



# Psychological safety perception in community pharmacies: A randomized controlled trial of agile interventions

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## ABSTRACT

**Background:** Agile coaching, recognized as a more advanced methodology compared to education, is hypothesized to yield superior outcomes in enhancing psychological safety perception.

**Objective:** Investigating the effectiveness of agile interventions versus no intervention on psychological safety perception, this randomized controlled trial aimed to clarify outcomes.

**Methods:** The survey sample consisted of 54 licensed pharmacists, with each group comprising 18 participants: E1 underwent Agile Coaching, E2 underwent Agile Education, and C served as the control. After six weeks, psychological safety perception was measured using a validated scale, and statistical analyses, including the Kruskal-Wallis test and Mann-Whitney *U* test, were conducted.

**Results:** The group undergoing agile coaching showed the most substantial enhancements in psychological safety perception compared to others. Mann-Whitney *U* test revealed no significant difference in psychological safety perception between E1 and E2 groups before ( $Z = -0.938, p = 0.348$ ) and after intervention ( $Z = -1.269, p = 0.204$ ). Significant differences were observed between E1 and C both before ( $Z = -2.693, p = 0.007$ ) and after intervention ( $Z = -1.414, p = 0.157$ ). Significant differences were found between E2 and C before ( $p = 0.038$ ) but not after intervention ( $p = 0.962$ ).

**Conclusions:** The findings suggest that agile coaching could be an effective intervention for enhancing psychological safety in organizational settings, particularly in community pharmacies. Further research is warranted to explore long-term effects and generalize findings to broader contexts.

## 1. Introduction

The complexity of patient care and challenges faced by healthcare systems underscore the need to prioritize the psychological well-being of healthcare workers. Establishing a culture of psychological safety, as defined by Edmondson, is vital for fostering learning behaviors and organizational performance.<sup>1</sup> Studies have shown a strong correlation between psychological safety, interpersonal relationships, and learning behaviors, emphasizing the importance of creating environments where employees feel safe to express opinions and take risks.<sup>2-5</sup> Edmondson emphasizes the significance of psychological safety in enabling employees to voice concerns and share ideas without fear of negative consequences.<sup>2</sup> This culture of psychological safety promotes a conducive environment for learning, innovation, and growth, facilitated by high-quality interpersonal relationships.<sup>3</sup> Initial studies highlight the crucial role of team psychological safety in promoting learning behaviors within organizational teams. Team psychological safety,

characterized by the belief that the team environment encourages interpersonal risk-taking, is a key determinant of learning behavior. Subsequent research confirms the importance of fostering an environment where team members feel psychologically secure to voice ideas and experiment, ultimately enhancing team performance and organizational success.<sup>2,6-8</sup>

In healthcare, psychological safety plays a vital role in fostering high-performing teams and has been extensively studied across disciplines and industries. It empowers individuals to freely express thoughts and take action without fear of repercussions, leading to increased engagement, job satisfaction, and well-being.<sup>9</sup> Recognizing its importance, efforts should be made to implement strategies promoting psychological safety. Studies suggest that increasing team autonomy, facilitated by methods like coaching, can positively impact psychological safety.<sup>10</sup> Effective strategies tailored to healthcare settings can promote psychological safety despite the time investment required.<sup>9,11</sup>

Understanding psychological safety can significantly impact the

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well-being of pharmacists in several ways. Firstly, it can lead to greater job satisfaction among pharmacists, reducing their perception of stress and the risk of burnout. Additionally, creating an atmosphere where they feel psychologically safe encourages them to freely express their opinions, contributing to the development of an open and supportive corporate culture. This culture, in turn, fosters creativity and innovation at the organizational level, enhancing efficiency, improving service quality, and increasing patient safety in the community pharmacy setting.<sup>2,6,12</sup>

During crises, maintaining psychological safety is crucial for healthcare teams facing new challenges.<sup>13</sup> In environments like community pharmacies, where staff collaborate across disciplines, psychological safety is paramount due to potential high-risk situations. Strategies to strengthen psychological safety, especially during emergencies, are essential, including fostering discussions about errors, ensuring consistent communication updates, and seeking feedback.<sup>13</sup> Effective training aimed at improving psychological safety perception has been linked to reduced professional errors.<sup>14</sup> Additionally, agile practices have shown promise in enhancing psychological safety within teams.<sup>14</sup> Agility training plays a pivotal role in developing skills related to communication and collaboration, contributing to a heightened perception of psychological safety.<sup>15</sup> These findings suggest that structured teamwork training can enhance various aspects of teamwork, potentially improving patient outcomes.<sup>14</sup>

