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The Farsi version of medication administration hassles scale in elderlies with chronic diseases: a psychometric study

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Abstract

Background Medication management is a crucial responsibility of family caregivers. Having a tool for assessing issues related to family caregiver medication prescription tasks is of great importance in evaluating the caregiving experience. This study aimed to translate and assess psychometrically the Medication Administration Hassles Scale in elderly individuals with chronic diseases.

Methods This study was conducted using a cross-sectional method on family caregivers of elderly individuals with a chronic illness in Iran. In the first phase, the Medication Administration Hassles Scale was translated. In the second phase, face and content validity, item analysis, structural validity, convergent and discriminant validity, and internal consistency were evaluated.

Results Following face and content validity assessment and item analysis, no items were removed, though some revisions were made. Using exploratory factor analysis with 200 caregivers, resulted in a three-factor structure with 18 items explaining 50.71% of the variance. Confirmatory factor analysis indicated a good model fit (RMSEA: 0.07, IFI: 0.92, CFI: 0.92, PNFI: 0.74, TLI: 0.91). Convergent and discriminant validity of all sub-scales were confirmed. Cronbach's alpha for the three subscales were 0.91, 0.82, and 0.80, respectively.

Conclusions The results indicated that the 18-item Farsi version of the scale, comprising three factors, exhibits acceptable psychometric properties among Iranian caregivers of elderly individuals.

Keywords Caregivers, Medication Administration Hassles, Elderly, Caregiver Burden, Questionnaire, Chronic Disease

Introduction

Studies reveal that the aging population in Iran is increasing in line with global trends. In 2016, the population of individuals aged 65 and over in Iran was approximately 4,871,000. The share of the population aged 65 and over in Iran was estimated to be 6.6% in 2020 [1], by 2050, this figure is projected to exceed 25 million, making up a quarter of Iran's population [2].

Nearly 80% of the elderly population has at least one chronic disease [3] with aging being a significant risk factor [4]. With the increasing likelihood of managing and treating chronic disorders through prescription

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medications, at-home care related to these medications has become an integral part of elderly care [3], and prescribing medications for elderly individuals family members is one aspect of caregiving that falls upon family caregivers [5]. A family caregiver, also known as an informal caregiver, is an individual who consistently provides care, without receiving compensation, for a family member or friend who is elderly, disabled, in the end stages of illness, suffering from chronic or mental health conditions, or dementia [6, 7]. Nearly one in every five adults in the United States is engaged in caregiving for an elderly relative at home [8]. Despite the vital role that family caregivers play in providing care and ensuring safety at home, their role is less recognized and acknowledged by professional healthcare teams [9]. Medication management is one of the important roles of family caregivers in the community [5] and is the most common form of care provided by these individuals [9]. Caregivers' responsibilities related to medication management include direct tasks such as medication procurement, preparation of medication boxes for the patient, assisting the patient in taking medication, and indirect tasks that require more cognitive effort, such as organizing and tracking medication, collecting information, and making treatment decisions [5, 9]. This role holds significant importance [10] because effective medication management by informal caregivers contributes to improved treatment adherence, enhanced medication safety, and reduced occurrence of medication-related side effects in the elderly [5], resulting in improved treatment outcomes for the patient and reduced need for seeking treatment and care at healthcare facilities [10]. Many family caregivers have reported medication prescription as a challenging and time-consuming task for which they lack readiness and sufficient equipment [9, 11, 12]. Over two-thirds of caregivers have reported difficulties in one or more medication management tasks, which include medication procurement, prescription, clinical judgment, and communication with the patient or the healthcare team [9].

In the culture of most Iranians, caring for the elderly is considered a duty of family members. However, there is no official institution in Iran that supports family caregivers. Moreover, various dimensions of caregiver burden, particularly the challenges of prescribing medication—an aspect of elderly care that requires specialized knowledge—have received less attention in Iranian culture. To examine this dimension of caregiver burden, a tool capable of identifying different aspects of medication management is needed.

In many caregiving assessment tools, the pressure on family caregivers or the complexity of medication treatments has not been adequately addressed, often limited to a single question [13]. Therefore, having a tool for assessing issues related to family caregiver tasks related to medication prescription is of great importance in evaluating the caregiving experience [3]. In this area, studies have been very limited, and according to the researcher's knowledge, only one specific tool exists. This tool, known as the Medication Administration Hassles Scale, was developed by Travis et al. (2003). It was first developed in English to assess issues related to medication management for family caregivers of individuals aged over 55 who require long-term care. The scale consists of 24 items and 4 subscales titled Information Seeking/Information Sharing (nine items), Scheduling Logistics (seven items), Safety Issues (five items) and Polypharmacy Management (3 items). Caregivers are asked to assign a score from zero to five to each question, where zero indicates no hassles and five represents the highest level of hassles. Higher scores obtained from the scale indicate experiencing more hassles [13].

