



Validation and Reliability of the Turkish Version of a Patient Satisfaction Survey for Comprehensive Medication Management

Ceren ADALI^{1,2*}, Pınar BAKIR³, Hanife AVCI⁴, Ayçe ÇELİKER⁵, Şule APİKOĞLU¹

¹Marmara University Institute of Health Sciences, Department of Clinical Pharmacy, İstanbul, Türkiye

²Lokman Hekim University Faculty of Pharmacy, Department of Clinical Pharmacy, Ankara, Türkiye

³Bilkent City Hospital, Clinical Pharmacy Unit, Ankara, Türkiye

⁴Hacettepe University Faculty of Medicine, Department of Biostatistics, Ankara, Türkiye

⁵Lokman Hekim University Faculty of Pharmacy, Department of Clinical Pharmacy, Ankara, Türkiye

ABSTRACT

Objectives: Comprehensive Medication Management (CMM) is pivotal in optimizing clinical outcomes through personalized medication review and patient engagement. Patient satisfaction surveys, such as the Medication Management Patient Satisfaction Survey (MMPSS), play a crucial role in assessing the quality of these services. However, there is currently no Turkish version of the MMPSS available. This study aimed to translate, culturally adapt, and validate the Turkish version of the MMPSS to assess patient satisfaction with CMM services provided by pharmacists in Türkiye.

Materials and Methods: Following established guidelines for cross-cultural instrument validation, the MMPSS was translated into Turkish and culturally adapted. The survey underwent forward translation, expert panel review, back-translation, and pilot testing. Data collection occurred in a tertiary care university hospital between September 9, 2022, and March 21, 2023. Psychometric analyses included reliability testing (Cronbach's alpha), factorial validity using confirmatory factor analysis, and test-retest reliability using the Intraclass Correlation Coefficient (ICC).

Results: A total of 124 participants (82.7%) completed the survey. Participants were mostly women (57.3%) and elderly, with a mean age of 70.43 years, three comorbidities, and six medications. The Turkish MMPSS demonstrated excellent internal consistency (Cronbach's $\alpha = 0.858$) and test-retest reliability (ICC=0.937), confirming its reliability over time. Factor analysis supported a one-factor structure, consistent with the original MMPSS framework, and all items showed strong correlations.

Conclusion: The Turkish version of the MMPSS is a reliable and valid instrument for assessing patient satisfaction with CMM services in Türkiye. Its implementation can enhance the evaluation and improvement of clinical pharmacy services, ultimately promoting better patient care and outcomes.

Keywords: Patient satisfaction, pharmaceutical services, survey, questionnaire

INTRODUCTION

Medication therapy management is a service provided by pharmacists that involves reviewing and managing patients' medication regimens to optimize clinical outcomes and ensure that patients receive the most effective medication therapy to achieve their individual pharmacotherapeutic goals.^{1,2}

Comprehensive Medication Management (CMM) constitutes a systematic medication evaluation procedure for evaluating the appropriateness, effectiveness, safety, and practicality of medication usage, ensuring patient medication adherence. CMM represents the optimal standard of care; it involves the assessment of all medications, ranging from prescribed drugs

*Correspondence: ceren.adali@lokmanhekim.edu.tr, ORCID-ID: orcid.org/0000-0003-3576-8880

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to over-the-counter remedies and nutritional supplements.³ The provision of CMM involves creating a personalized care plan aimed at achieving specific therapy goals, with active patient engagement.⁴ It includes conducting thorough assessments of the patient's clinical condition regarding each medication and health concern, conducting follow-up evaluations to assess the patient's progress towards treatment goals, and collaborating with the healthcare team. In this way, patients' individual needs, medication-related problems and the outcomes of the care plan can be determined.³ The personalized approach of the CMM service optimizes medication use and improves clinical outcomes.⁴

The relationship between CMM and patient satisfaction is significant, as CMM aims to optimize pharmacotherapeutic outcomes, which directly influences patients' perceptions of care quality. In the context of CMM, patient satisfaction is crucial for assessing the effectiveness of pharmacists' interventions and the overall quality of care.⁵ Research shows that patients receiving CMM services report higher satisfaction due to improved communication, personalized medication planning, and greater involvement in their own care. Conversely, low satisfaction may reduce adherence and weaken the impact of CMM.^{4,6}