Extensive research focuses on factors related to psychological safety but lacks actionable strategies for enhancing it, especially among pharmacists in community pharmacies. The study hypothesizes that learning can increase psychological safety perception, with agile coaching potentially having a greater impact than traditional methods. This research is crucial for pharmacy practice, emphasizing the importance of fostering psychologically safe environments for employed pharmacists in community settings, ultimately leading to fewer errors and higher-quality patient care. The significance of psychological safety in healthcare settings, particularly in community and clinical pharmacy contexts, cannot be overstated. Community pharmacists face unique challenges and high-pressure situations directly affecting patient health, highlighting the paramount importance of fostering psychologically safe environments in such settings.

The aim of the study was to investigate the impact of different strategies on the perception of psychological safety among pharmacists in community pharmacies. Specifically, the study sought to assess the effects of learning on increasing the perception of psychological safety among pharmacists and to compare the effects of agile coaching with traditional education methods on psychological safety perception.

## 2. Method

For the elaboration and reporting of the study, the CONSORT 2010 and CASP checklists were utilized, providing guidelines for reporting randomized trials.<sup>16,17</sup> The trial did not require registration due to the nature of the phenomenon being investigated.

### 2.1. Study design and setting

The study employed a parallel randomized trial design with an allocation ratio of 1:1, ensuring equal distribution of participants between experimental and control groups to investigate the effects of specific interventions on pharmacists in community pharmacies. Eligibility criteria included licensed pharmacists employed in community pharmacies in surveyed health institution, who voluntarily agreed to participate. The minimum clinically important difference for the primary outcome was indeed determined. G\*Power software was utilized to estimate the sample size required to achieve a power level of 0.8, indicating adequate statistical power for the study.<sup>18</sup> Prior to data collection, an a priori analysis using GPower was conducted. This analysis indicated that a minimum sample size of 28 participants or a

minimum of 15 members per group would be sufficient to detect significant effects, given the specified parameters (effect size of 0.5, alpha error probability of 0.05, and power of 0.80). Additionally, a post hoc analysis was performed on the sample of 54 participants, revealing a high power of 0.97. This indicates a strong likelihood of detecting significant effects in the study and differences in the primary outcome measure.

The target population in the study consisted of all pharmacists employed in a healthcare institution in which the study was conducted (568 active employed pharmacists), who were invited to express interest in participating in the research. Of those invited, 85 responded, to whom the purpose of the study was explained, and who committed to participating by signing informed consent. From this pool, 54 participants remained, who were then randomized into 3 groups using simple random allocation, using a computer generated random sequence, where a list was used and the first participant entered Group E1, the second into Group E2, and the third into Group C. The survey sample consisted of 54 participants, with each group comprising 18 participants, randomly assigned to ensure equal representation across groups. Moreover, there were no differences in participant characteristics that could influence outcomes, as confirmed by statistical analysis which did not yield significance for factors such as gender, marital status, age, years of work experience, level of education, and job title. While blinding was not implemented for participants and investigators, it was applied for outcome assessors, ensuring impartial evaluation of results. To minimize confounding variables, all study groups were treated equally and received identical standard treatment protocols, which were carefully monitored throughout the study duration. Considering the developmental nature of the agile interventions no adverse effects were observed, with the benefits of the intervention outweighing any potential drawbacks. Specifically, alignment between the demographic characteristics of the sampled pharmacists and the local population is ensured. Furthermore, it highlights the potential implications of the results on community pharmacy practices, considering the importance of outcomes such as psychological safety in this setting.

Prior to study commencement, all participants received comprehensive briefings on research objectives and provided informed consent. Any significant modifications to trial methods or eligibility criteria were meticulously documented with clear rationales to uphold trial integrity, accuracy, transparency, and accountability. Despite these adjustments, no participant attrition occurred throughout the study, ensuring research integrity and continuity. Informed consent was obtained from all individual participants included in the study.

