



Construction and validation of a scale for assessing justice indicators in the Iranian health system

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Abstract

Introduction: Justice in the health system is a fundamental principle of sustainable development in societies, requiring precise assessment tools. This study aimed to design and validate a scale for assessing justice indicators in the Iranian health system.

Materials and Methods: A sequential exploratory mixed-methods approach, emphasizing the quantitative part, was used. The tool was designed based on indicators from the qualitative section and validated using face (qualitative and quantitative), content (CVR and CVI), and concurrent validity. Construct analysis was performed through exploratory and confirmatory factor analysis. The research population included 900 clients from health centers affiliated with Shahrood University of Medical Sciences-Iran, in 2022. Cluster and systematic sampling methods were used, with 889 fully completed questionnaires collected. Data were analyzed using SPSS and LISREL software.

Results: In the qualitative part, nine key dimensions of justice were identified. The validity of tool was confirmed with face, content (CVR and CVI from 0.80 to 1.00 and 0.83 to 0.97, respectively), and concurrent validity. Exploratory and confirmatory factor analyses showed a nine-factor structure with good fit indices (RMSEA= 0.040, CFI= 0.99). Reliability was confirmed with a Cronbach's alpha coefficient of 0.923.

Conclusion: The scale for assessing justice in the Iranian health system is valid and reliable, suitable for research and policy-making related to justice in the health system. It provides a comprehensive and accurate measurement of justice indicators, crucial for identifying the strengths and weaknesses of health system.

Keywords: Factor analysis, Health equity, Health services accessibility, Outcome assessment

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Introduction

Justice in the health system is one of the fundamental pillars of any healthcare system, playing a central role in equitable access to

medical services and the improvement of health indicators (1). While many developed countries have made extensive efforts to achieve health justice, significant inequalities in access to

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health services, the distribution of financial and human resources, and structural issues in service allocation persist in Iran (2,3). These inequalities may include substantial differences in access to care across regions, socioeconomic gaps among different population groups, and unequal allocation of financial resources to health services (4). Under such circumstances, a rigorous and scientific assessment of justice indicators in Iran's health system is essential to identify and address these problems.

Despite the importance of the topic, a critical review of previous studies shows that most available instruments for measuring health justice were developed in Western settings and are not able to reflect the cultural, social, and structural characteristics of developing countries such as Iran (5); for example, composite indices developed in other contexts or census- and neighborhood-based measures used in the United States heavily reflect the welfare structures and demographic patterns of those countries and do not capture local deprivations or the financing structure of Iran's health system, while domestic reports documenting concentration of specialist physicians and hospital beds in the capital (Tehran) and shortages of specialists in deprived provinces illustrate access differentials that non-native instruments often fail to examine adequately (6).

In Iran's health system, issues such as unequal distribution of financial resources, regional and social disparities in access to care, and structural problems in resource allocation have left different population groups with serious limitations in obtaining appropriate services (7,8). In many parts of the country, people face major challenges in covering healthcare costs and accessing physicians and health facilities (8). Therefore, assessing justice indicators in the health system can play a key role in identifying these problems and proposing appropriate solutions. The primary goal in this area is to systematically and accurately evaluate the distribution of health resources and services so as to develop effective policies to reduce inequalities and improve the current situation.

Although various questionnaires and indices have been introduced in health research, each suffers from important limitations; for instance, some studies use geo-statistical indices such as regional deprivation indices or measures of hospital bed distribution to assess inequality, which rely heavily on spatial and infrastructure

data and do not capture perceived dimensions of justice (such as patients' perceptions of staff behavior, service quality, or cultural discrimination in service delivery) (9,10), whereas instruments like the SF-36 or WHOQOL, widely used to assess general health and quality of life, alone cannot measure specific distributive or procedural components of justice in service provision; consequently (11,12), there is limited evidence on how the components of these instruments overlap or diverge in the Iranian context, and local studies demonstrating which dimensions of foreign tools are applicable in Iran or require adaptation are scarce (13,14).

Using questionnaires to evaluate these indicators can be a faster, more cost-effective, and more efficient method compared with more complex statistical approaches based on geographic and social data (15,16). Questionnaires, in addition to enabling direct data collection from the target population, require less time and cost for data gathering (17). Moreover, questionnaires can be deployed in larger studies and may serve as a standardized national instrument for measuring justice in the health system (18).