Patient satisfaction is one of the most crucial components of quality assurance in healthcare services, measured by the patient's subjective experience.^{7,8} By evaluating results of patient satisfaction surveys, healthcare providers can identify areas for improvement in the services offered to patients and optimize resource utilization.^{8,9} Evaluation of satisfaction has led to a rise in projects focusing on understanding the concept of satisfaction, determining factors influencing patient satisfaction, and developing patient satisfaction questionnaires.^{10,11} One study emphasized that patient satisfaction is associated with factors such as the quality of information provided, the level of attention received, and the time allocated, regardless of physical conditions.⁹ A systematic review showed pharmacists' care services contribute to the management of medication-related problems, increase patient compliance, reduce health care costs, and increase patient satisfaction.¹² Previous studies have identified positive correlations between patient satisfaction and various factors such as patients' adherence to treatment, continuity of healthcare, collaboration with health professionals, and health outcomes.¹³⁻¹⁵

Therefore, evaluating patients' satisfaction with a CMM service is considered valuable in facilitating the dissemination and implementation of such a service.

While numerous instruments have been developed to assess patient satisfaction, none have been specifically designed to evaluate pharmacist-led CMM services, which were the focus of this study. A key strength of the Medication Management Patient Satisfaction Survey (MMPSS) is that it was specifically developed to assess patient satisfaction within the context of CMM services.

Additional strengths of the MMPSS include its focus on the process dimension of healthcare quality, as outlined by

Donabedian's framework, in which emphasis is placed on the interactions and activities constituting care delivery, rather than structural components or solely outcomes.¹⁶ This process-oriented focus aligns well with the personalized nature of CMM, involving patient engagement, medication education, and collaborative planning. Other strengths of the MMPSS include its brevity (10 items), clarity, and specificity to pharmacist-led interventions, making it suitable for routine use in clinical settings. However, despite these strengths, the scale has only been validated in limited cultural contexts.^{4,6} No Turkish version of the MMPSS exists to date, and its adaptation may offer a valuable contribution to the assessment of CMM quality in Türkiye. Therefore, this study aims to translate, culturally adapt, and evaluate the psychometric properties of the MMPSS in Turkish, filling a notable gap in measuring patient satisfaction with CMM services in local healthcare settings.

MATERIALS AND METHODS

The MMPSS

Approval was obtained from the author of the original English version of the MMPSS for its use. As part of the present study, the Turkish version of the MMPSS was developed for the first time through translation, cultural adaptation, and psychometric validation.

The MMPSS was originally developed to assess patient satisfaction specifically with CMM services provided by pharmacists. The tool aims to measure whether pharmacists helped patients understand their medications, supported medication adherence, and encouraged active involvement in care decisions. It consists of 10 items covering three conceptual domains: (1) addressing medication-related needs, (2) patient activation through pharmacist-patient engagement, and (3) overall satisfaction with the service. The MMPSS consists of 10 items. The first 9 items are rated on a 4-point Likert scale (from "strongly agree" to "strongly disagree"), while the tenth assesses overall satisfaction using a 5-point scale (from "excellent" to "poor"). Additionally, a "not applicable" option is provided for 6 items. Furthermore, there is an open-ended free-text question concerning service improvement suggestions; however, it was excluded from the quantitative analysis. The first 9 items are combined into a total score, with lower scores reflecting greater satisfaction, while the 10th item is scored separately, with higher values indicating lower satisfaction.⁶

Study population and setting

This study was carried out in a tertiary care university hospital between September 9, 2022 and March 21, 2023. The study site is an academic teaching hospital with 216 beds, including four intensive care units (82 beds) and services (134 beds). Inclusion criteria were patients over the age of 18 who were hospitalized in internal medicine, pulmonary diseases, or infectious diseases departments for at least 48 hours and had at least one chronic disease. Patients not fluent in Turkish or diagnosed with dementia, Alzheimer's disease, or psychological disorders affecting compliance were excluded. A demographic data collection tool was used to collect data on patient

characteristics such as age, gender, education level, household size, comorbidities, and medications.

The study was carried out in alignment with the Helsinki Declaration, and the Lokman Hekim University Scientific Research Ethics Committee reviewed and approved the study protocol (approval number: 2022135, dated: 15.10.2022). All the participants provided informed consent.

Sample size

In research studies, determining an appropriate sample size is crucial for ensuring the validity and reliability of study findings. In scale-based research, it is often recommended to include a minimum of 10 respondents per scale item to ensure sufficient statistical power and reliability.^{17,18} This guideline ensures adequate statistical power to identify significant relationships within the data.