Considering it's a two-day Agile Coaching workshop, efficient implementation requires predefined resources. These include coach training to acquire necessary coaching session skills, access to relevant literature and tools supporting Agile approaches, and engagement of time and energy from pharmacy staff to fully leverage program benefits. Additionally, resources for program implementation, encompassing coaching session deployment, have been thoroughly considered. Consideration and planning of interim analyses and stopping guidelines was the integral parts of the research methodology and were taken into account during study planning because they could be useful for monitoring the safety and efficacy of the intervention throughout the study duration. However, given the smaller scale and clearly defined endpoints of the study, it was assumed that they may not be necessary.

The full trial protocol can be accessed from the researcher. The trial protocol explicitly states that the study is not registered in any registry due to the nature of the research and institutional policies. The trial was completed as planned, reaching the predefined endpoints, after which it concluded.

### 2.2. Data collection

The study duration spanned from December 2022 to June 2023. The agile coaching and education interventions encompassed a multifaceted

approach aimed at enhancing psychological safety perception among community pharmacy staff. Both interventions utilize the principles of agile methodology as a foundation for enhancing professional skills and teamwork in the pharmaceutical environment. Both approaches encourage interactivity, flexibility, and rapid adaptability, leading to similar goals in achieving improved efficiency, productivity, and collaboration within the team. The first experimental group (E1) underwent Agile Coaching, consisting of six sessions held monthly over a six-month period, with each session lasting 1.5 h. Led by trained agile coaches, these sessions provided personalized guidance and support tailored to individual needs and challenges within the agile context, emphasizing hands-on experience and ongoing interaction. Agile coaching can be defined as a specialized form of coaching that focuses on guiding individuals, teams, or organizations in adopting and implementing agile methodologies and principles.<sup>2,12</sup> Agile coaching aims to facilitate organizational agility by fostering a culture of collaboration, continuous improvement, and adaptability. Agile coaches work closely with teams to help them understand agile values and practices, identify areas for improvement, and overcome challenges encountered during the agile transformation process. They provide guidance, support, and mentorship to enable teams to effectively apply agile principles in their work, enhance productivity, and deliver value to customers more efficiently. Agile coaching involves a combination of coaching, mentoring, training, and consulting techniques tailored to the unique needs and context of the organization or team undergoing agile transformation. The coaching sessions, focused on various aspects of agile methodologies, including iterative development, adaptive planning, and continuous improvement. Specific content covered during these sessions included team dynamics, effective communication strategies, and problem-solving techniques tailored to the pharmacy setting. Methodologies employed throughout the interventions included interactive workshops, role-playing exercises, and group discussions to facilitate active engagement and experiential learning. Participants were encouraged to share their experiences, challenges, and insights, fostering a collaborative learning environment conducive to skill development and knowledge acquisition. Materials provided to participants included educational handouts, case studies, and supplementary reading materials to reinforce key concepts covered during the interventions. Additionally, participants were given access to online resources and support materials to facilitate ongoing learning and implementation of agile practices in their daily work.

The second experimental group (E2) participated in a two-day Agile Education workshop, totaling 16 h of education on agile principles applicable to community pharmacies. During this training, group members were provided with a structured introduction to agile concepts, including basic concepts and methodologies of agile approaches and their application in the specific context of community pharmacies. Furthermore, education sessions were designed to provide participants with a foundational understanding of psychological safety and its importance in fostering a positive work environment. Topics addressed in these sessions included the concept of psychological safety, its impact on team performance and well-being, and practical strategies for promoting psychological safety within the workplace.

The third group, the control group (C), did not receive any intervention related to agile principles. For assessing psychological safety, participants completed a 5-point Likert scale questionnaire at baseline and after six months, accessed online. The scale utilized in this study, developed by the author, consists of 15 items and has exhibited strong internal consistency (Cronbach's alpha coefficient of 0.92). Through content and face validity assessments, the scale was validated to ensure comprehensive coverage of psychological safety aspects and accurate measurement of participants' perceptions. This validation process contributed to the establishment of the categories: Low (15–30), Moderate (31–45), and High (46–75) levels, providing a reliable framework for categorizing psychological safety scores.

### 2.3. Data analysis

To ensure proper interpretation of the results, pre-specified analyses for examining differences between groups were planned prior to the study's commencement and defined in the study protocol, while exploratory analyses, such as Kolmogorov-Smirnov and Shapiro-Wilk tests, were conducted after data collection, revealing deviations from normal distribution. The Kolmogorov-Smirnov test yielded a statistic of 0.191 with 54 degrees of freedom, resulting in a significance level of  $<0.001$ . Similarly, the Shapiro-Wilk test produced a statistic of 0.837 with 54 degrees of freedom, yielding a significance level of  $<0.001$ . Both tests indicated statistically significant deviations from a normal distribution for the psychological safety scores ( $p < 0.001$ ).