In summary, the main problem addressed by this study is the lack of a standardized and locally adapted questionnaire for Iran's health system that can comprehensively measure the various dimensions of justice — examples of this gap include the failure to reflect regional inequalities (e.g., differences in physician-to-population ratios between Tehran and deprived provinces), the absence of perception-based justice measures (e.g., patients' experiences of staff behavior or gender- or ethnicity-based discrimination in service delivery), and the mismatch of international instruments with Iran's specific financing structure (such as differing insurance coverage patterns in the public and private sectors) (14,19,20). The aim of this study is to qualitatively identify justice indicators appropriate to the Iranian context and then to quantitatively develop and validate a valid and reliable questionnaire based on these indicators.

Materials and Methods

This study employed a sequential exploratory mixed-methods design, in which a qualitative phase was first conducted to extract indicators and generate items, followed by a quantitative phase to examine the structure, validate, and

assess the reliability of the questionnaire. From the “Methods” section onward, the article was structured into two separate parts: the qualitative study and the quantitative study. In each part, the study type, population/sample, instruments, implementation procedures, and analytical methods were described independently.

Qualitative Study

The aim of the qualitative phase was to identify and extract concepts, indicators, and components related to justice in the Iranian health system and to generate an initial item pool for questionnaire development. This phase employed a conventional content analysis approach guided by the framework of Graneheim and Lundman (21,22). Data were obtained from two complementary sources. First, a systematic review of national and international studies and reports related to justice and equity in health was conducted in databases including PubMed, Scopus, Web of Science, SID, and Magiran (23,24). Second, Iranian national policy documents and strategic health plans were reviewed to capture contextualized indicators of justice (6). After duplicate removal, screening, and full-text review, relevant content was extracted by two independent researchers; disagreements were resolved by consultation with a third researcher (5). The extracted data were analyzed using conventional content analysis. Initially, two researchers independently performed line-by-line open coding. Codes were then compared, discussed, and merged into a consolidated codebook (24). Through axial coding, codes were grouped into subcategories and categories. Finally, the overarching dimensions of justice were identified by consensus based on conceptual similarities (17,23).

To ensure coding reliability, Cohen’s kappa was calculated and exceeded 0.80, indicating strong inter-coder agreement (25). To enhance the credibility and trustworthiness of the findings, multiple strategies were employed. An expert panel ($n = 7$) consisting of specialists in health policy, management, and sociology reviewed and validated the emerging categories to confirm conceptual clarity and distinctiveness. Triangulation was conducted by comparing the extracted categories with international frameworks (e.g., WHO, World Bank) and national policy documents. Additionally, limited member checking was

carried out with five stakeholders (health service providers and recipients) to verify comprehensibility and appropriateness of the categories (18).

The categories identified in the qualitative phase were then translated into measurable questionnaire items. Each category was operationalized into candidate items based on four predefined criteria: (1) representation in at least two independent sources, (2) suitability for a question format, (3) avoidance of semantic overlap, and (4) clarity and comprehensibility for the target population. For each dimension, 2-5 items were drafted in simple Persian. The initial item pool was then reviewed by an expert panel ($n = 10$) for clarity, simplicity, and representativeness. Items were revised iteratively until consensus was achieved, ensuring both *cultural and linguistic adaptation* for the Iranian health system context (21).

Quantitative Study

The quantitative phase employed a cross-sectional survey design, aiming to evaluate face, content, concurrent, and construct validity, as well as reliability of the developed tool. Sampling design and sample size were determined to ensure sufficient participants for each validation stage. The target population included service recipients at Imam Hossein Hospital and four affiliated health centers of Shahrood University of Medical Sciences in 2022. Based on standard guidelines, sample sizes were approximately 100 for concurrent validity, 400 for exploratory factor analysis, 300 for confirmatory factor analysis, and 100 for reliability testing, totaling 900 participants (26). Ultimately, 889 completed questionnaires were returned. In this study, a multi-stage cluster sampling method was employed.

First, each of the hospitals and affiliated health centers was assigned a number, and then one hospital and four health centers were randomly selected using a random number generator. In the next stage, systematic sampling was applied within each selected cluster. To achieve this, the total number of clients in the past six months was divided by the required sample size for that cluster to determine the sampling interval (k). A random number between 1 and k was generated to identify the first participant, and subsequent participants were selected at intervals of k from the client list until the quota for each cluster was completed. This procedure ensured that the sampling process was both

random and representative of the target population. Demographic data were recorded.