In the present study, a 10-item scale was used to assess patient satisfaction. According to the above-mentioned approach, a minimum of 100 participants was initially targeted (10 items*10 respondents per item). Ultimately, the analysis was conducted using data collected from 124 participants.

This approach aligns with commonly applied practices in survey-based research and helps ensure that the sample size is sufficient to yield reliable results while remaining practical and manageable. By applying this method, the study aimed to contribute to the literature with statistically sound and generalizable findings.

Preparing the Turkish version of the survey

The survey was translated into Turkish by five independent pharmacists fluent in English and native Turkish speakers. English and Turkish versions of the survey were individually reviewed by an expert committee of four bilingual (Turkish/English) clinical pharmacists, one of whom is a professor of clinical pharmacy. The expert committee utilized a language consistency form¹⁹ and a translation evaluation form²⁰ to identify and discuss any discrepancies in language and meaning. The agreed Turkish survey was subsequently back-translated into English by two pharmacists fluent in both languages, who were not previously involved in the translation process. The back-translated survey was compared to the original English version by the expert committee. At this phase, additional changes were not required due to the close similarity between the back translations and the original text. The finalized Turkish survey underwent cultural adaptation with the participation of pharmacists for language and understandability assessment. Survey participants were asked to identify any incomprehensible items and offer suggestions as needed. Following the pilot study, the Likert scale rating was adjusted from strongly disagree to strongly agree, and the scoring of the last question was modified from 1 (very poor) to 5 (excellent). The Turkish version of MMPSS is provided in Supplementary 1.

Test-retest reliability assessment

To assess the test-retest reliability of the Turkish version of the MMPSS, the survey was administered twice to the same group of patients with a two-month interval between

administrations. This interval was selected based on expert consultation involving clinicians, pharmacists, and statisticians, considering its suitability for potential future correlations with additional parameters such as medication adherence, patient knowledge, and others, which are commonly monitored over similar timeframes.²¹ It was also assumed that patients with chronic conditions would maintain clinical stability during this period, and no major changes in health status were observed. The follow-up surveys were conducted via telephone, and both administrations were carried out by the same clinical pharmacist to ensure consistency in data collection. A total of 124 participants completed both the initial and follow-up surveys, administered two months apart, and their data were included in the test-retest reliability analysis.

Statistical analysis

Statistical analyses were conducted using R (version 4.3.1, <https://cran.r-project.org>), SPSS for Windows Version 23.0, and AMOS (23); conducted under the guidance of an academic biostatistician. The reliability (internal consistency, test-retest reliability) and validity (structural) of MMPSS were evaluated. Test-retest reliability was measured using the Intraclass Correlation Coefficient (ICC), with values between 0.60 and 0.80 indicating good reliability and values above 0.80 indicating excellent reliability. The Bland-Altman graphical approach, via the “BlandAltmanLeh” package, was used to evaluate agreement.²² To assess test-retest reliability, the ICC was used, which is an appropriate method for evaluating the consistency of measurements for continuous data. In addition, the Bland-Altman analysis was performed to visually assess the agreement between two administrations of the scale and to examine potential systematic bias or limits of agreement. Together, these two methods provided a more comprehensive evaluation of the measurement stability. Internal consistency, indicating result homogeneity, was assessed with Cronbach’s alpha, with values exceeding 0.80 considered to indicate high internal consistency.²³ The analysis was performed on the first nine items, excluding the 10th item due to its distinct scoring format. Confirmatory factor analysis verified the factor structure. To achieve the best-fit model, the following indices were targeted: a Tucker Lewis index ≥ 0.90 ; a Satorra-Bentler scaled chi-square/degrees of freedom ratio (CMIN/df) ≤ 3 ; a comparative fit index (CFI) ≥ 0.95 ; a normed fit index ≥ 0.90 ; a low root mean square error of approximation (RMSEA) ≤ 0.08 ; an incremental fit index (IFI) ≥ 0.90 ; and a goodness-of-fit index (GFI) ≥ 0.90 .²⁴

The “metan” package was used for Pearson correlation coefficients.²⁵ Discriminant validity was assessed using receiver operating characteristic (ROC) curve analysis and the corresponding area under the curve (AUC) values, to evaluate the ability of the scale to distinguish between patients receiving pharmaceutical care from different healthcare settings. Additionally, using the Kruskal-Wallis test, differences in total MMPSS scores were analyzed across the subgroups of Item 10, which measures overall satisfaction on a 5-point scale ranging from poor to excellent. Dunn’s Bonferroni post-hoc

test was applied to determine which subgroup contributed to the observed differences. A two-tailed p -value of <0.05 was considered statistically significant.