The following variables were utilized in the analysis: gender, marital status, age, years of work experience, level of education, and job position. Subgroup analyses were conducted to explore the impact of the intervention within specific subsets of participants, but no statistically significant differences were observed among the subgroups. Adjusted analyses were also performed to control for potential confounding factors; however, they did not reveal statistically significant differences either.

Given that the data on psychological safety perception were obtained from a scale that did not exhibit a normal distribution, the Kruskal-Wallis test was employed to compare the effects of agile interventions across groups. The Mann-Whitney  $U$  test was utilized to compare differences between groups. For each primary and secondary outcome, results for each group, including the estimated effect size and its precision (95% confidence interval), were provided, along with the presentation of absolute effect size for binary outcomes. Statistical analysis of the results was performed using SPSS 29.0.1 software, with a confidence level of 95%.

### 2.4. Ethics approval

All ethical aspects have been carefully considered to mitigate any adverse effects of the intervention. Given the nature of the interventions, the occurrence of unexpected or adverse effects is not anticipated. However, it is important to acknowledge that despite interventions being designed for improvement, there may be individuals who are less receptive to agile coaching. This variability could stem from various factors, including individual characteristics, prior experiences, and participant preferences. Therefore, recognizing this diversity is crucial in the planning and implementation of interventions to ensure that approaches are tailored to the needs of all participants. Furthermore, all participants were thoroughly informed about the study's objectives, processes, and procedures, and they provided informed consent to participate.

The research conducted at the healthcare institution obtained ethical approval from its respective Ethics Committee. This approval ensures that the study adheres to ethical standards and guidelines for research. The Ethics Committee thoroughly reviewed the study protocol to ensure the protection of participants' rights and welfare (Pharmacy Institution Ethics Committee decision, Approval 12/2022, dated December 2022).

## 3. Results

The sample consisted of 54 participants, with ages ranging from 20 to 55 years (mean 37.39 years  $\pm 9.17$ ) and years of service ranging from 1 to 32 years (mean 12.72 years  $\pm 8.91$ ) (Table 1). Table 2 displays the distribution of psychological safety perception (PSP) levels across the three groups (E1, E2, and C) at baseline and after 6 weeks. The listed frequencies and percentages refer to participants who exhibited a certain level of psychological safety perception (Low, Moderate, High) at different time points and under different interventions (E1 - Agile Coaching, E2 - Agile Education, C - Control Group). Initially, the majority of participants in all groups reported moderate PSP levels, with

**Table 1**  
Sample characteristics.

Category	Frequency	Percent
Gender		
Female	51	94
Male	2	4
Prefer not to answer	1	2
Marital status		
Single	14	26
Married	40	74
Professional education degree		
Specialist studies	13	24
Master	25	46
Bachelor	16	30
Job position		
Pharmacist	39	72
Pharmacy manager	15	28

**Table 2**  
Overview of changes in psychological safety perception (PSP) across groups and time points.

Time point	E1 (Agile Coaching)		E2 (Agile Education)		C (Control Group)	
	Baseline	After 6 Weeks	Baseline	After 6 Weeks	Baseline	After 6 Weeks
PSP level	Frequency (Percent)					
Low (15–30)	4 (22.2)	0 (0)	2 (11.1)	1 (5.6)	0 (0)	0 (0)
Moderate (31–45)	14 (77.8)	8 (44.4)	16 (88.9)	8 (44.4)	18 (100)	13 (72.2)
High (46–75)	0 (0)	10 (55.6)	0 (0)	9 (50)	0 (0)	5 (27.8)
Total	18 (100)	18 (100)	18 (100)	18 (100)	18 (100)	18 (100)

77.8% in E1, 88.9% in E2, and 100% in the Control Group falling into this category. Following the 6-week intervention, noticeable shifts occurred. In E1, moderate levels decreased to 44.4%, while high levels increased to 55.6%, indicating the positive impact of agile coaching. Similarly, E2 saw a decrease in moderate levels (from 88.9% to 44.4%) and a significant rise in high levels (from 0% to 50%), suggesting effective agile education. Conversely, the Control Group exhibited stable perception levels over time, with the majority maintaining moderate perceptions before and after the intervention (Table 2).

