

Designing and Evaluating Psychometric Properties of a Tool for Assessing Primary Elderly Health Services in Iran

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Abstract- Semen Accurately assessing the status of older adults and evaluating service delivery requires a standardized instrument to capture primary healthcare conditions. Therefore, this study aimed to develop and validate a tool to assess the current provision of primary preventive services for the elderly in Iran. This exploratory sequential mixed-methods study was conducted in two phases: a quantitative descriptive survey for instrument development and measurement, and a qualitative phase using content analysis to gather expert perspectives. First, a comparative analysis was performed to describe the provision of primary preventive health services for the elderly in Iran and selected countries. Expert consensus was then obtained across three Delphi rounds to design a structured questionnaire. Face and content validity (CVR and CVI) were assessed to confirm key variables and items, and internal consistency reliability was determined using Cronbach's alpha coefficient. The instrument comprised demographic characteristics and domain-specific items derived from the Delphi process. Content validity ratio (CVR) and content validity index (CVI) were established based on the evaluation of 12 academic experts for each item. Confirmatory factor analysis (CFA) was used to evaluate the relationships between latent variables and their observed indicators. The final tool consisted of 6 dimensions and 64 items. Cronbach's alpha coefficients for the dimensions were 0.71, 0.84, 0.75, 0.76, 0.82, and 0.92, respectively, demonstrating acceptable to high internal consistency. The findings indicate that the developed tool possesses sound psychometric properties and provides a practical, standardized instrument for healthcare decision-makers to evaluate and enhance primary geriatric healthcare services.

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Introduction

Over the past few decades, improved living conditions, significant advancements in medical science, enhanced public health measures, better nutrition, and increased life expectancy have collectively contributed to the global phenomenon of aging (1). Aging is an inevitable biological process; as individuals age, they increasingly rely on health services to maintain well-being and manage illness (2). Therefore, health services are crucial for older adults to preserve and restore health,

particularly in cases of chronic conditions or acute illness. Access to these services becomes vital as individuals age and encounter complex health challenges, underscoring the need for tailored health interventions and long-term care options (3).

In Iran, the aging population is growing at an unprecedented rate. Projections suggest that the number of individuals aged 60 and older will increase more than fourfold over the next two decades, reaching an estimated 17 million by 2045 (4). This shift represents a monumental demographic transition for a country with

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limited prior experience in managing the health and well-being of its aging population (5,6).

As the number of older adults rises, so does the prevalence of chronic and debilitating diseases that demand specialized and ongoing care. This trend presents a considerable challenge for the Iranian healthcare system (7). Older adults are more susceptible to conditions such as cardiovascular diseases, diabetes, arthritis, and neurodegenerative disorders, all of which require long-term management and tailored healthcare resources (8). Addressing these challenges necessitates careful planning, investment in specialized services, and a robust infrastructure capable of meeting the unique needs of this demographic (8).

Over the last decade, policymakers in Iran have increasingly recognized the importance of addressing the needs of the elderly population. This shift in focus has led to an emphasis on preventive health services as part of the broader strategy to alleviate the economic burden of aging (9). Preventive measures such as health education, screenings, vaccinations, and lifestyle modifications have the potential to significantly reduce the incidence of age-related diseases and mitigate financial strain on the healthcare system (10).

Despite these efforts, Iran faces significant challenges in providing adequate services to its elderly population. Like many developing countries, Iran contends with constraints regarding financial and human resources, complicating the provision of comprehensive care for older adults (11). Effective solutions require a multidimensional approach, encompassing not only increased resource allocation but also shifting societal attitudes toward aging, improving management practices, and implementing long-term policies that address the broader spectrum of issues, including healthcare access, pensions, long-term care, and financial support (12).

Promoting healthy lifestyles throughout the life course, with a focus on geriatric years, remains another crucial aspect of addressing the needs of the aging population. Adopting healthier habits such as improved nutrition, regular physical activity, and the avoidance of harmful behaviors can significantly improve health outcomes, increase life expectancy, and reduce the incidence of chronic disease and disability (13). Such lifestyle interventions not only enhance the quality of life for older adults but also reduce overall healthcare costs by minimizing the need for acute medical interventions and long-term care (14).

