
eight weeks baseline	-4.765[a]	< 0.001	-1.427[b]	0.153
Interpersonal Relationships subscale				
eight weeks baseline	-3.272[a]	0.001	-0.207[a]	0.836
Developmental Thinking subscale				
eight weeks baseline	-0.994[b]	0.320	-3.775[a]	< 0.001

[a] – based on positive ranks; [b] – based on negative ranks; Asymp. Sig. – asymptotic significance.

difference in the Resilience Score between eight weeks of AT and baseline within the control group (Z = -0.168, $p = 0.866$). Similar patterns are observed across all subscales, where there were statistically significant differences between eight weeks of AT and baseline within the experimental groups, indicating improvements in these aspects of resilience ($p < 0.001$ for Confidence, Coping with Stress, Interpersonal Relationships, $p = 0.003$ for Agility). Conversely, within the control group, there were no statistically significant differences in most subscales between eight weeks of AT and baseline, except for Developmental Thinking

($p < 0.001$). When comparing each experimental group individually to the control, the participant distribution is equal (20 : 20), while the collective comparison reveals a disparity between the control and the experimental groups (20 : 40). Yet, statistical analyses confirm comparable efficacy of AT in enhancing resilience across all experimental groups compared to the control.

For the Wilcoxon signed-rank test, a priori power analysis was performed based on predefined parameters, including an effect size of 0.80, a power of 0.80, and an alpha error probability of 0.05. The results indicated that a

minimum of 12 participants *per* group was needed to power the study adequately given these parameters. With 20 participants *per* group included, the sample size exceeded the required minimum. Furthermore, a *post hoc* analysis of the same group of 20 participants *per* group revealed an effective test power of 0.96, surpassing the initially targeted 0.80. This heightened power level enhances the reliability of the study's results, emphasizing its capability to detect true effect sizes with high confidence, and at the same time confirms that the sample size not only met but also exceeded the requirements for achieving statistically significant and reliable results, thereby ensuring the robustness of the study's conclusions.

Discussion

The results of the present study are consistent with previous research on AT as a method for stress reduction and anxiety management. Ernst and Kanji [12] conducted a systematic review of controlled AT trials and found that most trials reported positive effects of AT in reducing stress. However, they noted methodological flaws in many studies, highlighting the need for further well-designed controlled trials. Stetter and Kupper [13] conducted a meta-analysis of clinical outcome studies of AT and found medium-to-large effect sizes for pre-post comparisons of disease-specific AT effects. They concluded that AT is effective for various conditions, including tension headaches, essential hypertension, anxiety disorders, depression, and functional sleep disorders. A systematic review and meta-analysis evaluating the effectiveness of AT on stress responses was conducted and found that AT decreased anxiety and depression and increased heart rate variability, suggesting its effectiveness in stress management [14]. Kohler et al. [15] conducted a systematic review and meta-analysis focusing on AT for chronic pain. They found a significantly positive, moderate effect of AT on pain reduction compared to passive control groups. However, they noted the need for high-quality randomized controlled trials to strengthen the evidence for AT in individuals with chronic pain. Breznoscakova et al. [16] reviewed studies examining the effects of AT on mental disorders and found consistent efficacy of AT in reducing anxiety and medium-range positive effects for mild-to-moderate depression. They concluded that AT represents a promising adjunctive intervention in the prevention and clinical management of mental disorders.

Overall, the findings from these studies support the effectiveness of AT in reducing stress, anxiety, and pain, as well as improving psychological well-being. However, further research, particularly high-quality randomized controlled trials, is needed to confirm and expand upon these findings.