RESULTS

Participants' characteristics

A total of 124 participants who completed both the initial and follow-up surveys, administered two months apart, were included in the analysis. Most of the participants were female (57.3%) and over 65 years of age (72.6%). Participants' mean age was 70.43 ± 14.24 years. Among the participants, 88.7% reported living with someone and 62.1% had less than 8 years of education. The median number of comorbidities was 3 [interquartile range (IQR): 2–4], and the median number of medications was 6 (IQR: 4–10). A detailed summary of the demographic characteristics is presented in Table 1.

Construct validity

Factor analysis

Factor analysis was conducted during the questionnaire validation process to define constructs (factors) and their associated items. A conceptual one-factor structure was applied to the model using data from 124 participants. Fit measures were assessed and detailed in Table 2. Fit indices were calculated, including $\text{CMIN/df}=1.549$, $\text{CFI}=0.981$, $\text{IFI}=0.981$, $\text{GFI}=0.946$, $\text{RMSEA}=0.067$. Based on the modification indices provided in Table 2, it was concluded that the values are in an

acceptable range for the measurement model's fit. As a result, a scale structure consisting of 9 items and one dimension was validated. Figure 1 displays the results of the confirmatory factor analysis. As seen in the diagram, all items loaded significantly on a single latent factor, with standardized factor loadings ranging from 0.85 (Item 4) to 1.00 (Item 3). These high factor loadings suggest that all items are strongly related to the underlying construct measured by the scale, supporting its unidimensionality.

A positive correlation was found between all items in the scale. The strongest correlation (0.85) was seen between Item 4 "My clinical pharmacist helped me find easier ways to take my medicines" and Item 5, "My clinical pharmacist helped me understand the best ways to take my medicines". This strong relationship suggests that the two items conceptually overlap and measure similar components of patient satisfaction. The weakest correlation (0.19) was observed between Item 1 and Item 4, as well as between Item 2 and Item 8. These low correlations indicate that the items represent different aspects of satisfaction and contribute to the overall diversity of the scale. Inter-item correlations are visualized in the matrix presented in Figure 2.

There was a statistically significant difference in the total MMPSS scores (Items 1–9) across the response categories of Item 10, which ranges from "poor" to "excellent" ($p < 0.001$). Participants who have a score of 4 on Item 10 have a higher MMPSS score (median 24). This finding supports the criterion validity of the scale, suggesting that patients who are generally

Table 1. Participant's demographic characteristics

		Values, n (%)
Age	Mean $\pm$ standard deviation	70.43 ± 14.24
	≥ 65 age	90 (72.6)
Gender	Female	71 (57.3)
	Male	53 (42.7)
Body mass index	Mean $\pm$ standard deviation	29.19 ± 6.97
Living alone	Yes	14 (11.3)
	No	110 (88.7)
Literacy	Literate	106 (85.5)
	Illiterate	18 (14.5)
Educational qualification	< 8 years	77 (62.1)
	8–12 years	25 (20.2)
	> 12 years	22 (17.7)
Smoking status	Smoker	16 (12.9)
	Former smoker	34 (27.4)
	Non-smoker	74 (59.7)
Number of comorbidities	Median (IQR 25–75%)	3 (2–4)
Number of medications	Median (IQR 25–75%)	6 (4–10)

IQR: Interquartile range

Table 2. Confirmatory factor analysis results

Parameter	Abbreviation	Acceptable range	Initial model	Final model
Chi-square fit test	<i>CMIN/df</i>	$2 \leq \text{CMIN/df} \leq 3$	9.176	1.549
Comparative fit index	<i>CFI</i>	$0.95 \leq \text{CFI} \leq 0.97$	0.635	0.981
Goodness of fit index	<i>GFI</i>	$0.85 \leq \text{GFI} \leq 0.90$	0.707	0.946
Normal fit index	<i>NFI</i>	$0.90 \leq \text{NFI} \leq 0.95$	0.613	0.949
Tucker-Lewis index	<i>TLI</i>	$\text{TLI} \geq 0.95$	0.513	0.967
Incremental fit index	<i>IFI</i>	$0.90 \leq \text{IFI} \leq 0.95$	0.640	0.981
Root square mean error of approximation	<i>RMSEA</i>	$0.05 \leq \text{RMSE} \leq 0.08$	0.258	0.067