Service delivery models are pivotal in shaping health outcomes and cost-effectiveness. Effective models, particularly those prioritizing preventive care and early

diagnosis, can have a profound impact on geriatric health while reducing the financial burden of chronic disease management (14). Therefore, policymakers must prioritize interventions targeting the most common health issues among the elderly, such as promoting physical activity, addressing poor nutrition, and providing regular screenings. Furthermore, reforming the healthcare system to incorporate integrated and efficient care models could enhance service delivery and mitigate existing inefficiencies (15).

Identifying the current status of service provision is the essential first step toward improvement. A clear understanding of the current landscape is a prerequisite for evidence-based reform, helping to determine which changes are necessary to achieve desired future outcomes and how their impact can be measured. Providing a situational analysis can describe the current environmental features; however, a standard questionnaire is required to assess current conditions and accurately describe primary healthcare provisions for the elderly. A review of the literature reveals a lack of standardized instruments for this purpose globally. Therefore, this study aims to develop an appropriate tool for assessing the current situation regarding the provision of preventive services for the elderly in Iran.

Materials and Methods

The present study employed a mixed-methods approach, combining quantitative and qualitative phases to develop a comprehensive understanding of the current state of preventive primary health services for the elderly in Iran. The primary focus was the design and psychometric evaluation of a questionnaire to assess these services. The quantitative phase utilized a descriptive survey method for instrument development, while the qualitative phase used content analysis to integrate expert perspectives.

The literature review in the first stage addressed the current state of preventive health services for the elderly in Iran and selected countries. A comprehensive search across multiple databases yielded relevant articles from 2005 to 2021. Inclusion criteria covered English and Farsi articles related to elderly preventive services, financing, insurance coverage, population demographics, service providers, and monitoring methods. The Joanna Briggs Institute checklist was utilized to assess the quality of the selected articles.

Based on the literature review findings and expert consultations, research items were formulated to develop a draft questionnaire for the Delphi process. Pre-testing

ensured the clarity and focus of the items. Delphi panel members were selected based on scientific rank, geographical region, management experience in health services, geriatric health expertise, and academic qualifications.

The Delphi process comprised multiple rounds. In the first round, experts provided feedback on the questionnaire, identifying factors affecting the management of preventive health services. The results informed the structured questionnaire for the second round, where experts utilized Likert scales to rate each item. The process involved refinement, the addition of new items, and the removal of others based on expert feedback.

The third round aimed to achieve final consensus. Experts revisited their answers, revised opinions, and ranked the importance of each item. No further changes were suggested, indicating consensus. A structured questionnaire, incorporating demographic questions and dimensions derived from the Delphi process, was developed.

To ensure validity, the content validity ratio (CVR) and content validity index (CVI) were employed. Twelve academic experts assessed the questionnaire, resulting in a CVR of 0.83 for the planning and monitoring categories. CVI, following the approach of Waltz and Bausell, demonstrated satisfactory validity for all items.

Reliability was assessed using Cronbach's alpha coefficient, with a value of 0.943 obtained for the entire questionnaire from a sample of 30 experts. Second-order confirmatory factor analysis (CFA) was applied to assess the relationships between latent variables and their observed indicators.

Confirmatory factor analysis identified specific indicators for removal in each dimension, reflecting a rigorous refinement process. The study concluded with the design of a structured and standardized questionnaire, encompassing demographic details and validated dimensions derived from the Delphi process, ensuring its reliability and psychometric soundness.

This article is derived from a doctoral thesis titled, "Designing the service delivery management model for preventive primary health care in the elderly in Iran," approved by the Islamic Azad University, Tehran South Branch (Approval Code: 164100).

Results

The findings indicated that the largest population aged over 65 years was in Japan (28.4%), while the lowest was in Iran (6.56%). In 50% of the reviewed studies, older

adults lacked insurance coverage. Regarding service financing, 50% of cases relied on tax payments, whereas 33% were financed through insurance premiums. The management and organization of services were national in over 70% of cases and federal in 20%. Regarding the level of service concentration, 64% of cases were centralized at the regional level, and 28% at the national level. Supervision of provided services was the responsibility of the government in more than 50% of cases, while in the remaining cases, this responsibility fell to local governments or the private sector. Among the selected countries, Cuba, Turkey, and Iran adopted a centralized structure, whereas the others utilized a decentralized model, in which many powers were delegated to regional and local authorities.

A review of the literature and the application of the Delphi technique to gather expert opinions revealed that the final questionnaire comprised 64 items categorized into six dimensions: planning, organization, resource provision, supervision, leadership, and preventive services.

