Strengthening pharmacy practice: development and validation of the Resilience Scale

Jačanje apotekarske prakse: razvoj i validacija Skale otpornosti

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Abstract

Background/Aim. Despite the demanding nature of their roles in community pharmacies and their critical importance to patient safety, healthcare professionals, including pharmacists, are often not covered by the Resilience Scale. Therefore, the aim of the study was to develop and validate a resilience scale specifically tailored for pharmacists working in community pharmacies. **Methods.** The study involved the development and validation of a scale aimed at assessing psychological resilience among community pharmacists. The domains and items of the scale were considered from the aspect of reviewing the available literature. Content validation by subject matter experts and subsequent computation of the content validity index ensured the scale's content validity. Face validity assessment ensured alignment with the intended construct. The final scale was distributed to a sample of 504 community pharmacists, after which the scale was analyzed using statistical methods such as factor analysis, multiple regression, and reliability analysis. Additionally, test-retest reliability analysis was performed on 80 community pharmacists. **Results.** During the brainstorming sessions and focus groups, 95 items were generated within five domains – Confidence, Agility, Coping with stress, Interpersonal relations, and Developmental thinking. Following expert review and rigorous content and face validity analyses, 30 items with Content Validity Index and Face Validity Index values surpassing 0.80 were retained. The scale exhibited strong internal consistency, with Cronbach's alpha exceeding 0.9. Factor analysis confirmed the five-factor structure, with each component displaying high factor loadings and significant variable loadings on only one component. **Conclusion.** The Resilience Scale emerged as a promising tool for assessing community pharmacists' resilience, demonstrating robust psychometric properties. The study contributed validity evidence concerning content and internal structure, thereby enhancing the scale's credibility in evaluating resilience domains within the pharmacy profession.

Key words:
data interpretation, statistical; pharmacists; resilience, psychological; serbia; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Uprkos zahtevnoj prirodi njihovih uloga u javnim apotekama i kritičnom značaju za bezbednost pacijenata, zdravstveni radnici, uključujući farmaceute, često nisu obuhvaćeni Skalom otpornosti. Zbog toga je cilj rada bio da se razvije i validira skala otpornosti posebno prilagođena farmaceutima zaposlenim u javnim apotekama. **Metode.** Istraživanje je uključilo razvoj i validaciju skale usmerene na procenu psihološke otpornosti među farmaceutima zaposlenim u javnim apotekama. Domeni i stavke skale razmatrani su sa aspekta pregleda dostupne literature. Validacija sadržaja od strane stručnjaka za predmetnu oblast i naknadno izračunavanje indeksa validnosti sadržaja osigurali su validnost sadržaja skale. Procena pojavne validnosti (*face* validnosti) osigurala je usklađenost sa pretpostavljenim konstruktom. Konačna skala distribuirana je na uzorku od 504 farmaceuta zaposlenih u javnim apotekama, nakon čega je skala analizirana primenom statističkih metoda kao što su faktorska analiza, multipla regresija i analiza pouzdanosti. Dodatno, analiza pouzdanosti test-retest metodom izvršena je na uzorku od 80 farmaceuta zaposlenih u javnim apotekama. **Rezultati.** Tokom sesija grupnog promišljanja (*brainstorming* sesija) i fokus grupa generisano je 95 stavki u okviru pet domena – Samopouzdanje, Agilnost, Savladavanje stresa, Međuljudski odnosi i Razvojno mišljenje. Nakon stručnog pregleda i rigorozne analize validnosti sadržaja i pojavne validnosti zadržano je 30 stavki sa vrednostima indeksa validnosti sadržaja i indeksa pojavne validnosti iznad 0,80. Skala je pokazala snažnu unutrašnju konzistentnost, sa Cronbach-ovim alfa koeficijentom preko 0,9. Faktorska analiza potvrdila je petofaktorsku

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strukturu, pri čemu je svaka komponenta pokazala visoka faktorska opterećenja i značajno opterećenje stavki samo na jednoj komponenti. **Zaključak.** Skala otpornosti pokazala se kao odgovarajući alat za procenu otpornosti farmaceuta zaposlenih u javnim apotekama, demonstrirajući zadovoljavajuće psihometrijske karakteristike. Ova studija doprinela je dokazima o validnosti u vezi sa sadržajem i unutrašnjom strukturom, čime je povećan kredibilitet skale u proceni domena otpornosti u okviru farmaceutske profesije.