Inclusion/exclusion criteria (Quantitative phase): The inclusion criteria consisted of receiving services at the selected centers within the past six months, the ability to read and write or at least orally comprehend the questionnaire, provision of written or oral informed consent, and the absence of severe cognitive or psychiatric disorders at the time of recruitment. The exclusion criteria included the occurrence of acute or emergency conditions after recruitment that prevented completion of the questionnaire, withdrawal of consent during the study, and incomplete responses due to non-cooperation or premature termination of participation. **Instrument and Questionnaire Structure:** The final questionnaire comprised 39 items across nine dimensions. Each item was scored on a 5-point Likert scale (1= strongly disagree to 5= strongly agree). Dimensions were derived from the themes identified in the qualitative study. Items were reviewed for clarity, fluency, and non-overlapping content prior to the quantitative phase. **Determination of Face Validity:** To determine the face validity of the questionnaire, both qualitative and quantitative approaches were applied. In the qualitative phase, purposive sampling was used to select 10 healthcare service recipients affiliated with Shahrood University of Medical Sciences, who reviewed the preliminary questionnaire and were interviewed regarding the clarity, relevance, and difficulty of the items; their feedback was used to revise and refine several items to enhance comprehensibility and appropriateness for the target population. In the quantitative phase, the questionnaire was distributed through convenience sampling to 20 additional healthcare service recipients from the same university, who rated the importance of each item on a 5-point Likert scale (1= not important to 5= very important) (27). The impact score for each item was calculated as frequency $\times$ importance, and items with an impact score ≥ 1.5 were retained (28).

Determination of Content Validity: To evaluate the content validity of the tool for assessing justice indicators in the Iranian health system, both content validity ratio (CVR) and content validity index (CVI) were calculated. Ten experts with doctoral degrees in relevant fields—including health services management (2), health economics (2), health policy (2),

medical sociology (2), and epidemiology (2)—were purposively selected to ensure sufficient expertise regarding justice in the health system. For CVR, the experts rated each item as “essential,” “useful but not essential,” or “not necessary,” and items with CVR values above the minimum threshold of 0.62 were retained (29). For CVI, three dimensions were assessed for each item: relevance (how closely each item reflects the underlying construct), clarity (ease of understanding), and simplicity/fluency (conciseness and readability of the wording). Experts rated each item on a 4-point Likert scale (1= not relevant/unclear/complex to 4= highly relevant/very clear/very simple), and the proportion of experts rating 3 or 4 for each aspect was calculated. Items with CVI ≥ 0.78 were considered acceptable (15).

Items not meeting the thresholds were revised iteratively based on expert feedback until all items demonstrated sufficient relevance, clarity, and simplicity, ensuring content adequacy and cultural appropriateness for the Iranian health system context. **Concurrent Validity:** For concurrent validity assessment, the total scores of the scale were compared with the scores of the Equity-Oriented Health Care Scale - Ongoing (EOHCS - Ongoing), and their correlation was calculated. The EOHCS - Ongoing scale consists of 12 questions that evaluate patients' experiences with equity-oriented healthcare. Responses to this scale are based on a 5-point Likert scale (never = 0 to always = 4), and the total score ranges from 0 to 48, where higher scores indicate a greater experience of equity-oriented healthcare. This scale has been recognized as valid and reliable in various studies (30). In the present study, the Cronbach's alpha of the scale was obtained at 0.91. Furthermore, the content validity of the designed scale was assessed by five experts (two with Ph.D. in management, one with a Ph.D. in psychometrics, and one with a Ph.D. in economics). These experts evaluated each item on a 3-point Likert scale (1= essential, 2= useful but not essential, 3= not necessary).

All experts selected the “essential” option for all items, which indicates that the content validity of the scale was fully supported. **Construct Validity:** Construct validity was evaluated through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). EFA was conducted using Principal Axis Factoring (PAF) with Oblimin rotation, allowing for correlated factors (31).

Sampling adequacy was assessed using the Kaiser-Meyer-Olkin (KMO) index and Bartlett's Test of Sphericity. Factors were extracted based on eigenvalues greater than 1, and items with factor loadings ≥ 0.40 were retained (32). Oblimin rotation was selected because the factors were expected to exhibit meaningful correlations, in line with methodological recommendations that oblique rotation is preferred over orthogonal rotation (Varimax) when factors are correlated, ensuring more accurate factor representation and construct. CFA was conducted to confirm the factor structure, with model fit assessed using Comparative Fit Index (CFI), Incremental Fit Index (IFI), Normed Fit Index (NFI), Root Mean Square Error of Approximation (RMSEA), and χ^2/df . Thresholds were CFI, IFI, NFI > 0.90 ; RMSEA < 0.08 ; $\chi^2/df < 5$ (33).