Research studies indicate that there is no tool in the Farsi language that addresses the experiences and pressures of family caregivers in dealing with medication-related issues of patients or the elderly. The absence of a culturally adapted tool tailored to assess this concept hinders Iranian researchers and clinicians from accurately identifying the issue and implementing effective interventions. The present study aimed to translate and psychometrically evaluate the Medication Administration Hassles Scale in elderly with chronic diseases.

Methods

Study design

This study is a cross-sectional methodological research conducted from February 2022 to May 2023. The study consisted of two main phases: (1) Translation of the scale; and (2) Psychometric evaluation of the translated scale. The research environment included hospitals and clinics in Bojnurd City, Iran, and social media networks.

Participants

The participants were family caregivers of the elderly individuals with at least one chronic disease. Inclusion criteria involved being the primary caregiver of the patient, the elderly not residing in nursing homes or care centers, not receiving payment for providing care, and the patient being under the medication management of the caregiver. Sampling was done using two methods: purposive (in the Cognitive Debriefing phase, face and content validity evaluation phase) and convenience (in the item analysis, factor analysis, and reliability evaluation phase).

The research tools were converted into an online format, and their URL was shared with caregivers through various social media platforms. Additionally, by visiting inpatient wards and outpatient clinics of hospitals and centers in Bojnurd City, the paper-and-pencil versions of the tools were completed by family caregivers who met the inclusion criteria.

Medication administration hassles scale

The Medication Administration Hassles Scale was developed to assess issues related to medication management for family caregivers of individuals aged 55 and above requiring long-term care. The scale consists of 24 items and four subscales: Information Seeking/Information Sharing (9 items), Scheduling Logistics (7 items), Safety Issues (5 items) and Polypharmacy (3 items). Caregivers are requested to assign a score from 0 to 5 to each item, where 0 indicates not a hassle and 5 represents one of the worst of all hassles. Higher scores indicate a higher level of experienced hassle [13].

Phases of the study

Translation

The translation process followed Wild et al.'s (2005) [14] guidelines, including:

- Preparation: In this stage, permission was obtained from the owner of the scale, a translation team was formed, and discussions about the concepts in the scale took place.
- Forward translation: An expert familiar with translation techniques and an experienced translator, both fluent in Farsi, independently translated the original version of the scale. The instruction emphasized concept-based translation rather than literal translation and the use of plain language understandable by the general population.
- Reconciliation: Five experts with sufficient experience in the study's methodology and the concepts addressed by the scale reviewed the two translated versions independently. A consensus was reached to finalize a version.
- Back Translation: A second independent group of translators, not involved in the initial translation and unfamiliar with the original scale, translated the finalized Farsi version into English. The two English versions were compared, resulting in a consensus English version that was sent to the owner of the scale for confirmation. With the owner's coordination, the Likert spectrum of the scale was changed from 5 levels to 7 levels.
- Back Translation Review: A comparison between the back-translated version and the original scale was performed by the research group manager and a proficient translator to ensure concept consistency.
- Harmonization: In this stage, all translated versions were harmonized, compared between the translator's versions and the owner-reviewed version, and alignment was achieved under the guidance of the research group manager.
- Cognitive Debriefing: An 8-member group of caregivers whose native language was Farsi and who had characteristics similar to the target population of the scale reviewed the translated scale for comprehensibility, cognitive equivalence, simpler and more understandable word substitutions, identification of unclear terms and expressions, and other potential confusing aspects.
- Review of Cognitive Debriefing Results: The research group manager reviewed the cognitive debriefing results, discussed the raised issues, achieved consensus, and applied changes to the scale's items.
- Proofreading: A Ph.D. Farsi language and literature specialists reviewed the scale for writing, grammar, and other potential errors and made corrections.
- Final Report: In this stage, the final version of the scale was prepared, accompanied by sufficient explanations regarding the stages and modifications undertaken. The final report was written by the research group manager.

Phase 2) Psychometric evaluation

- Face Validity:

Face validity was assessed quantitatively and qualitatively:

To determine quantitative face validity, the opinions of 10 family caregivers were gathered, and the Item Impact Score for each item was calculated. Items with an impact score greater than 1.5 were considered appropriate for further analysis and were retained. Items with an impact score of less than 1.5 were discussed and decided upon by the research team [15]. For qualitative face validity, face-to-face interviews were conducted with 10 family caregivers after providing explanations about the study objectives and the scale. They were asked to assess the items on the scale in terms of difficulty level, relevance, and ambiguity. Necessary revisions and modifications were made to the items based on their feedback [15].