Ključne reči:
statistička analiza podataka; farmaceuti; rezilijentnost; srbija; ankete i upitnici.

Introduction

Resilience within psychology refers to an individual's capability to handle and bounce back from various life challenges, stressors, or unfavorable circumstances while maintaining mental well-being. In essence, it involves the capacity to adapt, recover, or sustain a positive outlook despite facing difficulties. Central to resilience are active coping strategies, adaptation skills, and cultivating internal resources to navigate life's adversities with resilience and emotional fortitude [1, 2]. Resilience, defined as the ability to bounce back from adversity and maintain psychological well-being, is an essential trait for individuals facing the challenges inherent in the pharmacy profession, particularly those working in community pharmacies. Pharmacists in community pharmacies encounter various stressors, including high workload, time pressure, dealing with patient health issues, and ensuring medication safety. Given the critical role of pharmacists in healthcare delivery, their resilience directly impacts service quality, patient outcomes, and pharmacist safety [3–5].

Examining resilience among pharmacists, especially post-pandemic, is of paramount importance. The prevalence of low resilience among the general population is twice as high compared to healthcare professionals [6]. Earlier research has traditionally tracked resilience through the phenomena of stress coping and burnout without specifically focusing on the distinct aspects of resilience dimensions viewed as a specific construct. Findings indicate that more than half of the participants reported high levels of anxiety, stress, and burnout, suggesting low levels of resilience [4, 5]. This underscores the need for researching and supporting resilience within the pharmaceutical profession. The experiences of healthcare professionals during the coronavirus disease 2019 (COVID-19) pandemic offer invaluable insights into understanding the rapid responsiveness of healthcare systems to changes and the potential for fostering resilient healthcare services on a global scale. It was evident that healthcare professionals exhibited remarkable adaptive abilities amidst the challenges posed by the COVID-19 pandemic. While certain adaptations were deemed advantageous for future organizational healthcare service modifications, others revealed deficiencies in healthcare system structures and capabilities, resulting in maladaptive adjustments [7]. Despite the recognized importance of resilience, there is a lack of standardized resilience assessment tools tailored specifically for pharmacists working in community pharmacies.

Existing resilience scales (RSs) may not fully capture the unique stressors and coping mechanisms relevant to this population. Consequently, there is a pressing need to develop and validate an RS tailored to the context of public pharmacy practice. The development of a standardized RS for pharmacists in community pharmacies is crucial for several reasons. Firstly, it allows for a comprehensive assessment of pharmacists' resilience levels, enabling targeted interventions to enhance coping strategies and psychological well-being. Secondly, a validated RS can serve as a valuable tool for evaluating the effectiveness of resilience-building interventions and training programs tailored to pharmacists' needs. Thirdly, by understanding pharmacists' resilience levels, healthcare organizations can support their workforce better, leading to improved service quality, patient satisfaction, and medication safety outcomes. Additionally, the development of multidimensional instruments for assessing resilience is crucial, especially given the presence of similar phenomena such as stress and burnout. These instruments offer a more selective insight into specific components of resilience, allowing for a better understanding of how individuals cope with challenges and adversities. Their multidimensional nature contributes to a deeper understanding of resilience and the identification of key areas for interventions and support. Therefore, their existence enriches research and practice in the field of mental health and well-being, providing tools that target one of the most critical aspects of human resilience [8].

The aim of the research was to develop and validate a Pharmacist RS (PRS) tailored for pharmacists in community pharmacies at the primary level of healthcare. The study detailed the item generation, validation procedures, and psychometric evaluation of the scale using a sample of community pharmacists. Additionally, the significance of implementing a standardized RS for pharmacists was discussed, highlighting its potential to enhance service quality, improve patient outcomes, and safeguard pharmacist well-being and safety.