CMIN/df: Chi-square minimum/degrees of freedom ratio, CFI: Comparative fit index, GFI: Goodness-of-fit index, IFI: Incremental fit index, RMSEA: Root mean square error of approximation, NFI: Normed fit index, TLI: Tucker-Lewis index

satisfied with their medication management services tend to report higher satisfaction across specific service aspects assessed by the first 9 items. Moreover, in practice, Item 10 may function as a quick screening item for identifying patients with potential dissatisfaction. For instance, a low score on Item 10 could trigger an alert in an electronic system, prompting the healthcare provider to review detailed responses to Items 1–9 to identify which aspects of the CMM service may require improvement. This enhances the utility of the MMPSS not only as a research tool but also as a practical instrument for ongoing quality improvement in pharmacist-led care.

ROC analysis

In this study, the MMPSS scale, which was analysed for validity and reliability, was applied to patients with at least one chronic disease who had been hospitalized for a minimum of 48 hours. These patients were divided into two groups: those who received pharmaceutical care from the clinical pharmacy unit of a hospital and those who received care from a community pharmacy. To evaluate the discriminant validity of the scale, a ROC analysis was conducted, using the type of pharmaceutical care setting as the criterion variable. This analysis aimed to determine the ability of the total MMPSS score to distinguish between groups. The rationale for using ROC analysis in this context is to assess how well the scale differentiates patients based on the type of pharmaceutical care setting. The AUC for 9 items of the MMPSS scale was 0.909 (p -value<0.001), indicating excellent discriminative ability. As shown in Figure 3, the scale demonstrated strong performance in distinguishing between patient groups.

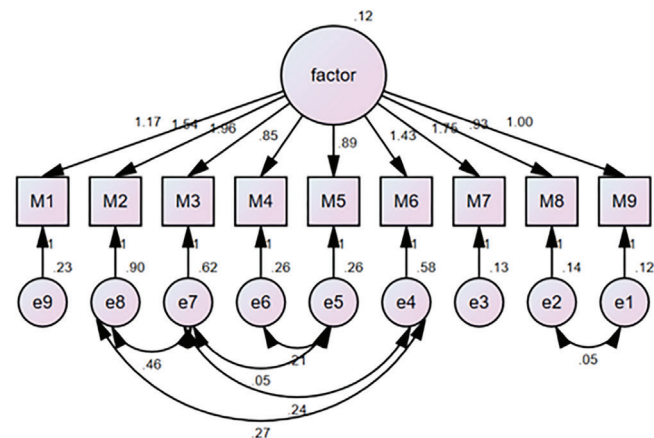
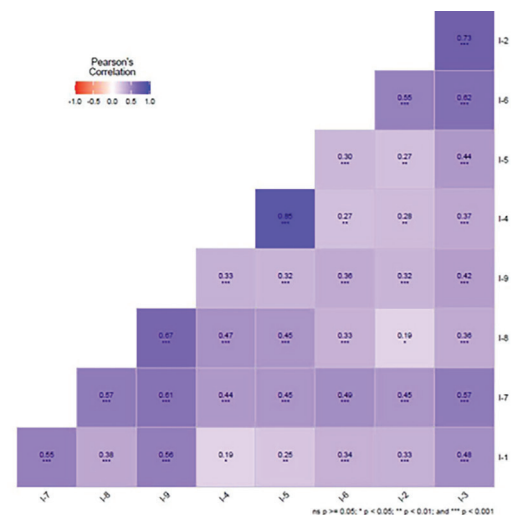
Reliability

Internal consistency

Cronbach's alpha was employed to evaluate the internal consistency reliability of the scale. Cronbach's alpha coefficient ($\alpha=0.858$) was calculated for the first nine items of the MMPSS, as the 10th item uses a different response format and was excluded from internal consistency analysis. This result indicates excellent internal consistency. These results are shown in Table 3.