- Content Validity:

Content validity was assessed through both qualitative and quantitative methods:

To determine qualitative content validity, the scale was given to 10 experts (in the fields of pharmacology, nursing, health education, and scale development). They were asked to provide their opinions in writing regarding the difficulty, ambiguity, grammar, wording, item allocation and scaling [15, 16].

For the quantitative assessment of content validity, two indices were evaluated: Content Validity Ratio (CVR) and Content Validity Index (CVI).

1) Content Validity Ratio (CVR):

   The scale was distributed to 10 experts in the fields mentioned above, and the CVR was calculated. According to the Lawshe Table [17] the minimum CVR is 0.62. Therefore, items with a CVR of at least 0.62 were retained.

2) Content Validity Index (CVI):

   The scale was given to 10 experts, and after calculating the CVI for each item (I-CVI), the modified kappa agreement coefficient was calculated. According to the criterion proposed by Fleiss (1981), kappa values above 0.75 are considered excellent [15], any I-CVI value higher than 0.78 would be equal to a modified kappa higher than 0.75 [18]. Then the average CVI for the scale (S-CVI) was calculated. The desired criterion for confirming the S-CVI was 0.90 [7, 15, 16].

- Item Analysis.

In item analysis by providing the scale to 30 family caregivers these coefficients were calculated: Cronbach's Alpha, inter-item correlation, Cronbach's Alpha if item deleted, and item-total correlation. Items with an item-total correlation of less than 0.2 were removed [16, 18].

- Structural Validity.

Exploratory Factor Analysis (EFA) was conducted based on the correlation matrix using the maximum likelihood method with Promax rotation, by a sample size of 200 family caregivers. When determining the appropriate sample size for factor analysis, several guidelines have been established. These include a minimum required sample size of 100 participants, a participant-to-variable ratio of 10:1, and a variable-to-expected factors ratio of at least 3:1 [19]. According to the COnsensus-based Standards for the selection of health status Measurement INstruments, a sample size equivalent to seven times the number of items, with a minimum of 100 participants, is considered very good for factor analysis [20]. In this study, factor analysis was conducted based on a combination of these established criteria, considering that the input questionnaires for EFA and CFA contained 24 and 18 items, respectively. Before performing factor analysis, the data's normal distribution (univariate normality with skewness between − 3 and + 3, and multivariate normality with Mardia's coefficient of multivariate kurtosis less than 20) was checked. Outliers were assessed through box plots in EFA, and Mahalanobis distance was used for Confirmatory Factor Analysis (CFA) (Mahalanobis distance less than 0.001 was considered as multivariate outliers). The linearity of the data and the presence of correlations (between 0.3 and 0.7) were examined [15, 21].

Bartlett's test and the Kaiser-Meyer-Olkin (KMO) measure were used to assess the adequacy of sampling. Bartlett's test should be significant, and KMO should be greater than 0.8 [22]. Parallel analysis was employed to determine the number of factors to retain [21]. The critical point for retaining items in a factor was set at 0.3, determined by the formula:

$$\mathrm{CV} = 5.152 \div \sqrt{(\mathrm{n}-2)}$$

Where n is the sample size [23]. Items with factor loadings below 0.2 were also removed [21]. Moreover, a minimum of 3 items in each factor was maintained [15]. CFA was performed using the maximum likelihood method with a sample of 219 independent cases from EFA, and model fit indices including CFI (> 0.9) IFI (> 0.9), PNFI (> 0.5), RMSEA (< 0.08), TLI (> 0.9) and CMIN/DF (< 3) were assessed. Statistical analyses were conducted using SPSS software version 26 and AMOS version 24.

- Convergent and Discriminant Validity.

The convergent validity and discriminant validity were assessed with CFA samples. The Fornell-Larcker criteria were used to assess convergent and discriminant validity [21]:

1 Convergence validity:

   Standard factor loads > 0.5, Composite Reliability (CR) > Average Variance Extracted (AVE), and AVE > 0.5 [21].

2 Discriminant validity:

   Maximum Shared Variance (MSV) < AVE [21].

Moreover, the Heterotrait-Monotrait (HTMT) ratio method was used to evaluate the discriminant validity. The criterion of 0.90 was considered [24]. To calculate these coefficients, an AMOS Plugin which was designed by James Gaskin [25] was used.