Methods

The study unfolded in two phases. The first phase identified resilience domains for community pharmacists and formulated corresponding items. The second phase validated these domains and items through content and face validation, followed by evaluating their factorial structure and internal consistency. Figure 1 shows the stages of scale development and validation.
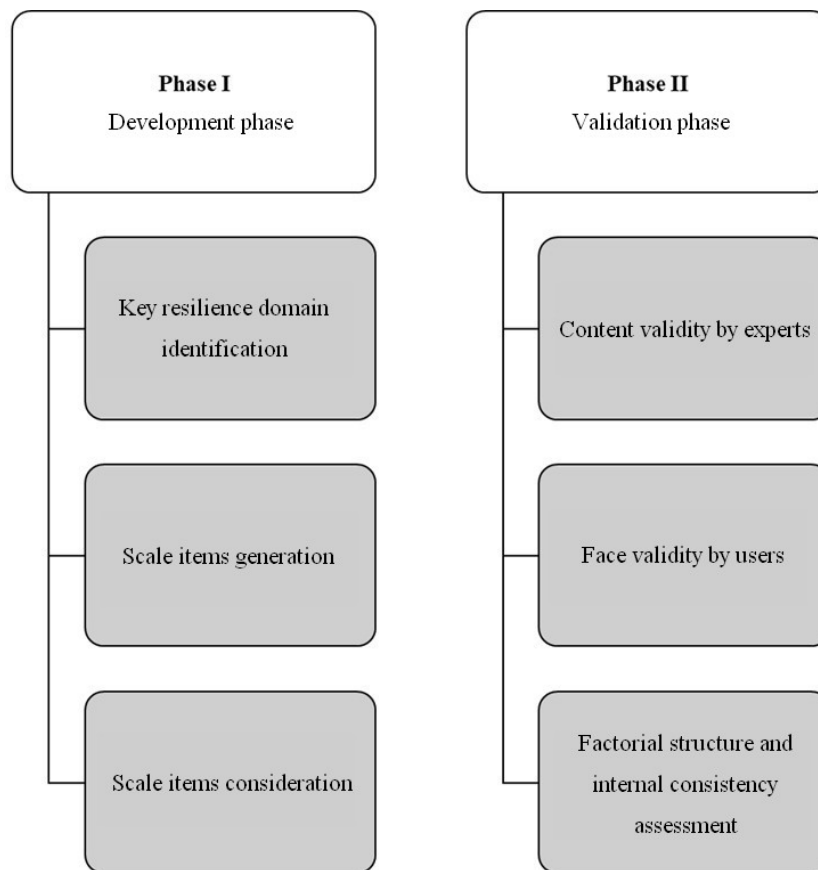
Fig. 1 – Stages of development and validation of the Pharmacy Resilience Scale.

Construction of the Pharmacist Resilience Scale

In the endeavor to evaluate psychological resilience for the study, a specialized scale was developed. The instrument was created following the methodology of psycho-social research concerning the development of measurement scales [9]. The study's initial phase was dedicated to pinpointing resilience domains among pharmacists in community pharmacies. These domains, derived from the integrated resilience model, encompass Control (maintaining composure under stress), Resourcefulness (utilizing available resources for solutions), Involvement (commitment to overcoming adversity), and Growth (continuous personal development amid challenges) [10]. Subsequently, items were crafted through a literature review and two collaborative brainstorming sessions with experts, including two psychologists, three pharmacy experts, and a scale development specialist. The process advanced through various stages, incorporating insights from two focus groups consisting of licensed pharmacists, a psychologist, and the study's primary investigator. Pilot testing highlighted areas for improvement, prompting iterative cycles of refinement that included formulation, testing, and revision.

The generation of items for the RS was based on a comprehensive literature review [1, 2], that involved an initial search in each database using selected keywords. Titles and abstracts were screened to identify potentially relevant studies, and full-text articles of the shortlisted studies were retrieved and reviewed. The methodology of the literature search, including details on the databases used, keywords, as well as inclusion and exclusion criteria, can be found in Appendix 1. Data extraction focused on resilience domains, item development processes, and validation techniques. The extracted data were synthesized to identify common themes and domains of resilience applicable to community pharmacists, such as Control, Resourcefulness, Involvement, and Growth.

The initial version of the scale was evaluated by a panel of content experts selected for their qualifications and extensive research background in resilience. A minimum of six experts participated in the content validation process, using a 4-point rating scale to assess each item's relevance to the resilience domains: 1 for irrelevant items, 2 for somewhat relevant, 3 for quite relevant, and 4 for highly relevant items. Experts also provided written feedback on items requiring modification or removal. The Content Validity Index (CVI) was computed based on two parameters. The first parameter was an Item-Level CVI (I-CVI). This index measured the proportion of experts who rated each item as 3 or 4, indicating its relevance out of the total number of experts. The second one was a Scale-Level CVI (S-CVI). The S-CVI was calculated as the average of the I-CVI scores across all items within the scale, reflecting the overall content validity of the instrument.