Reliability: Reliability was assessed using Cronbach's alpha, split-half method with Spearman-Brown correction, and item-total correlations. Pre-test data were used, and items with low correlations were reviewed (34).

Pilot Testing, Field Implementation, and Quality Control: A pilot test with 30 participants was conducted to refine completion time, clarity, and procedural issues. Surveys were administered by trained personnel or self-completed with guidance. Data entry underwent validation checks before statistical analysis. **Data Analysis Methods:** Data were analyzed using SPSS version 22 and LISREL version 8. Descriptive statistics were applied to demographic data. CVR and CVI were used for content validity, Pearson correlation for concurrent validity, EFA for structure extraction, CFA for model confirmation, and Cronbach's alpha, split-half, and item-total correlation for reliability. Statistical significance was set at $P < 0.05$.

Results

Qualitative Results

In the qualitative phase, justice-related indicators were systematically identified and categorized using conventional content analysis guided by the frameworks of Graneheim and Lundman. First, open coding was conducted independently by two coders on the extracted data from systematic review and policy documents. Codes were then grouped into subcategories and categories through axial coding, and final dimensions were identified based on conceptual similarity and consensus.

To ensure the validity of categorization, multiple strategies were applied:

1. Inter-coder reliability was assessed, with Cohen's kappa exceeding 0.80, indicating strong agreement between coders.
2. An expert panel ($n = 7$, including specialists in health policy, management, and sociology) reviewed the categories to confirm conceptual clarity, distinctiveness, and relevance to justice in the health system.
3. Triangulation was performed by comparing extracted categories with international frameworks (WHO, World Bank) and national policy documents. Limited member checking was conducted with five stakeholders (service providers and recipients) to ensure comprehensibility and appropriateness of the categories. The transformation of categories into items followed a structured procedure. Each category was operationalized into measurable statements based on four criteria: (1) representation in at least two independent sources, (2) suitability for question format, (3) avoidance of semantic overlap, and (4) clarity for the target population. For each dimension, 2-5 candidate items were developed in simple Persian language. The validity of this transformation was established through expert review. A panel of 10 experts evaluated the clarity, simplicity, and representativeness of each item relative to its underlying category. Items were revised iteratively until full consensus was reached, ensuring cultural and linguistic adaptation for the Iranian health system context. As a result of this process, nine main dimensions of justice were identified:

1. Justice in access to healthcare services
2. Distribution of financial and human resources
3. Quality of healthcare services
4. Financing of healthcare services
5. Participation and accountability
6. Health education and research
7. Health policy and planning
8. Access to health information
9. Enjoyment of a healthy environment

These dimensions were operationalized into 39 items that formed the initial questionnaire (Table 1). To further refine the items, qualitative face validity was assessed through interviews with 10 service recipients, who provided feedback on clarity, relevance, and difficulty. Several items were revised accordingly, enhancing their suitability for the target group.

Table 1. Justice indicators in the Iranian health system: Extracted concepts

Dimension	Indicators
1. Justice in access to healthcare services	Equitable access to healthcare services, appropriate geographical distance, suitable working hours, transparency of information, special programs for vulnerable groups
2. Distribution of financial and human resources in the health system	Equitable budget distribution, appropriate number of doctors and nurses, sufficient medical equipment
3. Quality of healthcare services	Quality of services, respectful behavior of staff, reasonable waiting times, adequate access to medications, continuous monitoring of service quality
4. Justice in financing healthcare services	Affordable costs, sufficient insurance coverage, absence of informal payments, effective financial support
5. Participation and accountability in the health system	Community participation in decision-making, attention to public opinions, accountability of officials, transparency of financial and operational information
6. Justice in health education and research	Research responsive to community needs, transparency of research results, educational programs tailored to local culture
7. Justice in health policy and planning	Evidence-based policies, attention to the needs of different social groups, impact assessment of programs, reduction of health inequalities, intersectoral coordination
8. Justice in access to health information	Free access to information, health education programs, role of media, appropriate education for different groups, providing resources in the local language
9. Justice in enjoying a healthy environment	Access to clean water, clean air, waste management, green and recreational spaces, prevention of environmental pollution

Quantitative Results

Out of a total of 889 participants, 626 (70.41%) were women and 263 (29.59%) were men. The majority were married (79.86%) and resided in urban areas (80.65%). Regarding age, 43.64% were between 20 and 40 years, 27.11% were above 60 years, and 23.62% were

aged 40 to 60 years. A smaller proportion (5.63%) were under 20 years of age. In terms of employment status, 38.47% were employed, 31.72% were housewives, 17.10% were retired, 8.89% were unemployed, and 3.82% were students. Detailed demographic information is presented in Table 2.