- Reliability.

To examine the internal consistency of the scale, Cronbach's Alpha, Omega, and Average Inter-Item Correlation (AIC) coefficients, were calculated. Cronbach's Alpha coefficient above 0.70 [26], Omega coefficient above 0.70, and AIC values between 0.40 and 0.20 were deemed acceptable [15, 27].

- Floor or ceiling effects.

The ceiling and floor effects were evaluated for 419 samples that completed the scale in the construct validity assessment phase. The ceiling and floor effects occur when more than 15% of respondents achieve the lowest or highest possible score [28].

Results

Demographic characteristics

The demographic information questionnaire and the Medication Administration Hassles Scale were administered to 419 caregivers. The caregivers had a mean age of 40.18 years (SD = 11.16), with 53.5% (*n* = 224) being women. The patients they cared for had a mean age of 73.53 years (SD = 10.24). Other demographic characteristics are presented in Table 1.

Translation phase

Based on Iranian culture and the unfamiliarity of the term "care-recipient" among caregivers, this term was changed to "patient" following reviews conducted after the Cognitive Debriefing phase and with the approval of the scale's original owner.

Table 1 Demographic characteristics of participants (*N* = 419)

Demographic		Number (%)/ Mean (SD)*
Caregiver Gender	Female	224 (53.5)
	Male	195 (46.5)
Patient Gender	Female	252 (60.1)
	Male	167 (39.9)
Caregiver marital status	Married	303 (72.3)
	Single	107 (25.5)
	Others	9 (2.1)
Caregiver Education level	Under diploma	63 (15)
	Diploma	176 (42)
	Bachelor of Science	131 (31.3)
	Master and higher	49 (11.7)
Patient Education level	Illiterate	175 (41.8)
	Under diploma	181 (43.2)
	Diploma	53 (12.6)
	Bachelor of Science	9 (2.1)
	Master and higher	1 (0.2)
Relationship with the patient	Patient's child	271 (64.7)
	other	92 (22)
	Patient's sister	23 (5.5)
	Spouse	22 (5.3)
	Patient's brother	11 (2.6)
Caregiver age		40.18 (11.16) *
Patient age		73.56 (10.24) *

Psychometrics assessment phase

Following the translation and finalization of the scale, its psychometric properties were examined:

Quantitative face validity

All items had impact scores greater than 0.5. Therefore, no items were removed.

Qualitative content validity

Expert opinions were used to refine items in terms of language correctness, appropriate wording, proper item placement, and suitable scoring.

Quantitative content validity

All items had CVR values greater than 0.62. No item had a CVI score below 0.75, so no items were removed. The S-CVI was 0.917.

Item analysis

Cronbach's Alpha and standardized Cronbach's Alpha were calculated as 0.946 and 0.957, respectively. No item had a corrected item-total correlation less than 0.30, and no item showed an inter-item correlation greater than 0.70.

Construct validity

The Kaiser-Meyer-Olkin (KMO) sampling adequacy measure was 0.901, and Bartlett's test of sphericity was significant ($P < 0.001$). These results indicate the adequacy of the samples for conducting EFA. EFA was done with 24 items using the maximum likelihood method with Promax rotation by SPSS software version 26. The results of parallel analysis extracted three factors. Six items were removed due to a factor loading less than 0.30 or cross-loading. Finally, the three-factor scale with 18 items extracted which was explained 50.71% of the total variance (Table 2).

CFA was conducted on another sample of 219 caregivers, after confirming assumptions. After model adjustments (measurement error between items 10 and 11), model fit indices indicated an acceptable fit for the three-factor structure (Table 3) (Fig. 1).

Convergent and discriminant validity

In all three factors, the CR was greater than the AVE. In factors 1 and 3, AVE was greater than 0.50, confirming convergent validity. In factor 2, AVE was close to 0.50 (0.480). MSV values were lower than AVE in all three factors, confirming discriminant validity (Table 4). Moreover, according to the HTMT ratio, the inter-factor

Table 2 Results of exploratory factor analysis of the medication administration hassles scale ($N=200$)

