The Syrian Health Care Scale: A Novel Instrument for Assessing Physician-Delivered Care in Crisis Contexts

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Abstract

Background: The Syrian healthcare system has faced profound disruptions due to prolonged conflict, resulting in major challenges to delivering quality patient care. Recognising the need for a culturally and contextually relevant assessment tool, this study introduces the Syrian Health Care Scale (SHCS), a novel instrument designed to evaluate the quality of physician-delivered care from a multidimensional perspective.

Methods: A cross-sectional study was conducted in July 2024 with a sample of 103 physicians across Syria. The SHCS, a 20-item self-report instrument, encompasses affective, behavioural, and cognitive dimensions of patient-centred care, using a 7-point Likert response format with both positively and negatively worded items. Internal consistency was assessed via Cronbach's alpha, while item validity was examined using Pearson correlation. Independent samples t-tests and ANOVA were used to explore differences by gender and years of clinical experience. Additionally, Exploratory Factor Analysis (EFA) was conducted to evaluate the scale's dimensional structure.

Results: The SHCS demonstrated acceptable internal reliability (Cronbach's alpha = 0.753). Factor analysis revealed a three-factor structure corresponding to the intended affective, behavioural, and cognitive domains, explaining 36.4% of the total variance and indicating a satisfactory structural performance of the scale. Several items showed strong loadings on their expected domains, supporting the scale's conceptual validity. While male physicians scored significantly higher in the behavioural dimension ($p = 0.036$), no significant differences were observed in total scores based on gender or years of experience. Notably, a majority of participants (67.96%) scored in the 'Below Standard' category, underscoring substantial gaps in healthcare delivery under crisis conditions.

Conclusion: The SHCS demonstrates acceptable reliability and preliminary validity for assessing physician-delivered care in conflict-affected settings. Its multidimensional design offers a nuanced evaluation of healthcare provision, making it a valuable tool for guiding policy, clinical training, and future research. The confirmed factor structure, along with the explained variance and score distribution of participating physicians, provides a strong foundation for subsequent confirmatory validation and broader application in resource-limited contexts.

Keywords: Syrian Health Care Scale, patient-centred care, healthcare quality, conflict-affected regions, physician assessment, psychometric validation.

Trial registration: Not applicable.

Background

The delivery of healthcare transcends essential clinical interventions involving a complex interplay of emotional intelligence, empathy, and ethical responsibility—elements crucial for effective patient care (1–3). In Syria, where the healthcare system has been severely impacted by conflict and displacement, comprehending the subtleties of care delivery is increasingly vital (4). Healthcare professionals serve not only as medical practitioners but also as community pillars, navigating patient interactions amid societal upheaval (5–7).

Healthcare encompasses a broad spectrum of services, including preventive measures, public health initiatives, personalised medical care, and social support systems for vulnerable populations (8). Effective delivery requires aligning patient needs with provider capabilities to ensure services are both accessible and of high quality (9,10). Quality healthcare fosters patient satisfaction and well-being, essential for positive health outcomes and for enhancing the overall patient experience (11,12).

In health sciences, measurement is foundational for evaluating the efficacy of interventions and outcomes (13,14). Despite its importance, discussions on measurement methodologies in clinical settings, especially in patient-centred care, have been limited (15). While laboratory sciences have established rigorous assessment frameworks, clinical research often lacks standardised approaches, leading to inconsistencies in care quality evaluation (16). This gap underscores the need for robust measurement tools that accurately reflect the complexities of patient-centred care (15).

The Syrian Health Care Scale (SHCS) aims to address this need by providing a comprehensive framework for assessing healthcare quality among Syrian health professionals. Its multidimensional structure is theoretically grounded in established patient-centred care and clinical competence frameworks, which conceptualise healthcare delivery as an integration of affective, cognitive, and behavioural domains. Patient-centred care models emphasise empathy, respect, and emotional engagement (affective domain), alongside shared understanding and clinical reasoning (cognitive domain), and observable communication and care practices (behavioural domain) (17,18). Similarly, clinical competence frameworks describe effective care as the convergence of professional attitudes and values, knowledge and judgement, and applied clinical behaviours (19). In a context marked by instability, the SHCS captures these interrelated dimensions of care delivery, evaluating not only clinical competencies but also the emotional and interpersonal aspects of patient–provider interactions that are essential for trust, ethical practice, and patient satisfaction (20,21).

Previous research highlights the significance of diverse measurement techniques (22), such as self-report questionnaires, observational methods, and qualitative interviews, to gain insights into patient experiences and outcomes (23). However, measuring patient-centred care is hindered by conceptual ambiguities and a lack of standardised assessment tools (24). Consequently, health systems often struggle to accurately gauge care quality, impeding efforts to implement meaningful improvements (25).