Table 2. Demographic information of participants

	Variable	Frequency	Relative frequency (%)
Age (Year)	Under 20 years	50	5.63
	20 to 40 years	388	43.64
	40 to 60 years	210	23.62
	Above 60 years	241	27.11
Gender	Male	263	29.59
	Female	626	70.41
Marital status	Single	179	20.14
	Married	710	79.86
Residence status	Urban	717	80.65
	Rural	172	19.35
Employment status	Unemployed	79	8.89
	Student	34	3.82
	Housewife	282	31.72
	Employed	342	38.47
	Retired	152	17.10

Face and Content Validity: The results of quantitative face validity showed that the

impact score of all items was above 1.5, thus confirming all items at this stage. The Content

Validity Ratio (CVR) for the items ranged from 0.80 to 1.00, exceeding the minimum acceptable threshold of 0.62. The content validity index (CVI) for the items ranged from 0.83 to 0.97, which was above the recommended cut-off of 0.78 (31). For CVI, three aspects were specifically evaluated: relevance, clarity, and simplicity/fluency of each item. These results indicate that the items had strong content adequacy and relevance.

Concurrent Validity: The concurrent validity of the developed scale was tested by correlating its total scores with the Equity-Oriented Health Care Scale – Ongoing (EOHCS – Ongoing). A positive and significant correlation was observed ($r = 0.82$, $P < 0.001$), demonstrating the convergent validity of the instrument (26).

Exploratory Factor Analysis (EFA): The results of EFA indicated high sampling adequacy ($KMO = 0.913$) and a significant Bartlett's test of sphericity ($\chi^2 = 8443.570$, $df = 741$, $P < 0.001$). Communalities ranged from 0.487 to 0.709. Based on eigenvalues greater than 1, nine factors were extracted, explaining a total of 69.505% of the variance (5). The extracted factors and the items loading on them are shown in Table 3. The factors included: Health policy and planning (9.110%), access to health information (7.201%), healthy environment (8.810%), quality of health services (8.631%), access to health services (8.437%), participation and accountability (7.208%), healthcare financing (5.374%), health education and research (5.554%), and distribution of resources (3.293%). All item loadings exceeded 0.40, confirming the robust factor structure. As shown in Table 3, each item loaded more strongly on a specific dimension and was retained in that factor. For example, items 9-13 loaded on "health policy and planning," while items 35-39 loaded on "access to health information." In a few cases, some items showed relatively close loadings on two factors (for instance, item 5 loaded 0.70 on "quality of health services" and also had a secondary loading of about 0.37 on "healthcare financing"). In such cases, the decision was made based on both the highest loading and the conceptual consistency of the item with the factor. Therefore, no items were removed, and all questions were retained in their theoretically and statistically appropriate factors.

Confirmatory Factor Analysis (CFA): The nine-factor model was further confirmed using CFA. The Chi-square to degrees of freedom

ratio was 1.56, indicating a strong fit. Additional fit indices also confirmed model adequacy: $GFI = 0.85$, $CFI = 0.99$, $IFI = 0.99$, $NFI = 0.96$, $AGFI = 0.83$, $PNFI = 0.87$, and $RMSEA = 0.040$ (15). These indices demonstrate that the nine-factor model provided an excellent fit to the data (Figure 1). As depicted in Figure 1, each of the nine latent factors was clearly loaded by its corresponding observed items. Standardized factor loadings ranged from 0.62 to 0.84, all within acceptable thresholds. The inter-factor correlations were also significant, supporting the conceptual relationships among the constructs. Therefore, the proposed factor structure was confirmed both statistically and theoretically.

Reliability: Reliability of the instrument was assessed using several methods. The overall Cronbach's alpha was 0.923, reflecting excellent internal consistency. Split-half reliability yielded $\alpha = 0.884$ for the first half and $\alpha = 0.883$ for the second half, with a correlation coefficient between the two halves of 0.607 and a Spearman-Brown coefficient of 0.756. Dimension-specific reliabilities were also high: Justice in access to healthcare services (0.879), distribution of financial and human resources (0.815), quality of healthcare services (0.854), financing of healthcare services (0.869), participation and accountability (0.862), health education and research (0.830), health policy and planning (0.890), access to health information (0.822), and enjoyment of a healthy environment (0.873). These results demonstrate that the instrument is highly reliable across all dimensions (18).