Factors	Items	Factor loading	h^2	λ	% Variance
Scheduling Logistics	13- Embedding the medication program into my everyday tasks	0.906	0.792	4.714	26.18
	11- Having a schedule when the patient should intake several medications per day	0.839	0.702		
	16- Remembering to give medicines as scheduled	0.820	0.634		
	10- Giving medicines on time	0.781	0.596		
	15- Share responsibility for adherence to the medication program with my patient	0.766	0.618		
	14- Coordinating my medication program with my patient's medication program	0.706	0.547		
	12- Arguing with my patient about how to take medications	0.685	0.444		
	24- Managing prescriptions made by different doctors	0.594	0.517		
Information Seeking/ Information Sharing	5- Availability of someone to answer questions	0.743	0.498	2.474	13.74
	3- Awareness about why the medication is prescribed and whether it causes positive effects	0.691	0.522		
	4- Feeling comfortable asking about medications	0.665	0.392		
	2- Finding clear information about the medication	0.611	0.388		
	6- Access to information within a reasonable time period	0.579	0.449		
	7- Being comfortable in making pharmaceutical decisions	0.542	0.489		
Safety Issues	20- Diagnosis of pharmaceutical adverse effects	0.896	0.675	1.943	10.79
	19- Knowing in what cases medications can be powdered, combined, dissolved, etc.	0.762	0.633		
	18- Awareness about when to continue, increase, or reduce the dose or discontinue the medication	0.600	0.391		
	21- Awareness about the safe prescribing of medications	0.447	0.451		

h2: Communalities, λ: Eigenvalues

Table 3 The fit model indices of confirmatory factor analysis of the medication administration hassles scale

Chi-Square, df, *P*-value	CMIN/DF	RMSEA	IFI	CFI	PNFI	TLI
289.539, 131, $p<0.001$	2.210	0.075	0.924	0.923	0.744	0.910

correlation was less than 0.90, confirming discriminant validity (Table 5).

Reliability

Results demonstrated that Cronbach's Alpha and Omega coefficients were both above 0.70, indicating acceptable internal consistency for all three factors. The AIC was within an acceptable range (Table 4).

Floor or ceiling effects

The frequency of participants with the minimum total score was 2%, and no participant had the maximum score.

Medication administration hassles score

The mean score for medication administration hassles was 59.28 (SD = 17.89) among all caregivers. The correlation between the patient's age and the caregiver's age with the mean score of medication administration hassles was negative; however, these relationships were not statistically significant ($p>0.05$). The mean level of medication administration hassles differed significantly between male and female patients, with medication administration being more of a hassle for male patients than for female patients. ($p=0.02$, CI: -7.32, -0.422). Additionally, male caregivers experienced a higher level of hassle compared to female caregivers, and this difference was statistically significant ($p=0.00$, CI: -7.06, -0.06).

Discussion

This study aimed to evaluate the psychometric properties of the Farsi version of the Medication Administration Hassles Scale in family caregivers of older adults with chronic disease. The results indicated that the 18-item Farsi version of the scale with three factors demonstrated an acceptable fit and explained 50.71% of the variance. Thus, it appears that this scale could be considered a valid and reliable instrument for assessing medication administration hassles among family caregivers.

The original scale consisted of 4 factors and 24 items [13]. In this study, after conducting EFA and removing six items due to low factor loadings or cross loading, a three-factor structure was extracted, resulting in different outcomes. Among the removed items, three belonged to factor 1 of the original scale (items 1, 8, and 9), which pertained to medication-related information seeking and 1 item is related to factor 3 which is about admitting the mistake to the physician. Possible reasons for excluding these items could be attributed to differing caregiver expectations regarding their role in medication-related information sharing, as well as variations in the doctor-patient or doctor-family caregiver communication patterns in the Iranian culture. Another removed items,