The minimum acceptable I-CVI value was set at 0.78, and the minimum acceptable S-CVI value was set at 0.80. Items with an I-CVI below 0.80 were rejected, while those with an I-CVI of 0.80 or higher were accepted [11].

Following the content validation process, face validation was conducted primarily to assess the clarity of instructions and language in the instrument, aiming to identify any ambiguities or multiple interpretations of the items. A minimum of ten test respondents were targeted for the face validation phase. The determination of the Face Validity Index (FVI) involved evaluating specific criteria. The first one was Item-Level FVI (I-FVI). This metric gauges the percentage of test respondents who assigned a clarity rating of 3 or 4 to each item. The second criterion was Scale-Level FVI (S-FVI). This index represents the mean of all I-FVI scores across items within a scale, such as a resilience domain. The I-FVI was required to meet a minimum threshold of 0.80, while the S-FVI needed to reach at least 0.83. Items with an I-FVI below 0.80 were disregarded, and those with an I-FVI of 0.80 or higher were considered acceptable [12].

Scale results were categorized into Low, Moderate, and High resilience based on score ranges: 0–33% for Low resilience (insufficient resources and coping strategies), 34–66% for Moderate resilience (moderate resources and coping strategies), and 67–100% for High resilience (abundant resources and effective coping strategies). These criteria stem from resilience literature analysis and proposed classification standards [1, 2, 9].

The scale utilizes a 5-point Likert scale, spanning from "Never" to "Always", where respondents indicate their level of agreement or frequency. Scoring is determined by summing up the responses across all items. According to predefined criteria, individuals are then categorized into specific resilience levels: Low resilience (scores from 30–90), Moderate resilience (scores from 91–120), and High resilience (scores from 121–150).

The research instrument underwent official approval from the Pharmaceutical Chamber of Serbia, enabling its development and testing. All participating pharmacists were thoroughly briefed on the study's details, assured of their anonymity, and given a full explanation once again. Notably, no financial compensation was provided to any participant. The approval for the study was granted by the Ethics Committee of the Pharmaceutical Chamber of Serbia, No. 316/2-6, from August 3, 2022.

Procedure and statistical analyses

Licensed pharmacists working in community pharmacies were invited *via* email by the Serbian Chamber of Pharmacy to complete questionnaires assessing socio-demographic data and psychological resilience. Initially, 504 pharmacists completed the resilience questionnaire. During this phase, participants were given the option to revisit the questionnaire after three months. Informed consent was obtained from 120 individuals who agreed to participate in the follow-up evaluation. After three months, 80 respondents completed the questionnaire, forming the basis for further statistical analysis.

The scale's reliability was assessed to gauge its resistance to random errors, focusing on temporal stability (test-retest reliability) and internal consistency. Temporal stability was evaluated by administering the scale twice to the same subjects: initially and after three months. With a sample size of 80 in the second phase, additional parameters related to the distribution's normality were also examined for the test-retest analysis. Since the sample size in the second phase was 80, and given that this was the basis for the test-retest analysis, additional parameters of normality of the distribution were examined [9].

Subsequently, the correlation of the obtained results was calculated. Wilcoxon rank test was utilized to compare the mean values of the attributes of the same group of participants, i.e., resilience scores at two time points (measured twice). Another analysis confirming the temporal stability of the results is demonstrated by Spearman's rank correlation coefficient. Spearman's coefficient confirms the temporal stability of the results. High correlations indicate consistent measurement results over time, validating the scale's reliability and stability across different time points [9].

Internal consistency of the scale was assessed to measure item similarity and interconnectedness. Cronbach's alpha coefficient, commonly used for this purpose, indicates the average correlation among all scale items. Ideally, Cronbach's alpha should exceed 0.70 [9]. Skewness and kurtosis calculations are recommended for samples with fewer than 200 cases analyzed [13].

Multiple regression analysis was used to examine the scale model, assessing the predictive power of each subscale and their contribution to the overall model [9]. This analysis determined how much variance in the RS score is explained by each subscale individually, evaluating both the overall model and each subscale's statistical significance.