During the validity assessment stage, several of the 64 items were modified based on expert feedback to address issues such as redundancy, overlap, and information gaps resulting from an incomplete understanding of the country's elderly health system and its relationship to broader health outcomes. Subsequently, five experts were interviewed to assess the clarity of the items, and additional clarifications were incorporated to improve their fluency and comprehensibility.

Demographic characteristics of the study sample

Of the 30 respondents, 18 (60%) were male and 12 (40%) were female. In terms of academic rank, 3 participants (10%) were full professors, and 4 (13%) were faculty members (associate or assistant professors), while the remaining participants were not faculty members. Regarding educational qualifications, 7 participants (23%) held a Ph.D., 2 (6%) were specialists, 1 (3%) was a general practitioner, 16 (53%) held a master's degree, and 3 (9%) held a bachelor's degree. Furthermore, 29 participants (97%) were affiliated with the Faculty of Medical Sciences, and one was affiliated with the Faculty of Science and Engineering. Regarding professional experience, 12 participants (40%) had 5-10 years of management experience, 12 (40%) had 10-15 years, and 4 (13%) had over 15 years. The age distribution was as follows: 2 participants (6%) were aged 20-30, 9 (27%) were aged 30-40, 11 (33%) were aged 40-50, and 8 (24%) were over 50 years old.

The Kaiser-Meyer-Olkin (KMO) value for the entire

questionnaire exceeded 0.6, confirming that the sample size was adequate and the data were reliable for performing exploratory factor analysis (EFA). The significance level of Bartlett's test of sphericity was less than 0.05 ($P < 0.05$), indicating a satisfactory degree of linear correlation among the items.

The scree plot illustrated a six-factor structure with 64 items following the principal components analysis (PCA), which was identified as the most appropriate structure for the questionnaire (Figure 1).

The main question of the questionnaire was how

effective can each of the following criteria be in providing the first type of preventive health services to the elderly? The answer to each question was determined with 5 options, I strongly disagree, I disagree, I have no opinion, I agree, I strongly agree. The questions of each field are defined in Table 1.

Cronbach's alpha coefficients of the factors were obtained as 0.71, 0.84, 0.75, 0.76, 0.82, and 0.92, respectively (Table 2). Cronbach's alpha coefficient of the whole questionnaire was equal to 0.71, which was acceptable.

Table 1. Questionnaire questions for evaluated CVR and CVI

Row	Item	CVR	CVI
Planning			
1	Concentrated	1	1
2	Decentralized	1	1
3	Need assessment	1	1
4	Determining goals	0.83	1
5	How to execute	1	1
6	Long term	1	1
7	Medium-term	1	1
8	Short term	1	1
9	Participation of senior managers	1	1
10	Participation of middle managers	1	1
11	Participation of basic managers	1	1
12	Policymaker (decision-making and decision-making institutions)	1	1
13	Modify processes	1	1
Organization			
14	Organizational structure based on predetermined goals	1	1
15	Delegation of authority	1	1
16	Allocation of organizational posts for elderly care	1	1
17	Organizational position of elderly care provision	1	1
18	Official organization	1	1
19	Informal organization	1	1
20	Intra-organizational communication	1	1
21	External communications	1	1
22	Job enrichment	1	1
23	Limits of Responsibilities	1	1
24	authority level	1	1
Financing			
25	Private sources		1
26	General tax		1
27	Social Supply	1	1
28	Ministry of Health	1	1
29	Welfare	1	1
30	Ministry of Cooperation, Labor and Social Welfare	1	1
31	Insurance and pension	1	1
32	Charities	1	1
33	Using voluntary and unpaid human resources	1	1
34	Payment of patients	1	1
35	The share of health and treatment in the gross national product	1	1
36	Equipment and facilities	1	1
37	Physical area	1	1
38	Human force	1	1
Supervision			
39	Relief Committee	1	1
40	Ministry of Health	1	1
41	Non-governmental organizations	1	1
42	Municipality	1	1
43	Insurers	1	1