Several studies have demonstrated the potential benefits of AT in various populations and contexts. Litwic-Kaminska et al. [17] conducted a pilot study to evaluate the effectiveness of AT in improving sleep quality and reducing physiological stress reactions among university athletes. The study found that AT, delivered in an audio recording form, significantly increased subjective sleep quality in the experimental groups compared to the control group. Dobos et al. [18] investigated the effects of AT on migraine frequency and brain activation patterns in response to fearful visual stimuli. The study found that regular practice of AT led to a reduction in migraine attacks and induced changes in brain activation patterns, suggesting a potential mechanism through which AT exerts its effects. Ramirez Garcia et al. [19] conducted a mixed-method randomized controlled trial to assess the effects of AT on quality of life and symptoms in people living with human immunodeficiency virus (HIV). The study found significant improvements in social and mental dimensions of quality of life and sleep quality among participants in the AT group compared to the control group. These findings collectively suggest that AT may effectively improve sleep quality, reduce migraine frequency, and enhance the quality of life in various populations. However, further research is needed to confirm and expand upon these results, as well as explore the underlying mechanisms of action of AT. Additionally, research has shown that AT can have a positive impact on sleep quality and the reduction of stress symptoms in various populations, including student athletes and people living with HIV [18, 20]. Furthermore, a study conducted by Atkins and Hayes [21] on adolescents in school settings demonstrated that structured AT significantly reduced anxiety levels. Similarly, a pilot study involving people living with HIV and experiencing symptoms of depression found that AT and progressive muscle relaxation were feasible and potential therapeutic options for reducing depressive symptoms [22]. Regarding methodology, the study by Hoge et al. [23] highlighted that mindfulness-based stress management was equally effective as escitalopram, the standard treatment, for treating anxiety disorders. This supports the inclusion of alternative therapeutic approaches such as AT in the treatment of anxiety disorders. Furthermore, a systematic review on the effectiveness of interventions to improve resilience among healthcare workers emphasizes the importance of developing resilience-building programs, which could contribute to reducing stress and improving the well-being of healthcare workers [24]. The study by Kemper and Khirallah [25] indicates the acute benefits of online mind-body skills training in improving stress, mindfulness, empathy, and resilience among healthcare professionals. This suggests that such intervention programs should be further researched and implemented. Moreover, a review by Yumkhaibam et al. [26] encompassing 162 research papers underscores that AT can effectively reduce symptoms of anxiety disorders in various populations, highlighting its positive role in improving overall well-being.

Taking all of this into consideration, AT appears to be a promising relaxation technique that can have a significant positive impact on reducing anxiety, improving sleep quality, and overall well-being in various populations [27].

Based on the comprehensive body of research discussed, it can be concluded that AT holds promise in addressing a wide range of symptoms and phenomena. With its demonstrated effectiveness in reducing anxiety,

improving sleep quality, and enhancing overall well-being across diverse populations, AT emerges as a multifaceted technique with far-reaching benefits [6, 8, 9]. Given the intricate nature of resilience, the findings suggest that AT plays a pivotal role in bolstering resilience by targeting key factors such as anxiety and stress reduction. By mitigating these significant stressors, AT contributes to the enhancement of resilience, which is crucial for effectively coping with adversity and maintaining psychological well-being. In essence, AT serves as a foundational practice that fosters resilience by addressing core elements of mental health and adaptive functioning. Its ability to alleviate anxiety, improve sleep, and mitigate stress underscores its potential as a holistic approach to promoting overall resilience and well-being.

However, some research on healthcare workers facing high-stress levels suggests that simply enhancing resilience may not necessarily decrease anxiety and stress. Instead, interventions targeting coping skills have demonstrated effectiveness in bolstering resilience. Implementing capacity-building initiatives like resilience training can yield significant benefits for both healthcare staff and patients. Poor well-being among healthcare professionals has been associated with reduced clinical care capacity and increased vulnerability to mental illness. Therefore, investing in interventions that enhance resilience can positively impact both staff performance and patient outcomes [28].

The research underscores the pivotal role of resilience in mitigating the detrimental impact of burnout on the subjective well-being of healthcare workers. This highlights the significance of introducing resilience training programs to combat burnout and protect the mental well-being of healthcare professionals during demanding periods [29].