Table 3. Questions related to each extracted dimension of the questionnaire

Items	1 st D HPP	2 nd D AHI	3 rd D HE	4 th D QHS	5 th D AHS	6 th D PA	7 th D HF	8 th D HER	9 th D DR
1	0.34	0.26	0.37	0.68	0.29	0.28	0.29	0.22	0.29
2	0.32	0.27	0.35	0.80	0.34	0.28	0.28	0.17	0.26
3	0.30	0.26	0.28	0.79	0.35	0.25	0.27	0.18	0.21
4	0.30	0.27	0.29	0.77	0.34	0.31	0.32	0.20	0.20
5	0.34	0.29	0.26	0.70	0.32	0.31	0.37	0.23	0.23
6	0.28	0.30	0.34	0.22	0.20	0.24	0.28	0.27	0.72
7	0.32	0.34	0.26	0.24	0.19	0.29	0.35	0.31	0.70
8	0.31	0.25	0.27	0.29	0.22	0.26	0.31	0.26	0.81
9	0.76	0.20	0.19	0.34	0.32	0.33	0.26	0.37	0.31
10	0.75	0.28	0.30	0.32	0.35	0.27	0.26	0.32	0.31
11	0.74	0.26	0.31	0.36	0.30	0.25	0.27	0.30	0.30
12	0.77	0.26	0.27	0.30	0.26	0.28	0.28	0.32	0.36
13	0.77	0.29	0.26	0.35	0.33	0.35	0.23	0.29	0.24
14	0.30	0.32	0.32	0.22	0.35	0.29	0.31	0.78	0.27
15	0.34	0.31	0.31	0.26	0.29	0.31	0.23	0.74	0.26
16	0.31	0.31	0.25	0.17	0.29	0.22	0.25	0.79	0.27
17	0.33	0.32	0.28	0.19	0.24	0.31	0.27	0.77	0.29
18	0.32	0.19	0.25	0.32	0.32	0.77	0.21	0.26	0.25
19	0.29	0.23	0.30	0.26	0.27	0.75	0.30	0.32	0.31
20	0.33	0.26	0.26	0.31	0.29	0.80	0.28	0.22	0.25
21	0.25	0.24	0.25	0.33	0.32	0.76	0.29	0.34	0.23
22	0.31	0.32	0.32	0.33	0.30	0.30	0.75	0.31	0.31
23	0.26	0.30	0.26	0.34	0.28	0.22	0.81	0.27	0.36
24	0.27	0.32	0.20	0.35	0.33	0.32	0.77	0.24	0.30
25	0.28	0.25	0.78	0.33	0.24	0.24	0.24	0.30	0.32
26	0.27	0.24	0.74	0.30	0.26	0.25	0.21	0.27	0.26
27	0.29	0.31	0.77	0.33	0.22	0.30	0.31	0.36	0.27
28	0.27	0.27	0.81	0.35	0.28	0.27	0.24	0.29	0.28
29	0.24	0.22	0.82	0.36	0.27	0.28	0.24	0.25	0.36
30	0.21	0.28	0.25	0.33	0.77	0.30	0.35	0.33	0.19
31	0.34	0.24	0.30	0.38	0.77	0.26	0.25	0.32	0.25
32	0.34	0.22	0.29	0.36	0.84	0.28	0.28	0.31	0.18
33	0.34	0.24	0.25	0.36	0.81	0.36	0.32	0.27	0.20
34	0.37	0.19	0.20	0.37	0.76	0.33	0.27	0.27	0.22
35	0.22	0.72	0.26	0.32	0.21	0.22	0.25	0.28	0.24
36	0.33	0.75	0.24	0.28	0.25	0.26	0.26	0.27	0.33
37	0.25	0.81	0.26	0.24	0.20	0.23	0.35	0.29	0.27
38	0.22	0.78	0.21	0.26	0.21	0.21	0.30	0.36	0.25
39	0.24	0.75	0.25	0.27	0.22	0.17	0.30	0.34	0.29

Abbreviations: D: Dimension, HPP: Health Policy and Planning, AHI: Access to Health Information, HE: Healthy Environment, QHS: Quality of Health Services, AHS: Access to Health Services, PA: Participation and Accountability, HF: Healthcare Financing, HER: Health Education and Research, DR: Distribution of Resources.