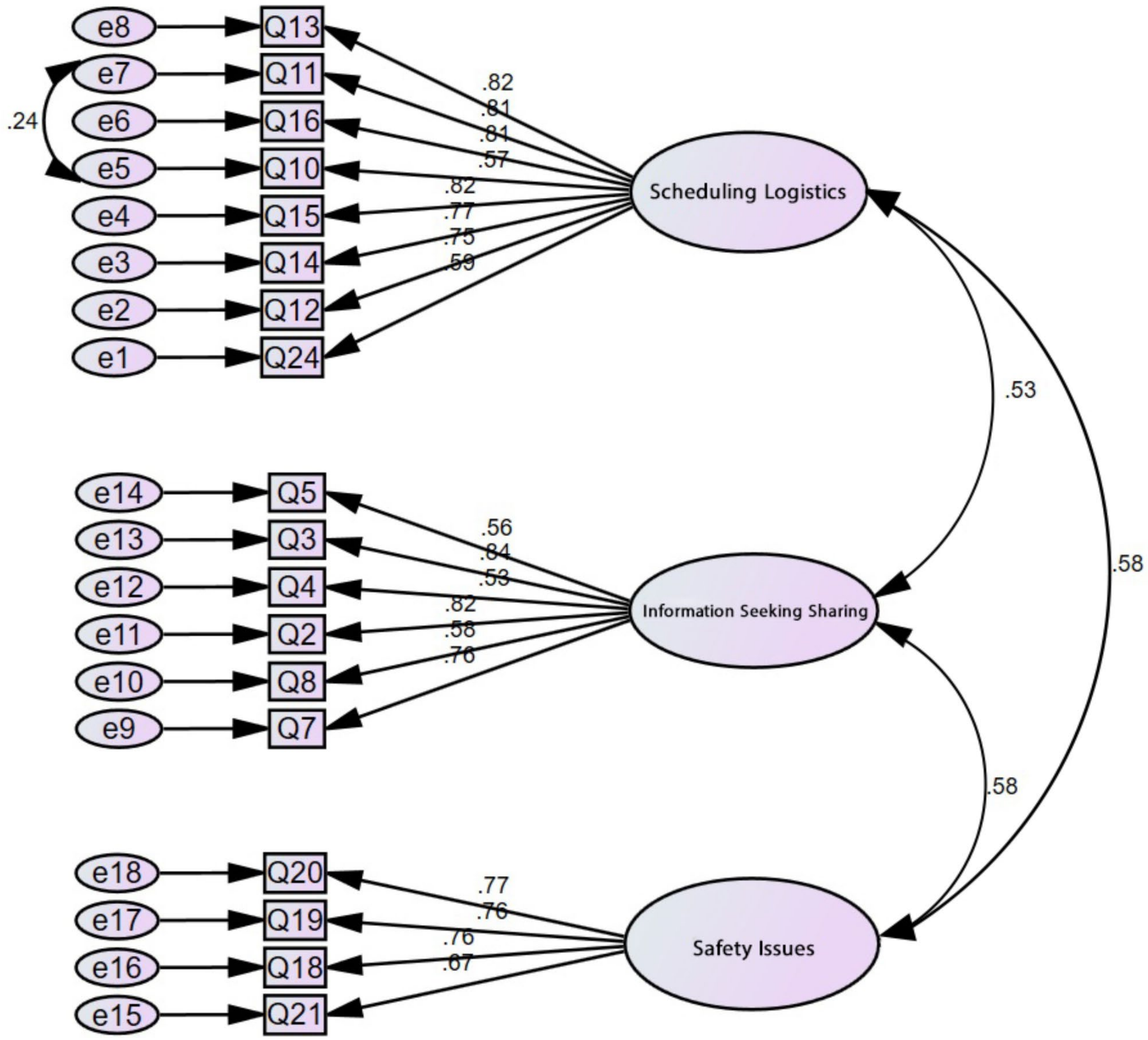

Fig. 1 The final structure model of the medication administration hassles

Table 4 Convergent, discriminant validity and composite reliability of the medication administration hassles scale

Subscales	CR	AVE	MSV	Cronbach's alpha	MaxR	Omega	AIC
1	0.910	0.562	0.338	0.918	0.922	0.919	0.584
2	0.842	0.480	0.341	0.828	0.877	0.829	0.445
3	0.830	0.550	0.341	0.804	0.834	0.810	0.507

Table 5 HTMT ratio of the medication administration hassles subscales

Subscales	Subscale 1	Subscale 2	Subscale 3
1	-	-	-
2	0.592	-	-
3	0.608	0.638	-

item 22 and 23, which were part of factor 4 of the original scale, related to keeping the medication prescriptions filled. However, caregivers in this study did not find this issue to be a significant challenge.

In this study, factor 1 (Scheduling Logistics) consisted of 7 items (items 10 to 16) from the original factor 2 and 1 item (item 24) from the original factor 4, while factor 2 (Information Seeking/Information Sharing) included all items from the original factor 1 except for items 1 and 8–9, which were removed. Factor 3 (Safety Issues) included all items from the original factor 3 except for item 17, which was removed in this study.

The variance explained in the original 24-item, 4-factor study was 70% [13]. In this study, the explained variance was 50.71%, which differs from the original study. This variance discrepancy can be attributed to the differences in the factor analysis methods employed [15]. Travis et al. (2003) conducted principal component analysis, a method inherently producing higher explained variance than exploratory factor analysis [13]. A similar study by Kao and Lynn (2009), which validated the Medication Administration Hassles Scale among Mexican American caregivers, reported a 6-factor structure with 23 items and an explained variance of 53%. The removed item in that study was item 24, related to managing medication prescriptions written by multiple physicians, which was retained in this study. Furthermore, the factor extraction method in Kao et al. study was principal component analysis [3].