Factor analysis, specifically principal component analysis, was used to determine the underlying factors of the RS's 30 items. Criteria included a Kaiser-Meyer-Olkin value exceeding 0.6 and statistical significance in Bartlett's Test of Sphericity [14, 15], confirming the factorability of the correlation matrix. Subscale correlations were also calculated to affirm internal consistency. Sample size determination used GPower [9, 14, 15] with $\alpha = 0.05$ and effect size 0.5. Power analysis ensured a minimum sample size of 80% power to detect significant effects. The effect size of 0.80 indicated a substantial impact, boosting result confidence. *Post hoc* analyses validated findings across subgroups, reinforcing conclusions. Statistical calculations were conducted using the SPSS software package, version 29.0.1.

Results

Based on literature data, 95 items were generated through brainstorming sessions and focus groups, including Confidence, Agility, Coping with stress, Interpersonal relationships, and Developmental thinking domains. During this process, 28 items were discarded. Based on qualitative feedback from expert panels, 16 items were reviewed, and 13 items were discarded. Subsequently, 54 items underwent content validity analysis. Among these, ten items had an I-CVI of less than 0.8 and were consequently discarded, leaving 44 items for FVA. Based on the FVA, 14 items were dis-

carded (I-FVI less than 0.8), resulting in the creation of a final scale comprising 30 items. The S-CVI score was 0.81. The S-FVI yielded a satisfactory score of 0.71, slightly below that of the basic set. Despite this, the scale featuring this item structure was retained, as items with both I-CVI and I-FVI scores below 0.80 were discarded.

A questionnaire was administered to a sample of 504 pharmacists to assess the factorial structure of the scale. Among these participants, 92.5% were female, with an age range from 24 to 79 years [mean age = 41.43 years, standard deviation (SD) = 10.55]. Additionally, 58.3% of participants held managerial positions, and 67.5% expressed job satisfaction.

To evaluate the temporal stability of the scale, the questionnaire was administered to a sample of 80 pharmacists at the beginning and after three months. While the questionnaire was initially distributed to all 504 pharmacists who completed it, only 80 pharmacists responded to the follow-up assessment, resulting in a response rate of 15.87%. Among these respondents, 87.5% were female, with an age range from 27 to 52 years (mean age = 37.56 years, SD = 7.41). Furthermore, 63.7% of respondents held managerial positions, and 62.5% reported job satisfaction.

In the first dataset, the majority (50.6%) of respondents exhibited a high level of resilience, while smaller proportions showed moderate (41.5%) and low (7.9%) resilience levels, based on a sample size of 504 individuals. In the second dataset, the majority (53.8%) of respondents also demonstrated a high level of resilience, with moderate (36.3%) and low (10.0%) resilience levels being less prevalent, based on a sample size of 80 individuals.

The scale showed high reliability (Cronbach's $\alpha = 0.945$, n = 504; Cronbach's $\alpha = 0.934$, n = 80) and strong correlations with subscales, highest with Coping with Stress

($r = 0.919$, $p < 0.01$) and lowest with Interpersonal Relationship ($r = 0.564$, $p < 0.01$). Given that the level of significance was significantly greater than 0.05 (sigma = 0.637), based on the Wilcoxon rank test, it can be concluded that there was no difference in resilience test results after three months ($z = -4.71$). Additionally, the median (Md) score had not changed after three months (Md = 121) (Table 1).

A priori power analysis for the Wilcoxon signed-rank test 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 analysis indicated that a minimum of 28 participants *per* group was needed to power the study adequately. With 80 participants included, the sample size exceeded this minimum requirement. Furthermore, a *post hoc* analysis revealed an effective test power of 0.99, surpassing the initially targeted 0.80. This heightened power level enhances the reliability of the study's results, ensuring its capability to detect true effect sizes with high confidence. These findings confirm that the sample size not only met but also exceeded the requirements for achieving statistically significant and reliable results, thereby strengthening the robustness of the study's conclusions.

Spearman's rho correlation demonstrated strong positive associations between the Resilience Score test and Resilience Score retest ($r = 0.998$, $p < 0.001$), as well as between the Resilience Level test and Resilience Level retest ($r = 0.981$, $p < 0.001$). Additionally, significant correlations were found between the Resilience Score test and Resilience Level test ($r = 0.893$, $p < 0.001$), and between the Resilience Score retest and Resilience Level retest ($r = 0.896$, $p < 0.001$).