The results of this study suggested that the experimental groups showed improvements over time, particularly after eight weeks of intervention. These findings imply that the intervention effectively enhanced various dimensions of resilience among participants, highlighting its potential value in promoting psychological well-being and adaptive functioning. The results indicate that the intervention implemented with the experimental groups has contributed to significant improvements in overall RLs, as well as in various aspects contributing to resilience, compared to the control group over the eight weeks. Overall, these results underscore the effectiveness of the intervention in enhancing resilience-related factors among participants in the experimental groups, while no significant changes are observed in the control group. This suggests that the intervention has been successful in producing positive outcomes and highlights the importance of the intervention in promoting resilience.

While this study offers valuable insights into the potential benefits of AT on resilience and well-being, there are opportunities for further refinement and expansion in future research endeavors. Firstly, expanding the sample size and diversifying participant demographics could enhance the robustness and generalizability of the findings. It is crucial to emphasize that, although the sample size in the study was relatively small, power analysis concluded that the sample was sufficiently large to achieve adequate statistical power for detecting the effects of interest. However, it is important to note that increasing the number of participants could further enhance the generalizability and robustness of the findings. Therefore, while the current sample was deemed adequate for achieving the research objectives, further expansion of the sample could strengthen the conclusions and their applicability to a broader population. Employing a more comprehensive data collection approach, perhaps incorporating objective measures alongside self-reported data, could provide a more nuanced understanding of the effects of AT. Additionally, implementing a control group receiving an alternative intervention or usual care would strengthen the ability to draw causal inferences about the efficacy of AT. Longitudinal studies tracking participants over an extended period could illuminate the sustainability of AT effects on resilience and well-being, particularly by allowing for the assessment of whether any observed changes persist beyond the intervention period while maintaining a relatively consistent number of participants throughout the study duration. This extended follow-up would provide valuable insights into the long-term impact of AT and its potential benefits for resilience and overall well-being.

Given the type of sampling, there was awareness of potential confounders, including factors such as years of experience, gender, age, workload, and previous health conditions. To control the influence of these confounders, a power analysis was utilized for the statistical methods employed, taking into account the sample size. Future research should thoroughly investigate the potential impact of confounding variables, such as varying job positions, levels of responsibility among pharmacists and pharmaceutical technicians, events outside of work, and personal life stressors or changes, as these variables may influence participants' resilience and study outcomes. Additionally, participants' experience with AT or other relaxation techniques, along with their individual characteristics, could also impact study results independently of the intervention. Integrating qualitative assessments to capture participants' experiences, perceptions, attitudes, and beliefs in greater depth would enrich our understanding of the subjective effects of AT. Furthermore, considering potential moderating or mediating factors, such as concurrent therapies, could shed light on the factors influencing the effectiveness of AT interventions. Collaborating with diverse stakeholders, including healthcare providers and policymakers, could facilitate the integration of AT into existing healthcare models and enhance its accessibility. Finally, conducting cost-effectiveness analyses would provide valuable insights into the economic implications of implementing AT interventions in various healthcare settings. By addressing these suggestions, future research endeavors can further advance our knowledge of AT and its potential to promote resilience and well-being.

While the benefits of AT for stress reduction are well-documented, further research is needed to comprehensively

understand its potential role in enhancing resilience – the ability to bounce back from adversity and maintain psychological well-being amidst challenging circumstances. Examining how relaxation techniques, including AT, may bolster resilience could provide valuable insights into holistic approaches to mental health promotion and stress management. Thus, future research endeavors should aim to address this gap in the literature to fully grasp the therapeutic potential of relaxation practices in fostering resilience and mitigating the detrimental effects of stress [11].

Conclusion

Autogenic training has proven effective in strengthening resilience among community pharmacists, contributing to various aspects such as Confidence, Agility, Coping with Stress, Interpersonal Relationships, and Developmental Thinking. Integrating autogenic training techniques into practice can aid in stress management, enhance resilience, and improve the overall well-being of professionals and patients. Emphasizing autogenic training as a complementary approach to conventional healthcare practices, especially in pharmacy and public health, is crucial.

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