A study assessing structural validity through CFA was not available for comparison.

In the present study, internal consistency was assessed by calculating Cronbach's alpha and omega coefficients for sub-scales. The alpha coefficient for factor 1 was above 0.90, and for the other two factors, it was above 0.80. In the original study [13], factors had alpha coefficients ranging from 0.80 to 0.90, similar to this study. Cronbach's alpha for the sub-scales in Kao et al.'s study mostly fell between 0.70 and 0.80, differing from the results of this study [3].

This study had limitations. The reliability (stability) of the scale was not examined, and other psychometric indicators such as responsiveness and sensitivity were not addressed. The use of convenience sampling method, which may have led to the selection of a specific group of caregivers or reduced the generalizability of the study's findings, is another limitation of this research.

Conclusion

Findings suggest that the 18-item Farsi version of the scale, comprising three factors, exhibits acceptable psychometric properties among Iranian caregivers of elderly individuals. In nursing literature, there is a significant emphasis on caring for the patient's family. Family members of patients with chronic diseases and older adults have regular and continuous contact with healthcare centers and caregivers due to the nature of the diseases. This consistent relationship could offer a suitable platform for nurses to assess the burdens of medication regimen complexities these caregivers face. For designing, planning, and implementing supportive interventions for these caregivers, understanding the type and extent of medication-related challenges they experience is essential. The application of this scale can be beneficial in various aspects, such as screening and assessing caregiver status at a macro level, policy-making, intervention design, and evaluating the effectiveness of such interventions by managers and decision-makers.

The clinical implication of this study is that healthcare providers can use this tool to identify medication administration challenges in elderly patients with chronic diseases and develop interventions to improve medication adherence and patient outcomes. By using this scale, healthcare providers can tailor interventions to address specific medication administration challenges faced by elderly patients with chronic diseases, ultimately improving their quality of life. However, further research is needed to validate this scale across diverse cultural, educational, socioeconomic, and regional contexts. Additionally, its utility in real-world clinical or community settings, as well as its impact on caregiver support programs, should be assessed. We also recommend assessing the scale's sensitivity and responsiveness in tracking caregiver burden over time.

Abbreviations

CVR	Content Validity Ratio
CVI	Content Validity Index
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
KMO	Kaiser–Meyer–Olkin
CFI	Comparative Fit Index
IFI	Incremental Fit Index
PNFI	Parsimonious Normed Fit Index
TLI	Tucker-Lewis Index
RMSEA	Root Mean Square Error of Approximation
AIC	Average inter-item correlation
AVE	Average Variance Extracted
MSV	Maximum Shared Variance
HTMT	Heterotrait-Monotrait

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Author contributions

The authors confirm contribution to the paper as follows: Study conception and design: Arezoo Shahsavari, Hamid Sharif Nia, Sima Hejazi Data collection: Arezoo Shahsavari, Sima Hejazi, Ali Arghaee, Mahdieh Roshan-Nejad Analysis and interpretation of results: Sima Hejazi, Hamid Sharif Nia. Draft manuscript preparation: Sima Hejazi, Arezoo Shahsavari, Mahdieh Roshan-Nejad. All authors reviewed and approved the final version of the manuscript.

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Data availability

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Human ethics and consent to participate

The Ethics Committee of North Khorasan University of Medical Sciences approved the research protocol (code: IR.NKUMS.REC.1400.169). This research is committed to adhering to the principles outlined in the Declaration of Helsinki. Written informed consent was obtained from the participants.

Measures were taken to ensure data security and anonymity. For online data collection, a secure survey platform was used to encrypt responses and prevent the collection of any personally identifiable information. Participants were informed that their responses would remain confidential and be used solely for research purposes. For paper-and-pencil data collection, surveys were completed anonymously, without names or identifying details. The completed surveys were stored securely and were accessible only to the research team.

Consent for publication
Not applicable.

Clinical trial number
Not applicable.

Competing interests
The authors declare no competing interests.