Test-retest reliability

A total of 124 participants completed the scale again two months later for test-retest analysis. The baseline and follow-up mean scores were 21.16 and 21.31, respectively. Test-retest reliability was found to be excellent, with an ICC value of 0.937 (95% confidence interval: 0.912–0.956). The data points in the Bland-

**Figure 1.** Diagram of confirmatory factor analysis (adjusted model)**Figure 2.** Correlation matrix plot for items (1-9)

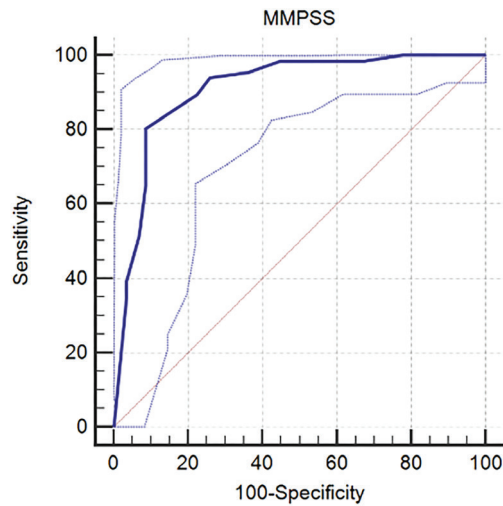


Figure 3. ROC curves plot

MMPSS: Medication Management Patient Satisfaction Survey, ROC: Receiver operating characteristic

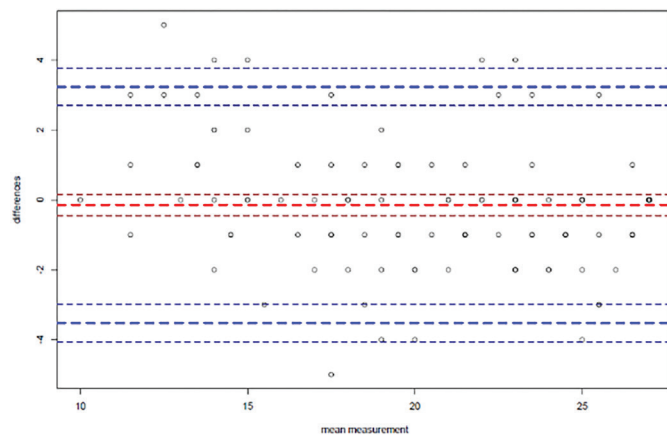


Figure 4. Test-retest results with Bland-Altman plot of MMPSS

MMPSS: Medication Management Patient Satisfaction Survey

Altman graphs are very close to the zero line, indicating that the agreement between the test-retest results is at a reliable level. Figure 4 illustrates the Bland-Altman plot for test-retest reliability. The majority of data points lie within the 95% limits of agreement, and no systematic bias was observed, indicating good agreement between the two administrations of the scale.

DISCUSSION

Patient satisfaction is a critical component of quality assurance in healthcare services. Evaluating satisfaction helps identify areas for improvement, optimize resource use, and improve overall patient care. Previous studies have shown that high levels of patient satisfaction correlate with better adherence to treatment, continuity of care, and improved health outcomes.¹¹⁻¹³ In this context, there is an increasing necessity for user-friendly and comprehensible assessment tools to evaluate patients' perceptions of the CMM services provided by pharmacists, the quality of these services, and patients' satisfaction with them. To the best of the authors' knowledge, this is the first study validating and exploring the psychometric properties of the Turkish version of the MMPSS. The study aimed to translate, culturally adapt, and assess the psychometric properties of the MMPSS for use in Türkiye. In addition to the original English version, there is only a Lebanese version of the MMPSS. The results demonstrated that the Turkish version of the MMPSS is a reliable and valid instrument for evaluating patient satisfaction with CMM services provided by pharmacists.

Reliability and validity of the Turkish MMPSS

The psychometric analysis of the Turkish MMPSS demonstrated excellent reliability and validity. Internal consistency, assessed by Cronbach's alpha ($\alpha=0.858$), had high reliability, similar to the Lebanese version ($\alpha=0.90$) and the original version ($\alpha=0.95$).^{4,6} Unlike the Lebanese version, test-retest reliability was analysed in the Turkish version and the ICC value was excellent (0.937),⁴ suggesting that the survey consistently measures patient satisfaction over time. The Turkish version showed a lower RMSEA value (0.067) compared to the Lebanese version (0.10),