In Syria, the ongoing challenges faced by healthcare professionals necessitate a tailored measurement approach reflecting their unique experiences and operating context (26). The SHCS seeks to bridge this gap by offering a psychometrically sound instrument that effectively measures patient-centred healthcare among physicians with varying experience

levels, while also considering gender dynamics. Comprising 20 items on a 7-point Likert scale (27), the SHCS provides nuanced insights into healthcare providers' attitudes and practices, ultimately contributing to enhancing care quality in the region.

By focusing on the emotional and relational dimensions of healthcare, this study aims to measure healthcare among Syrian health professionals using the Syrian Health Care Scale (SHCS).

Methods

Study Design and Participants

This study was conducted in July 2024 among physicians in Syria. A total of 103 participants were recruited. Participants were recruited using a convenience sampling strategy through professional networks and online physician groups. Comprising 47 females (45.6%) and 56 males (54.4%). Among these, 48 participants (46.4%) had over ten years of professional experience, while 55 participants (53.4%) had less than ten years of experience. The sample size was determined to be five to ten times the number of items on the Syrian Health Care Scale (SHCS), based on prior research recommendations (28). The final sample size of 103 participants for 20 items provided a ratio of approximately 5.15:1, which meets the recommended guideline of 5–10 participants per item for exploratory factor analysis

Instrument Development

The SHCS was developed by the medical education program at the Syrian Virtual University to assess healthcare practices among health professionals. The scale includes 20 statements designed to be simple, clear, and relevant to the study's objectives. Approximately half of the items were framed negatively to encourage thoughtful responses from participants. Specifically, the scale consists of 12 negative and eight positive statements, with the scores for negative items reversed to ensure consistency with positive responses.

The statements were categorised into three dimensions:

- **Emotional Questions:** 8 items
- **Behavioural Questions:** 8 items
- **Cognitive Questions:** 4 items

The items of the Syrian Health Care Scale were grouped into three thematic domains: **Affective**, **Behavioural**, and **Cognitive** components, as shown in Table 1. Each domain represents a different aspect of healthcare delivery—emotional engagement, practical behaviour, and cognitive understanding—related to interactions with patients and the clinical setting. The categorisation of items into these components is outlined below. The questionnaire used in this study was developed by the authors (see Supplementary File 1).

Table 1. Questionnaire item distribution across affective, behavioural, and cognitive components

Affective	Behavioural	Cognitive
1- A smile and a cheerful face	3- Access to high-quality	2- Listening carefully to

are essential elements for treatment success.	medical equipment in clinics is crucial for ensuring effective healthcare delivery.	the patient is one of the most important elements in providing treatment.
7- Many patients prefer to leave the clinic quickly after receiving their prescriptions*.	4- There is a significant correlation between a doctor's clinical experience and their effectiveness in addressing patient complaints.*.	9- When taking a clinical history, I only commit to filling out a pre-written card*.
11- I feel it is helpful to listen to a patient's household problems when providing health care.	5- Newly graduated doctors tend to prioritize foundational healthcare principles*.	12- The clinical examination phase should be completed within five minutes before initiating any treatment in the clinic*.
13- As a doctor, it is important for me to empathize with patients, feel their problems, and appreciate their condition in order to achieve successful treatment.	6- Clinics with fewer daily patients may provide a more effective application of patient-cantered care compared to overcrowded clinics.	14- I use a standardized protocol for reporting bad medical news to all patients*.
15- Patients want reassurance about their health condition rather than information about their actual health status*.	8- Providing patient care is an essential component of achieving successful treatment.	
16- Sensitivity to a patient's problems may complicate my healthcare delivery to patients*.	10- Awareness of patients' circumstances can sometimes be perceived as intrusive*.	
17- Responsiveness to a patient's specific needs may influence the quality of clinical healthcare decisions*.	18- Patients must comply with my instructions as a doctor without asking too many questions*.	
20- I feel that a good doctor is one who provides the correct diagnosis and treatment without interfering in the affairs of individual patients*.	19- I prefer for the patient to comply with my recommendations without trying to identify his own condition individually*.	

- *Items are reverse-scored.

Scores on the scale range from 20 to 140, with interpretations as follows:

- **20–58: Severely Deficient**
  Indicates a critical lack of adequate health care systems, training, or support among Syrian medical staff.
- **58–90: Below Standard**
  Reflects suboptimal health care with many areas in need of development and support.
- **90–118: Moderately Effective**
  Demonstrates a fair level of healthcare delivery with room for strategic improvements.
- **118–140: Highly Proficient**
  Represents a strong health care environment with excellent practices and outcomes.

Data Collection

The SHCS was distributed digitally using Google Forms privately to ensure the confidentiality and anonymity of responses.

Following the initial development of the scale, it was reviewed by specialists who provided feedback for refinement to undergo validation. Modifications were made to certain phrases, while no statements were removed. Reliability testing was conducted on survey responses from a sample of 6 doctors, who were subsequently excluded from the final analysis to maintain data integrity.

Statistical analysis was conducted using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including means, standard deviations (SD), frequencies, and percentages, were calculated to summarise participants' demographic characteristics, specifically focusing on gender and years of clinical experience.