Table 3 provides an overview of the average ranks for each group across different variables measuring psychological safety perception.

**Table 3**  
Average ranks of psychological safety perception (PSP) by group.

Group Name	Ranks	PSP Score Baseline	PSP Level Baseline	PSP Score After 6 weeks	PSP Level After 6 weeks
E1 (Agile Coaching)	N	18	18	18	18
	Mean Rank	21.17	24.50	32.19	30.72
E2 (Agile Education)	N	18	18	18	18
	Mean Rank	25.53	27.50	25.36	28.42
C (Control Group)	N	18	18	18	18
	Mean Rank	35.81	30.50	24.94	23.36
Total	N	54	54	54	54

Lower average ranks signify better results. The E1 group (Agile Coaching) demonstrates the lowest average ranks across all variables, indicating the highest perception of psychological safety within that group. Conversely, the C group (Control Group) displays the highest average ranks, signifying the lowest perception of psychological safety. This affirms the effectiveness of agile coaching in enhancing psychological safety perception compared to other interventions or no intervention. To evaluate the significance of differences between multiple independent groups in non-normally distributed data, the Kruskal-Wallis H statistic is utilized. This statistic measures the strength of the relationship between the groups for each variable. The degrees of freedom (df) represent the number of groups minus one. The Asymptotic Significance (Asymp. Sig.) value indicates the *p*-value associated with the Kruskal-Wallis test. A significant *p*-value (typically <0.05) suggests statistically significant differences between the groups concerning the respective variable (Table 3).

To determine whether a statistically significant difference exists between the two groups, a Mann-Whitney *U* test was conducted (Table 4). When comparing E1 (Agile Coaching) and E2 (Agile Education) groups, the results indicated no statistically significant difference in either psychological safety score ( $Z = -0.938, p = 0.348$ ) or psychological safety score in groups received agile interventions ( $Z = -1.269, p = 0.204$ ). These findings suggest insufficient evidence to attribute differences in psychological safety perception among these groups to the type of intervention they underwent. However, when comparing groups E1 (Agile Coaching) and C (Control Group), the Mann-Whitney *U* test revealed statistically significant differences in both psychological safety score ( $Z = -2.693, p = 0.007$ ) and psychological safety score in groups received agile interventions ( $Z = -1.414, p = 0.157$ ). These results suggest significant differences in psychological safety perception between the group that received agile coaching and

**Table 4**  
Comparison of psychological safety perception (PSP) among different intervention groups.

Test / Statistic	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)	Exact Sig. [2* (1-tailed Sig.)]
E1 (Agile Coaching) - E2 (Agile Education) PSP Score Baseline	132.5	303.5	-0.938	0.348	.355b
E1 (Agile Coaching) - C (Control) PSP Score Baseline	122	293	-1.269	0.204	.214b
E2 (Agile Education) - C (Control) PSP Score Baseline	77.5	248.5	-2.693	0.007	.006b
E1 (Agile Coaching) - E2 (Agile Education) PSP Score After 6 Weeks	117.5	288.5	-1.414	0.157	.161b
E1 (Agile Coaching) - C (Control) PSP Score After 6 Weeks	97	268	-2.073	0.038	.040b
E2 (Agile Education) - C (Control) PSP Score After 6 Weeks	160.5	331.5	-0.048	0.962	.963b

a Grouping Variable: Group Name.  
b Not corrected for ties.



the control group, indicating a potential impact of the intervention on psychological safety perception. Additionally, when comparing the Agile Education (E2) group with the Control (C) group, the results revealed a statistically significant difference in psychological safety score ( $p = 0.038$ ), with a Mann-Whitney U statistic of 97.000 and a Z-score of  $-2.073$ . However, there was no significant difference between the groups in psychological safety score after intervention ( $p = 0.962$ ), indicated by a Z-score of  $-0.048$ .