Table 3. Item-level analysis and Cronbach's alpha coefficients for the MMPSS

Scale	Subjects (n)	Mean (SD)	Range (min.-max.)	Corrected item-total correlation	Cronbach's alpha if item deleted
Item-1	124	2.69 (0.629)	0-3	0.527	0.848
Item-2	124	1.56 (1.091)	0-3	0.599	0.848
Item-3	124	1.94 (1.046)	0-3	0.763	0.823
Item-4	124	2.60 (0.596)	1-3	0.525	0.849
Item-5	124	2.63 (0.604)	1-3	0.555	0.846
Item-6	124	1.81 (0.914)	0-3	0.608	0.841
Item-7	124	2.39 (0.707)	1-3	0.722	0.830
Item-8	124	2.76 (0.500)	1-3	0.548	0.849
Item-9	124	2.77 (0.491)	1-3	0.596	0.846

Cronbach's alpha=0.858. SD: Standard deviation, min.-max: Minimum-maximum, MMPSS: Medication Management Patient Satisfaction Survey

indicating a better fit between the model and the observed data. The confirmatory factor analysis supported a one-factor structure, with fit indices within acceptable ranges, further affirming the survey's validity.

These findings suggest that the Turkish version of the MMPSS is not only psychometrically sound but also practical for use in longitudinal studies and routine clinical settings. The strong internal consistency and test-retest reliability support its applicability in monitoring patient satisfaction over time in various healthcare environments, including hospitals and community pharmacies. Furthermore, the validated scale can serve as a valuable tool for national quality improvement initiatives aiming to enhance the delivery of pharmacist-led CMM services in all healthcare settings across Türkiye.

When comparing the Turkish version with the existing Lebanese adaptation, some methodological and structural differences can be observed. For instance, in the Lebanese version, the word "clinical pharmacist" was removed and replaced with "pharmacist", and exploratory factor analysis was performed. Explanatory factor analysis was not performed in the present study, as no modifications were made to the original survey structure. Similar to what was observed in the Lebanese version, positive correlations were observed among all items in the current study. The strongest correlations were identified between similar items (Items 4 to 9) in both the Turkish and Lebanese versions.

Cultural adaptation and its challenges

The process of translating and culturally adapting the MMPSS involved multiple steps to ensure the survey was both linguistically and contextually appropriate for Turkish patients. The translation by five independent pharmacists and subsequent review by a bilingual expert committee ensured that the survey retained its original meaning and relevance. The back-translation process confirmed the accuracy of the Turkish version.

A pilot study was conducted to assess the clarity and comprehensibility of the Turkish version. Participants were asked to identify any unclear expressions or questions; no major linguistic challenges were reported. While the 4-point Likert scale structure of the original tool was retained and easily understood by respondents, a minor modification was made to the final question's scoring direction—from "excellent to poor" to "poor to excellent"—to align with the general scoring format used in Türkiye.

In addition, although there are cultural differences between this study and other versions, the demographic characteristics of the participants are similar. In the Turkish version of the study, most of the participants were female and over the age of 65, similar to the other studies. The number of comorbidities and medications reported by participants was similar to those reported in the Lebanese version of the study.

Implications for practice and policy

Building upon these findings, considering how the Turkish version of the MMPSS may contribute to improving

pharmaceutical care services and inform healthcare strategies at clinical and policy levels. Importantly, the ultimate goal of pharmaceutical care is to improve patients' quality of life through the responsible provision of drug therapy to achieve defined outcomes.²⁶ When the goal is to enhance humanistic outcomes such as patient satisfaction, these outcomes must be measurable. However, there is currently no widely adopted tool specifically designed to assess this domain. The MMPSS fills this gap by offering a standardized and validated instrument that helps identify deficiencies in pharmacist-led care processes, thereby supporting systematic improvement in pharmaceutical care quality.

Given the strong association between patient satisfaction and quality of life, regular assessment using a tool like the MMPSS becomes critical. The high ICC and Cronbach's alpha values reported in this study indicate that the Turkish version is reliable for longitudinal evaluations and can be used in routine clinical settings such as hospitals and community pharmacies. Moreover, it holds value for integration into national quality improvement programs and health policy initiatives. Embedding the MMPSS into electronic health records would allow the standardized collection of patient satisfaction data, producing actionable insights to guide the enhancement of pharmacist-led care services across Türkiye.

Study limitations

While this study provides a robust tool for assessing patient satisfaction with CMM services in Türkiye, there are limitations to consider. Although all patients were recruited from a single tertiary healthcare institution, the pharmaceutical care services they received were delivered across different healthcare settings. Therefore, while the recruitment site was singular, the care contexts were diverse. Moreover, the patient population represents a relatively homogeneous group from a specific geographical region, which allows for consistent evaluation but may limit broader applicability. To enhance generalizability, future research should validate the Turkish version of the MMPSS in more heterogeneous populations across multiple regions and healthcare institutions.