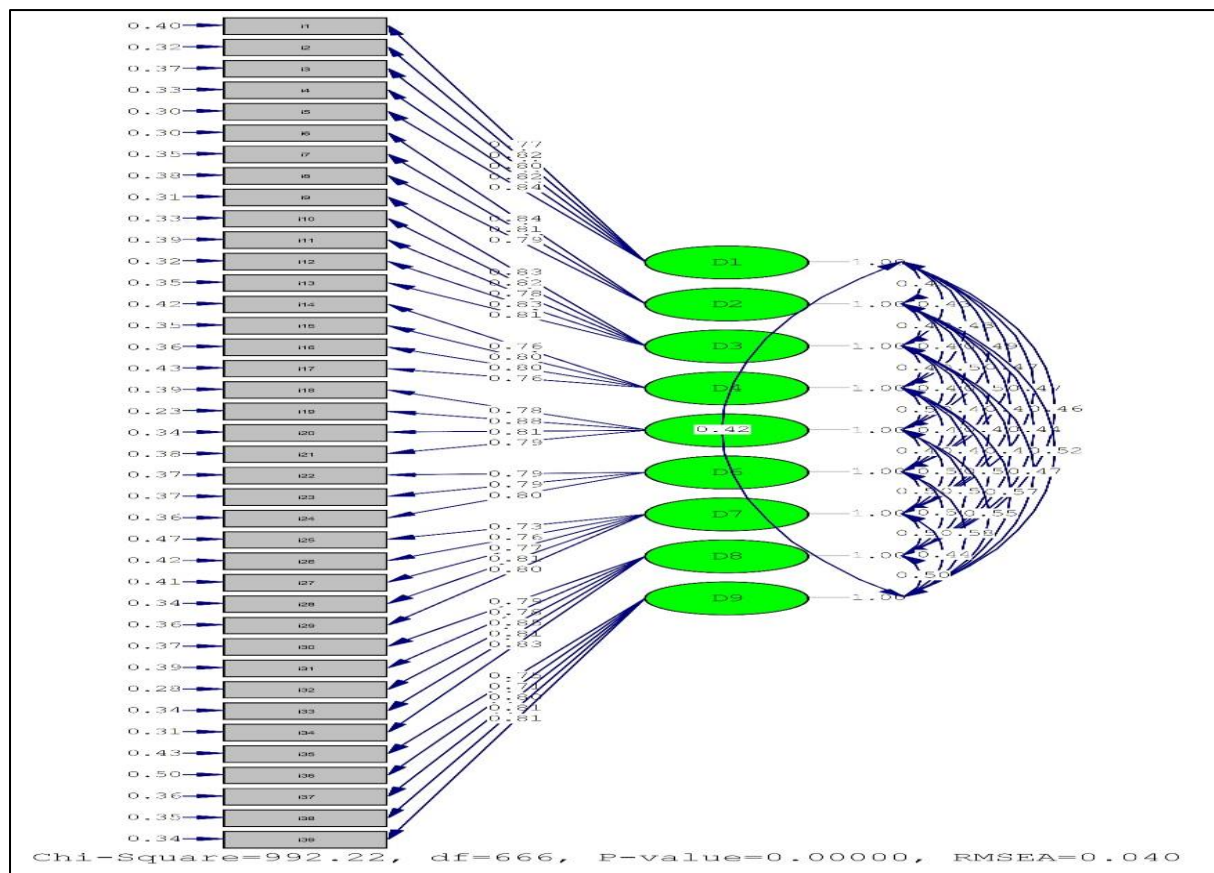


Figure 1. Standard coefficient model

Discussion

Qualitative phase

In the qualitative phase, nine main dimensions of justice in the health system were identified: access to healthcare services, distribution of resources, quality of services, financing, participation and accountability, education and research, policy and planning, access to health information, and enjoying a healthy environment. The emergence of these dimensions reflects both global frameworks (e.g., WHO, World Bank) and locally contextualized needs. While international studies often emphasize structural and financial equity, our analysis highlighted culturally specific aspects such as participation, transparency of information, and responsiveness of education and research, which are deeply rooted in the Iranian socio-cultural context. The identification of these culturally sensitive dimensions underscores why a new instrument, rather than a mere translation of existing tools, was necessary. For instance, the “enjoyment of a healthy environment” dimension strongly emerged from our content analysis, reflecting public health challenges in Iran, such as air pollution,

water quality, and urbanization. Similarly, “participation and accountability” was emphasized in local policy documents and stakeholder feedback, indicating a socio-political expectation for transparency in governance. These findings demonstrate that cultural and contextual elements shape the operational definition of health justice, justifying the originality of the instrument relative to translated questionnaires. Compared to similar tools, our qualitative phase captured a broader conceptualization. For example, the Equity-Oriented Health Care Scale (EOHCS) primarily emphasizes access, quality, and responsiveness (35), whereas our tool incorporates structural and environmental determinants significant in the Iranian context. This overlap with existing constructs confirms alignment with international standards, while the unique dimensions highlight context-specific extensions.