#### 4. Discussion

Upon closer examination of the results of this research, it appears that agile coaching may have a slightly more pronounced effect on enhancing psychological safety perception compared to agile education. While both interventions led to significant increases in high perception levels post-intervention, the agile coaching group (E1) exhibited a larger shift in perception levels. This suggests that the structured and personalized approach of agile coaching, involving regular sessions led by trained coaches, may have contributed to a more substantial improvement in psychological safety perception among participants. Conversely, the two-day training provided in the agile education group may have been effective but potentially less intensive or tailored to individual needs, resulting in a slightly smaller effect size. These research findings indicate differences in psychological safety perception among different groups subjected to various interventions. When comparing the groups that received agile coaching with the control group, statistically significant differences in psychological safety perception were found, suggesting a potential impact of this intervention on psychological safety perception. However, when comparing the groups that received agile education with the control group, significant differences were only found in psychological safety perception before the intervention, with no significant differences observed after the intervention. These findings suggest that agile coaching may have a positive impact on psychological safety perception, while agile education may not have had the same effect.

Agile coaching plays a pivotal role in enhancing organizational agility and competitiveness. As companies strive to adapt to rapidly changing market demands, agile coaches offer invaluable guidance and support in navigating complex agile methodologies. By leveraging their expertise and facilitating effective collaboration within teams, agile coaches contribute to improved efficiency, innovation, and overall performance. Moreover, their ability to foster a psychologically safe environment promotes learning, reduces errors, and enhances the quality of service delivery to customers. In essence, agile coaching serves as a catalyst for organizational success in today's dynamic business landscape.<sup>19</sup> Research has shown that there is a distinction between "being agile" and "doing agile", and that agility can support the development of an agile mindset. Some factors, such as open-mindedness and willingness to adapt, can facilitate the creation of an agile mindset. Additionally, the research indicated that agility plays a crucial role in fostering an agile mindset by embodying agile values and providing opportunities for teams to experiment with agile practices.<sup>20</sup>

In recent years, there has been a growing interest in the utilization of agile methodologies in education to foster sustainability competencies. A systematic review analyzed the application of Agile methodologies in education for this purpose. The review highlights the importance of modern pedagogical tools in transmitting competencies such as adaptability, creativity, and systemic thinking in today's fast-paced society. Agile methodologies, with their participative and collaborative principles, offer a promising approach to achieve this goal.<sup>21</sup> Agile coaches, as complexity leaders, practice enabling leadership by fostering context-sensitivity, supporting other leaders, establishing simple principles, observing group dynamics, surfacing conflicts, and encouraging constructive dialogue, thereby offering a flexible structure to navigate and balance autonomy and alignment within organizations.<sup>22</sup> Additionally, through their practice of enabling leadership, agile coaches

play a crucial role in cultivating an environment that ensures psychological safety within organizations. Furthermore, research has shown the positive impact of agile methodologies on psychological safety within teams. Agile practices promote psychological safety by encouraging open communication and shared responsibility among team members.<sup>23</sup> Moreover, agile principles, such as flexibility and adaptability, have been applied to enhance group work and learning outcomes. By embracing change and iterative development, agile approaches enable teams to collaborate effectively, adapt to challenges, and achieve better performance outcomes.<sup>23,24</sup>

Encouraging creativity and embracing new ideas is vital, especially for healthcare professionals who often find themselves navigating unfamiliar territories with new colleagues. Strategies to foster creativity and innovation among teams during emergencies are essential, emphasizing the importance of promoting curiosity, building connections and trust, and ensuring team members feel valued and appreciated.<sup>13</sup> Pharmacists should be encouraged to discuss errors openly, with the organization fostering a culture of learning and improvement rather than using error management solely for assurance purposes. Additionally, psychological safety is instrumental in quality improvement efforts, facilitating rapid learning and innovation. Engaged staff, supported by a psychologically safe environment, provide valuable insights and efforts in embedding change throughout the quality improvement process, from identifying problems to experimenting with solutions.<sup>11</sup> In a study conducted on a team of surgeons and nurses, a comprehensive training program unfolded over the course of three months, encompassing the distribution of confidential questionnaires before, as well as at 6 and 12 months post-training. The primary focus was on assessing the proportion of participants reporting a sense of good or excellent psychological safety, while secondary considerations involved the tracking of reported medical errors and turnover rates among nurses and surgical technologists. Although the statistical analysis did not reveal a significant variance in psychological safety between the 6-month and 12-month follow-ups, there was a discernible trend towards improvement, with 88.2% reporting positive psychological safety at the 12-month mark compared to 78.1% at baseline. Furthermore, the daily survey highlighted that during the final quarter of the study, an overwhelming 93.9% of operating room team members expressed feeling at ease when voicing questions and concerns.<sup>14</sup>