The tolerance values presented in Table 2 indicate the proportion of variance in RS that remained unexplained by the variances of the included subscales. With values exceed-

Table 1

Analysis of temporal stability of Pharmacist Resilience Scale

Parameter	25th percentile	50th percentile (median)	75th percentile		Z	Asymp. Sig. (2-tailed)
Resilience (n = 80) Score test	109.25	121.00	128.75	resilience score retest – resilience score test	-0.471	0.637
Resilience (n = 80) Score retest	109.00	121.00	128.00			

n – number; Asymp. Sig. – asymptotic significance.
Note: Z is the result at baseline and after three months based on Wilcoxon signed ranks test and negative ranks.

Table 2

Multicollinearity assessment

Model	Correlations			Collinearity Statistics	
	zero-order	partial	part	tolerance	VIF
1 (Constant)					
Confidence subscale	0.894	1.000	0.122	0.289	3.462
Agility subscale	0.893	1.000	0.119	0.287	3.490
Coping with stress subscale	0.919	1.000	0.167	0.274	3.644
Interpersonal relationships subscale	0.723	1.000	0.086	0.553	1.807
Developmental thinking subscale	0.881	1.000	0.144	0.330	3.028

VIF – variance inflation factor.
Note: Constant refers to the intercept of the model, representing the predicted value of the dependent variable when all predictors are zero. Part indicates the unique contribution of each predictor to the dependent variable after accounting for other predictors.

ing 0.10, indicating a low likelihood of multicollinearity among the subscales, it suggests that each subscale contributed individually to elucidating the overall model variance. Additionally, the Variance Inflation Factor value, below 10, reinforces these findings further, assuring that no subscale needs to be excluded from the model. GPower indicated a minimum requirement of 100 participants at a power of 0.80, while *post hoc* analysis demonstrated that the sample of 504 participants was sufficient and relevant with a power of 0.96.

Reviewing the scree plot, a clear break point after the second component was identified. Based on the Kaiser criterion, it was decided to retain five components for further investigation, as the five-component solution explained a total of 58.0% of the variance (compared to 61.5% for the six-component solution), with the contributions of the first component at 40.2% and the fifth component at 3.5%. To facilitate the interpretation of these five components, an oblimin rotation was conducted. Table 3 shows the correlation coefficients between different components extracted from principal component analysis with an oblimin rotation.

Table 3

Component correlation matrix

Component	1	2	3	4	5
1	1.000	0.183	0.422	-0.397	0.540
2	0.183	1.000	0.198	-0.207	0.197
3	0.422	0.198	1.000	-0.359	0.331
4	-0.397	-0.207	-0.359	1.000	-0.362
5	0.540	0.197	0.331	-0.362	1.000

Extraction method: principal component analysis.
Rotation method: oblimin with Kaiser normalization.

The rotated solution revealed a simple structure, with each of the five components having high factor loadings and each variable loading significantly on only one component. These findings support the use of five separate subscales as proposed in the previous analysis. Each factor exhibited a few variables with high loadings (correlations), while the remaining variables tended to have loadings near zero. This pattern is characterized by a small number of substantial loadings and a larger number of negligible or small loadings across each factor. While the scale items were initially designed to cover four domains, the results of the factor analysis revealed the presence of five factors. Factor analysis groups similar items based on their correlations. Thus, despite the initial anticipation of four domains, the analysis identified five factors as the optimal representation of the data's variability. These factors genuinely reflect the patterns within the data, with redistribution among the four domains that the scale measures.

Discussion

Literature focusing on scale validation emphasizes the necessity of high correlations between subscales and the total scale, as well as temporal stability of scale results [9], both of which this research has confirmed. This study suggests that RS maintained temporal stability, affirming its consistent

measurement of intended constructs without significant changes in results over time.

Given the inevitability of the need for resilience measurement scales that are both selective and reliable while also containing subscales that cover comprehensive domains, this study has confirmed the validity of one such scale with five dimensions.

Many studies highlight the importance of validated RSs in various cultural contexts, providing essential tools for assessing and understanding resilience across different populations and settings [8]. The studies discussed provide valuable insights into the development, validation, and application of RS across different populations and contexts. Each study contributes to the growing body of knowledge on resilience and underscores the importance of understanding and assessing resilience in diverse professional settings. The Rushton Moral RS (RMRS) was refined to create a more concise scale, improve reliability, especially of the personal integrity subscale, and provide further evidence of validity [16]. The results of the study provide valuable insights into the development and validation of RS tailored for pharmacists working in community pharmacies. Drawing on the framework outlined in the study, it is evident that the scale underwent rigorous validation processes to ensure its reliability and validity.