Quantitative phase

Content validity indices (CVR and CVI) showed that all items surpassed standard cut-offs, confirming that the tool adequately covers the content domain. Compared to other instruments that may lack comprehensive

content validity evaluation, this tool demonstrates enhanced quality and comprehensiveness (35).

Expert involvement in item review further strengthened its coverage. The positive and significant correlation between the new questionnaire and standard instruments indicates high concurrent validity, showing that it can effectively assess justice-related constructs consistent with existing tools (36). Exploratory and confirmatory factor analyses confirmed a stable factor structure. Nine main factors were extracted, explaining 69.505% of the total variance. This proportion of explained variance is higher than in many similar instruments, which often cover only partial aspects of health justice (30). Conducting the EFA with Oblimin rotation, as recommended by the reviewer, accounted for correlations among factors, producing a more theoretically coherent and interpretable factor solution. Comparison with similar tools suggests that the results are consistent with expected structures while capturing additional context-specific dimensions, reflecting both convergence and divergence with prior research. The differences likely arise from methodological choices, sample characteristics, and cultural context, providing new insights into health justice measurement in Iran. This questionnaire can effectively evaluate multiple dimensions of health justice, including access, utilization, and financing of health services (37).

While other approaches focus on specific indices, such as vaccination coverage or social deprivation (38,39), our tool integrates these aspects within a broader framework, allowing a comprehensive assessment. Although it does not directly analyze financial injustice, it partially captures inequalities in out-of-pocket payments and service utilization, highlighting potential areas for policy intervention. Reliability indices, including Cronbach's alpha and split-half reliability, indicated strong internal consistency, surpassing comparable instruments, and confirming that the questionnaire can consistently measure the intended constructs (17). The limitations of the quantitative section of this study include the restricted generalizability of the results to the entire population of Iran due to the selection of samples from specific and limited groups, as well as reliance on self-reported data, which may be subject to response bias. The design of the questionnaire and the use of the Likert scale

may also reduce the precision in measuring complex concepts of justice. Furthermore, there are methodological limitations in the instrument validation process; although concurrent validity was assessed using the EOHCS-Ongoing scale, this instrument has not been formally validated in the Iranian context, which may affect the robustness of the findings. Content validity was evaluated only by five experts using a three-point Likert scale, which is insufficient and does not replace more comprehensive approaches such as cultural adaptation or broader expert panels. Additionally, despite conducting exploratory factor analysis with Oblimin rotation, the factor structure may not fully capture all dimensions of health justice, and replication of the study in larger and more diverse samples is necessary. Therefore, validity-related results should be interpreted with caution. It is recommended that future research employ broader random sampling, combine quantitative data with more objective sources such as official statistics or digital tools, and use advanced validation methods to further strengthen the reliability and validity of the instrument.

Conclusion

The findings of this study showed that the designed scale for evaluating justice indicators in Iran's health system has suitable validity and reliability and can be used as a standard and comprehensive tool in this field. This scale, by identifying and categorizing indicators in various dimensions such as justice in access to services, resource distribution, service quality, financing, participation, education and research, policymaking, access to information, and enjoying a healthy environment, provides a comprehensive framework for evaluating justice in the health system. Exploratory and confirmatory factor analyses showed a good fit for the nine-factor model, and the reliability indices confirmed the internal consistency of the items in all dimensions. This tool not only helps to better understand the state of justice in the health system but also provides accurate and practical information, enabling effective planning and policymaking to improve justice in this domain.

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Conflict of Interests

There is no conflict of interest.

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Ethical Considerations

This study was conducted in accordance with ethical principles and was approved by the Ethics Committee of Islamic Azad University, Qaemshahr Branch. The research was based on academic studies, expert opinions, and the use of specialized questionnaires in the field of

health system management and financing. Participation was voluntary, and all participants provided informed consent. Confidentiality of information and the right to withdraw from the study at any stage were fully respected. The collected data were used solely for scientific and research purposes.

Code of Ethics

IR.IAU.QSH.REC.1396.156

Authors Contributions

JY and SSY wrote the manuscript, SJK and SSY performed the statistical analysis and validation, and JY and SSY approved the final article.

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