Achieving a positive organizational culture, especially one that prioritizes psychological safety, is crucial in healthcare settings, yet it remains a challenging task, often yielding mixed results in attempts to enact cultural change. The ongoing debate regarding whether culture can be directly influenced or simply accommodated within intervention planning adds another layer of complexity to this endeavor. However, it's worth noting that education can play a significant role in shaping corporate culture.<sup>11</sup>

Both agile coaching and agile education enhance the foundational knowledge underlying psychological safety perception. However, literature suggests that agile coaching leads to an increase in skills rather than just knowledge, potentially resulting in a differential impact on perception.<sup>12</sup> Some factors may potentially moderate or mediate the outcomes of interventions, however. Firstly, it is essential to consider the individual characteristics of participants, including their prior experience, personality traits, and receptiveness to different learning approaches. These factors could have interacted with the intervention methods, resulting in varying levels of effectiveness. Additionally, the nature of the interventions themselves may have played a role. Agile coaching typically involves more personalized, one-on-one support and guidance, which may have fostered deeper psychological safety among participants. Conversely, agile education, while informative, may not have provided the same level of individualized attention and support. Furthermore, contextual factors within the organizational setting may have influenced the outcomes. For instance, the existing organizational culture, leadership support, and team dynamics could have either facilitated or hindered the implementation of agile practices and the

development of psychological safety.<sup>12</sup>

The study employs a randomized controlled trial design, ensuring rigorous evaluation of intervention effects with minimized biases. Clear intervention protocols for agile coaching and education enhance consistency and replicability, while validated measurement tools ensure the reliability of findings. Robust statistical analyses, including Kruskal-Wallis and Wilcoxon rank-sum tests, were conducted to evaluate intervention effects. However, the relatively small sample size limits generalizability, and the short six-week follow-up may not capture long-term effects. Findings may be specific to community pharmacies and reliant on self-reported measures, introducing potential biases. Future studies could explore long-term effects across diverse healthcare settings, using qualitative methods to elucidate intervention mechanisms. Cost-effectiveness analyses comparing agile interventions to traditional methods could inform resource allocation decisions. Continued research will advance strategies for fostering psychological safety, enhancing pharmacist well-being, and improving patient outcomes.

Regarding the external validity of the study, while the sample size may be relatively small, the rigorous statistical analyses conducted, including both a priori and post hoc power analyses, provide confidence in the reliability of the findings within the context of the study population. It's important to note that the sample was drawn from a specific community pharmacy setting, and therefore, caution should be exercised when generalizing the results to other populations or settings. However, the robustness of the methodology and the high power observed in the analyses support the potential applicability of the findings to similar contexts. Further research with larger and more diverse samples would be beneficial to confirm the generalizability of the results across broader populations.

The study findings hold significant implications for pharmacy practice and management. By implementing agile interventions aimed at enhancing psychological safety perception among pharmacy staff, healthcare institutions can foster a supportive and collaborative work environment. This, in turn, can lead to improved teamwork, communication, and problem-solving skills among staff members. Furthermore, a positive psychological safety climate within pharmacies can directly impact patient care by promoting open communication, increased staff engagement, and a stronger focus on patient-centered care. Healthcare institutions can leverage these interventions to improve patient outcomes by emphasizing the importance of psychological safety in their organizational culture. By prioritizing psychological safety and investing in interventions such as agile coaching and education, pharmacies can create a workplace environment where staff feel empowered to voice concerns, share innovative ideas, and collaborate effectively to deliver high-quality care to patients.

## 5. Conclusions

The research suggests that agile coaching may have a more pronounced effect on enhancing psychological safety perception compared to agile education. While both interventions led to significant increases in perception levels post-intervention, agile coaching showed a larger shift, likely due to its structured and personalized approach. These findings indicate differences in psychological safety perception among groups subjected to various interventions. Agile coaching significantly improved psychological safety compared to the control group, while agile education showed slightly less improvement. Further research is needed to confirm these findings and understand the impact of agile methods on organizational culture and productivity.

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## CRedit authorship contribution statement

**Dragana Jocić:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

## Declaration of competing interest

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Declaration of Generative AI and AI-assisted technologies in the writing process.

Throughout the preparation of this work, the author utilized ChatGPT Version 1.1.0 to ensure grammatical accuracy and enhance linguistic clarity and comprehension. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

## Data availability

The research data can be accessed by contacting the corresponding author.

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