Healthcare professionals often confront moral dilemmas, leading to moral distress when their integrity is tested. Therefore, a reliable tool to measure moral resilience is essential. RS developed for pharmacists in this study meets this need. Similar scales, like the RMRS and RS by Wagnild and Young [17], have been widely validated in diverse populations, emphasizing the importance of robust measurement tools in resilience assessment. Focusing on responses to moral adversity, personal and relational integrity, and moral efficacy has shown high reliability and validity, similar to RS by Wagnild and Young [17], which has been validated across various populations [17, 18]. Both scales address domains that are also present in the PRS. The Dispositional RS (DRS-15) in the Korean context and the Portuguese version of RS have also demonstrated satisfactory validity and reliability with similar domains [19, 20]. These findings, alongside the development and validation of the PRS, underscore the growing recognition of resilience measurement's significance across different contexts and populations. Utilizing validated scales enables effective assessment and intervention to support healthcare professionals, including pharmacists, promoting their well-being and adaptability in demanding work environments.

Other studies offer valuable insights into RS development, validation, and application in diverse health contexts. Liang et al. [21] explored the RS's measurement invariance in cancer care between the Americans and the Chinese, emphasizing the necessity of considering cultural differences in resilience assessment. In a separate study, Mueller [22] developed and tested a 10-item RS tailored for university students, identifying key factors such as social support and positive attitude. Wongpakaran et al. [23] introduced a resilience inventory based on inner strength, incorporating Buddhist principles, demonstrating good validity and reliability for nonclinical

populations. These studies highlight the importance of context-specific resilience assessments, emphasizing their vital role in identifying protective factors and fostering positive outcomes across diverse settings. They demonstrate that a general RS cannot be effectively applied in specific contexts [22, 23], thus justifying the need for a specialized scale in the community pharmacy setting.

Several studies offer insights into resilience in extraordinary circumstances. A rapid review highlighted limited research on resilience and self-efficacy among healthcare professionals during the COVID-19 pandemic, stressing the need for further investigation [24]. The PRS includes questions in the domains of agility and stress coping, making it suitable for use in emergencies.

A study by Chinese university students found good criterion validity for the Brief RS (BRS) and Brief Resilient Coping Scale (BRCS), with the BRS showing superior internal consistency and construct validity [25]. Another study validated the Chinese version of RS among disaster-exposed adolescents, demonstrating a 3-factor structure with good reliability and validity [26]. Researchers developed and validated the Indonesian Academic RS, showing high validity and reliability among junior high school students [27]. Confirmation of the suitability of RS for Spanish nursing students was emphasized [28]. These studies affirm the importance of comprehensive, context-specific scales that encompass domains suitable for emergencies while also monitoring resilience in everyday circumstances. The PRS embodies these qualities. High levels of burnout and secondary traumatic stress among the United Kingdom doctors were found, underscoring the importance of understanding resilience in healthcare settings [29]. These studies contribute to our understanding of resilience's role in mental health and professional functioning, highlighting the need for further research in challenging circumstances.

Several studies have developed and validated RSs specifically tailored for health professionals. Rahman et al. [30] created the Medical Professionals RS (MeRS) for medical officers, showing good psychometric properties and addressing the need for customized resilience measures in healthcare. McCoy et al. [31] found comparable reliability and validity between RS and its shortened version (RS-13) in nurses, emphasizing the importance of adapting RS for professional groups like nurses. Galanis et al. [32] validated the brief CD-RISC-10 in Greek nurses, providing a reliable instrument for assessing resilience in Greek-speaking populations.

Another study developed and validated the Work RS – Chinese version (WRS-C), demonstrating its reliability, validity, and measurement invariance across demographic groups, contributing to understanding resilience in occupational settings [33]. Wollny and Jacobs [34] validated the German versions of the CD-RISC-10 and CD-RISC-2, supporting their use as measures of trait resilience in German-speaking populations. Cajada et al. [35] critically examined RS, suggesting the need for further examination of its theoretical framework. Nguyet Trang and Thang [36] developed and validated the Vietnam Teachers' RS (VITRS) for Vietnamese teachers,

offering a culturally sensitive tool for assessing teacher resilience. These studies enhance resilience research by offering validated scales for specific professional groups and cultural contexts, highlighting the need for instruments that are context-specific and demonstrate high factor saturation and internal consistency. They confirm the necessity of stable factor structures that cover relevant domains, allowing for resilience measurement in specific settings while accounting for environmental changes. The PRS meets these criteria.