Another limitation is the two-month interval between the test and retest administrations. This duration was selected based on its suitability for potential future correlations with parameters such as medication adherence and knowledge level, which are commonly evaluated over similar periods in chronic care settings. A multidisciplinary team also agreed that this timeframe would not likely result in major changes in the health status of patients with stable chronic conditions, making it appropriate for test-retest analysis. Nonetheless, the extended interval may have introduced some variability and should be considered when interpreting the results.

Future research should aim to validate the Turkish MMPSS in diverse healthcare environments and with larger, more varied patient populations. Additionally, increasing the sample size could enhance the modification indices and further reduce the root mean square error. This study is the first to validate the psychometric properties of the Turkish version of MMPSS.

Exploring the impact of CMM services on clinical outcomes and healthcare costs in the Turkish context would provide a more comprehensive understanding of its benefits.

CONCLUSION

The primary objective of the present study was the validation and reliability assessment of a patient satisfaction survey for CMM. Evidence indicates a strong correlation between patient satisfaction, treatment adherence, and positive health outcomes; this underscores the importance of using satisfaction assessment tools. The findings indicate that the Turkish version of the MMPSS is a reliable and valid instrument for evaluating patient satisfaction with CMM services. The scale demonstrated high internal consistency ($\alpha=0.858$), excellent test-retest reliability (ICC=0.937), and satisfactory model fit indices, confirming its robustness for repeated applications. Given its strong psychometric performance, the Turkish MMPSS can be used not only in research settings but also as a practical tool for routine use in hospitals, community pharmacies, and national quality improvement efforts. Future studies are recommended to explore its applicability in various healthcare settings and to assess its utility in intervention studies targeting pharmacist-led care. The Turkish MMPSS will serve as a valuable instrument for systematically evaluating and improving patient-centered pharmacy services across Türkiye.

Ethics

Ethics Committee Approval: The study was carried out in alignment with the Helsinki Declaration, and the Lokman Hekim University Scientific Research Ethics Committee reviewed and approved the study protocol (approval number: 2022135, dated: 15.10.2022).

Informed Consent: All the participants provided informed consent.

Footnotes

Authorship Contributions

Concept: C.A., A.Ç., Ş.A., Design: C.A., A.Ç., Ş.A., Data Collection or Processing: C.A., P.B., Analysis or Interpretation: C.A., P.B., H.A., A.Ç., Ş.A., Literature Search: C.A., P.B., A.Ç., Ş.A., Writing: C.A., P.B., H.A.

Conflict of Interest: The authors declare no conflicts of interest.

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Supplementary 1. Turkish patient satisfaction survey for comprehensive medication management

#	Sorular	Kesinlikle katılmıyorum	Katılmıyorum	Katılıyorum	Kesinlikle katılıyorum	
1	Klinik eczacım ilaçlarımın her birini neden kullandığını anlamama yardımcı oldu.					
2	Klinik eczacım ilaçlarımın işe yarayıp yaramadığını nasıl anlayacağım konusunda yardımcı oldu.					
3	Klinik eczacım (ilaçlarımın olası yan etkilerini bilerek ve ilaç etkileşimlerini önleyerek) ilaçlarımın güvenli olduğundan emin oldu.					
4	Klinik eczacım ilaçlarımı kullanmanın daha kolay yollarını bulmama yardımcı oldu.					
5	Klinik eczacım ilaçlarımı kullanmanın en iyi yollarını anlamama yardımcı oldu.					
6	Klinik eczacım, benimle ilgilenen diğer sağlık çalışanları ile birlikte takımın bir üyesi olarak çalışıyor.					
7	Klinik eczacımla konuştuktan sonra, ilaçlarımı yönetme konusunda kendime daha çok güveniyorum.					
8	Klinik eczacım ilaçlarım hakkındaki endişelerimi dinledi.					
9	Klinik eczacımı aileme veya arkadaşlarıma tavsiye ederim.					
#	Sorular	1 (Çok kötü)	2	3	4	5 (Mükemmel)
10	Genel olarak, klinik eczacıdan aldığınız bakım ve hizmetlerin kalitesini nasıl değerlendirirsiniz?					