Cont. table 1			
44	Customer	1	1
45	Colleague	1	1
46	Comprehensive (superior, subordinate, customer, and colleague)	1	1
47	Continuous (monitoring)	1	1
48	Intermittent (Evaluation)	1	1
49	Final or compact (Evaluation)	0.83	1
50	Employee motivation	1	1
Leadership			
51	Management of human factors of organizational behavior	1	1
52	How to communicate (facilitating group relations)	1	1
53	Creating change and transformation in the service delivery system - guiding and influencing others	1	1
54	Health education	1	1
55	Personal responsibility (protection)	1	1
Preventive services			
56	Social responsibility	1	1
57	Nutritional interventions	1	1
58	Change of lifestyle	1	1
59	Immunization	1	1
60	Drug prevention	1	1
61	Screening	1	1
62	Information (advertisement)	1	1
63	Family doctor	1	1
64	Referral system	1	1

Table 2. The results of the reliability check with the internal consistency method (Cronbach's alpha)

Dimensions	Number of questions (items)	Cronbach's alpha
Planning	13	0.71
Organization	11	0.84
Provision of resources	14	0.75
Supervision	11	0.76
Leadership	4	0.82
Preventive services	11	0.92

Discussion

The primary objective of this study was to design and validate a tool for assessing primary healthcare services for the elderly in Iran. A robust, multi-dimensional instrument was developed using a mixed-methods approach. Psychometric evaluation demonstrated that the tool is practically applicable and effective for assessing health systems and collecting pertinent data in this field. Various instruments have been developed globally to assess elderly healthcare service delivery. Performance measurement represents the foundational step in enhancing healthcare quality. Robust performance measurement systems facilitate the recognition of exemplary practices, enable the development of performance-improvement strategies, and allow for the certification of service providers who adhere to established standards (16). Although diverse methods for performance assessment exist in Iran, they have not yet been systematically applied to public health organizations serving the elderly. This study addresses this gap, creating significant opportunities for policymakers to

enhance accountability in health-related decision-making.

Several instruments have been designed to assess the performance of primary healthcare services for the elderly. Lengyel *et al.*, developed a questionnaire to evaluate the nutritional status of the elderly and the delivery of nutritional services. Their study assessed the satisfaction of long-term care (LTC) recipients regarding meal services and their eating-related quality of life. The findings underscored that food delivery services should be provided in environments that foster autonomy, interpersonal relationships, and security (17). This questionnaire remains a standard tool for evaluating food service provision for older adults.

The Self-Care Ability Scale for the Elderly (SASE) is another instrument that has garnered significant attention. Its psychometric properties were previously validated in Persian. Originally containing 45 items, the scale was refined to 40 items following factor analysis, demonstrating desirable psychometric characteristics (18). In another study, the Elderly Caregiver Questionnaire for COVID-19 (ECQC-24) was developed to assess caregiver attributes during the pandemic. Based

on international expert consensus and recommendations from authoritative bodies such as the World Health Organization and the US Centers for Disease Control and Prevention, the tool underwent rigorous psychometric analysis. With Cronbach's alpha coefficients ranging from 0.72 to 0.87 and acceptable construct validity determined via EFA, the ECQC-24 provided valid and reliable estimates (19). Furthermore, a cross-sectional study evaluating health service quality in Mashhad, Iran, utilized the SERVQUAL and HEALTHQUAL models to assess 200 users across four health centers. Both models revealed a negative gap between user expectations and perceptions, highlighting the utility of such research in guiding managers and policymakers toward effective, evidence-based interventions (20). Similarly, the current study provides a validated tool for evaluating elderly health services that can be utilized by health system managers and relevant departments. Future research should prioritize the development of instruments to specifically evaluate elderly satisfaction with primary healthcare services.

This study possesses certain limitations. First, while robust, the scope might be influenced by regional factors, potentially limiting the generalizability of findings to the entire elderly population in Iran. Second, as the tool was developed specifically for the Iranian context, cultural nuances may affect its applicability in other regions or countries. Third, the dynamic nature of healthcare needs means that the tool's relevance could evolve alongside changing policies and practices, requiring future periodic updates.

This study successfully designed and validated a comprehensive tool for assessing primary healthcare services for the elderly in Iran. Developed through a mixed-methods approach, the instrument's psychometric properties confirm its suitability for evaluating the health system and gathering relevant data. This study underscores the critical importance of performance measurement in improving healthcare quality. By utilizing this validated tool, managers and policymakers can more effectively address the needs of the elderly and implement targeted improvements in healthcare service delivery. Furthermore, specialized questionnaires addressing the unique needs of the elderly population contribute significantly to enhancing their overall satisfaction and quality of life.

Conflict of Interest

The authors declare no conflicts of interest regarding this research.

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