Limitations of the study

One limitation of the study was the reliance on self-report measures, which may introduce response bias or social desirability bias. Participants may provide answers they believe are socially acceptable rather than reflecting their true experiences or feelings, potentially impacting the accuracy of the results. Additionally, the study's sample may not fully represent the diversity of pharmacists, potentially limiting the generalizability of the findings to other pharmacist populations. Moreover, the study's focus on pharmacists may restrict the applicability of the RS to other healthcare professionals or broader populations, warranting caution in extrapolating the results beyond the specific target group. Furthermore, while efforts were made to ensure the scale's temporal stability, the three-month follow-up period may not capture longer-term resilience level fluctuations. Finally, as with any validation study, there may be inherent limitations in the chosen statistical methods or in the interpretation of the results, necessitating further research to corroborate the findings and address any potential methodological shortcomings.

Directions for future research

Future research directions should prioritize further validation of resilience assessment instruments specifically tailored for pharmacists, going beyond merely examining resilience levels. This entails conducting additional validation studies to assess the psychometric properties of RSs, such as reliability, validity, and factorial structure, within the pharmacist population. Moreover, future studies could explore the applicability of RSs across different practice settings within pharmacies, such as community pharmacies, hospital pharmacies, and specialty pharmacies. This would involve examining whether RSs demonstrate consistent psychometric properties and factor structures across diverse pharmacy practice environments. Additionally, research efforts could focus on investigating the criterion validity of RSs for pharmacists by examining their associations with relevant outcomes, such as job satisfaction, burnout, turnover intention, and quality of patient care. Establishing these associations would provide further evidence of the utility and relevance of RSs in predicting important outcomes in pharmacy practice. Furthermore, future research could explore the responsiveness of RSs to interventions aimed at enhancing pharmacist resilience. Intervention studies could assess changes in resilience levels following participation in resilience-building programs or interventions, providing insights into

the effectiveness of such interventions in improving pharmacist well-being and performance. Lastly, given the importance of cultural context in shaping resilience perceptions and practices, future research could investigate the cultural validity of RSs for pharmacists across different cultural contexts. This would involve conducting cross-cultural validation studies to ensure that RSs are valid and reliable measures of resilience in diverse cultural settings.

By focusing on the validation of resilience assessment instruments specifically tailored for pharmacists and considering the unique challenges and contexts of pharmacy practice, future research can provide valuable insights into pharmacist resilience and inform evidence-based interventions to support pharmacist well-being and professional practice.

Conclusion

This study confirmed the scale's robust psychometric properties through rigorous statistical analyses, including measures of reliability, internal consistency, and factorial structure. High Cronbach's α coefficients and significant correlations between subscales and the total scale underscored strong internal consistency. Despite deviations from normality, the RS demonstrated temporal stability over three months,

further reinforcing its reliability. Multiple regression analysis and principal component analysis revealed the predictive power of each subscale and a clear factorial structure, respectively, supporting the use of five separate subscales. These findings highlight the scale's utility as a valuable tool for assessing resilience among pharmacists. Moreover, the findings of this study align with the broader literature emphasizing the importance of validated RSs in diverse cultural contexts. The studies discussed in this context offer valuable insights into the development, validation, and application of RSs across different populations and settings. Each study contributes to expanding our understanding of resilience and emphasizes the significance of assessing resilience in various professional contexts. Collectively, these endeavors provide essential tools for evaluating and comprehending resilience across different populations and settings, ultimately contributing to the promotion of well-being and adaptive functioning in diverse professional settings.

Acknowledgement

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Appendix 1

Details of literature review

Element	Description
Databases Used	PubMed®
	PsycINFO®
	Scopus
	Web of Science
Keywords	"resilience"
	"psychological resilience"
	"community pharmacists"
	"stress management"
	"coping strategies"
	"occupational stress"
	"workplace resilience"
Inclusion Criteria	Articles published in peer-reviewed journals
	Studies conducted within the last 10 years
	Research focused on psychological resilience in healthcare professionals, specifically pharmacists
	Studies available in English
	Full-text articles accessible through the databases
Exclusion Criteria	Articles not peer-reviewed
	Studies focused on resilience in non-healthcare professions or unrelated fields
	Publications older than 10 years, unless they were seminal works in the field
	Abstracts or summaries without access to the full-text