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References

1. Fathi E. The phenomenon of population aging in Iran. srtc-ijoss. 2020;30(2):387–413.
2. Tavan H, Azadi A. The frequency of fall, fear of fall and its related factors among Iranian elderly: A systematic review and meta-analysis. Int J Afr Nurs Sci. 2024;20:100660.
3. Kao HF, Lynn MR. Use of the measurement of medication administration hassles with Mexican American family caregivers. J Clin Nurs. 2009;18(18):2596–603.
4. Atella V, Piano Mortari A, Kopinska J, Belotti F, Lapi F, Cricelli C, et al. Trends in age-related disease burden and healthcare utilization. Aging Cell. 2019;18(1):e12861.
5. Look KA, Stone JA. Contextual factors influencing medication management by rural informal caregivers of older adults. Res Social Adm Pharm. 2019;15(10):1223–9.
6. Bruce R, Murdoch W, Kable A, Palazzi K, Hullick C, Pond D et al. Evaluation of carer strain and carer coping with medications for people with dementia after discharge: results from the SMS dementia study. Healthc (Basel). 2020;8(3).
7. Hejazi SS, Hosseini M, Ebadi A, Alavi Majd H. Development and psychometric properties evaluation of caregiver burden questionnaire in family caregivers of Hemodialysis patients. BMC Nurs. 2022;21(1):246.
8. Chari AV, Engberg J, Ray KN, Mehrotra A. The opportunity costs of informal elder-care in the united States: new estimates from the American time use survey. Health Serv Res. 2015;50(3):871–82.
9. Look KA, Stone JA. Medication management activities performed by informal caregivers of older adults. Res Social Adm Pharm. 2018;14(5):418–26.
10. Gillespie R, Mullan J, Harrison L. Managing medications: the role of informal caregivers of older adults and people living with dementia. A review of the literature. J Clin Nurs. 2014;23(23–24):3296–308.
11. Coleman EA, Roman SP. Family caregivers' experiences during transitions out of hospital. J Healthc Qual. 2015;37(1):12–21.
12. Hejazi SS, Hosseini M, Ebadi A, Alavi Majd H. Caregiver burden in Iranian caregivers of patients undergoing hemodialysis: a qualitative study. Soc Work Health Care. 2022;61(2):82–107.
13. Travis SS, Bernard MA, McAuley WJ, Thornton M, Kole T. Development of the family caregiver medication administration hassles scale. Gerontologist. 2003;43(3):360–8.
14. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of good practice for the translation and cultural adaptation process for Patient-Reported outcomes (PRO) measures: report of the ISPOR task force for translation and cultural adaptation. Value Health. 2005;8(2):94–104.
15. Hoseinzadeh E, Sharif-Nia H, Ashktorab T, Ebadi A. Development and psychometric evaluation of nurse's intention to care for patients with infectious disease scale: an exploratory sequential mixed method study. BMC Nursing. 2024;23(1):65.
16. Hejazi SS, Hosseini M, Ebadi A, Alavi Majd H. Development and psychometric evaluation of caregiver burden questionnaire for family caregivers of patients undergoing hemodialysis: A protocol for A sequential exploratory Mixed-Method study. Iran J Psychiatry. 2021;16(4):471–9.
17. Lawshe CH. A quantitative approach to content Validity1. Pers Psychol. 1975;28(4):563–75.
18. Polit DF, Yang F. Measurement and the measurement of change. 1st ed. LWW; 2015.
19. Gaskin CJ, Happell B. On exploratory factor analysis: a review of recent evidence, an assessment of current practice, and recommendations for future use. Int J Nurs Stud. 2014;51(3):511–21.
20. Mokkink LB, de Vet HCW, Prinsen CAC, Patrick DL, Alonso J, Bouter LM, et al. COSMIN risk of Bias checklist for systematic reviews of Patient-Reported outcome measures. Qual Life Res. 2018;27(5):1171–9.
21. Sharif Nia H, Pahlevan Sharif S, Boyle C, Yaghoobzadeh A, Tahmasbi B, Rassool GH, et al. The factor structure of the spiritual well-being scale in veterans experienced chemical weapon exposure. Journal of religion and health. 2018;57:596-608.
22. Plichta Kellar S, Kelvin E. Munro's Statistical Methods for Health Care Research. 6th Edition ed: Wolter Kluwer. 2012.
23. Rahmatpour P, Peyrovi H, Sharif Nia H. Development and psychometric evaluation of postgraduate nursing student academic satisfaction scale. Nurs Open. 2021;8(3):1145–56.
24. Henseler J, Ringle C, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci. 2015;43:115–35.
25. Gaskin J, James M, Lim J. Master validity tool, AMOS plugin. Gaskination's Statistics; 2019.
26. Devellis RF. Scale development: theory and applications. Fourth ed. Los Angeles: SAGE Publications, Inc; 2016.
27. Sharif Nia H, Sivarajan Froelicher E, Hosseini L, Ashghali Farahani M, Hejazi S. Development and validation of the care challenge scale in family caregivers of people with Alzheimer's disease. Front Public Health. 2022;10:921858.
28. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34–42.

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