The mean overall score on the Syrian Health Care Scale (SHCS), as well as the mean scores for the cognitive and empathetic subscales, were computed. Scores were categorised and analysed according to participants' gender and years of experience. An independent samples *t*-test was applied to compare mean health care scores between male and female physicians. Additionally, one-way analysis of variance (ANOVA) was employed to assess differences in scores between groups stratified by clinical experience (i.e., more than 10 years vs. 10 years or less). A *p*-value of less than 0.05 was considered indicative of statistical significance. An independent samples t-test was conducted to examine differences in SHCS scores based on gender across the three dimensions: affective, behavioural, and cognitive.

Pearson correlation coefficients were calculated to assess the relationship between the total score of the scale and individual items, revealing significant correlations (P=0.05). Additionally, the correlation of each item with its respective dimension was analysed, with coefficients also indicating significance (P<0.05). The stability of scores obtained by the same individuals at different times was evaluated using Cronbach's Alpha, demonstrating high values indicative of strong reliability. The internal consistency of the Syrian Health Care Scale (SHCS) was assessed using Cronbach's Alpha.

Factor Analysis

Exploratory Factor Analysis (EFA) was conducted using Principal Component Analysis (PCA) with Varimax rotation to explore the underlying structure of the Syrian Health Care Scale (SHCS).

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.604, which is considered marginal but acceptable for factor analysis. Bartlett's Test of Sphericity was significant ($\chi^2 = 411.769$, df = 190, $p < 0.001$), confirming that the correlation matrix was suitable for factor extraction.

Seven components had eigenvalues greater than 1, accounting for a cumulative variance of 61.3%. However, inspection of the scree plot (Figure 1) showed a clear inflexion after the third component, supporting a three-factor solution. This solution was also consistent with the theoretical framework of the SHCS, which conceptualises patient-centred care as comprising affective, behavioural, and cognitive domains. The remaining components were not retained

because they accounted for relatively little additional variance, showed unstable cross-loadings, or lacked theoretical coherence.

Table 2 presents the rotated component matrix, with most items loading primarily on their intended domains. Although several items demonstrated moderate cross-loadings, the overall factor structure aligned reasonably with the hypothesised dimensions. These findings provide preliminary support for the multidimensional nature of the SHCS, while also identifying items that may benefit from refinement in future iterations. Importantly, the current factor solution offers a foundation for subsequent validation through Confirmatory Factor Analysis (CFA).

Table 2. Rotated Component Matrix Summary (Top Loadings by Factor)

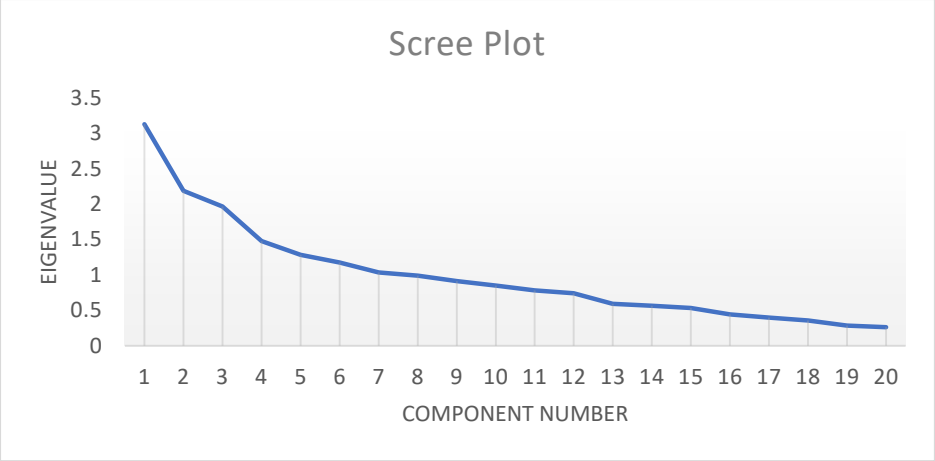
Item No.	Item Summary (Shortened)	Primary Factor	Loading
Q20	A good doctor stays out of patient affairs	Behavioural	0.758
Q10	Awareness of social lives unnecessary	Behavioural	0.745
Q11	Short clinical exams acceptable	Behavioural	-0.724
Q12	Empathising is important	Affective	0.563
Q13	Appreciating patient's condition	Affective	-0.594
Q5	New grads follow basics better	Cognitive	-0.749
Q2	Listening is important	Cognitive	0.615
Q14	Follow single protocol for bad news	Behavioural	0.559
Q18	Compliance over questioning	Behavioural	0.778
Q19	Compliance w/ recommendations	Behavioural	0.775
Q8	Household problems interfere	Affective	-0.668
Q15	Patients want reassurance	Affective	0.538
Q16	Sensitivity complicates delivery	Cognitive	0.418
Q9	Only follow pre-written card	Cognitive	0.494
Q1	Smile helps treatment	Behavioural	0.457
Q4	Experience matters	Behavioural	0.839
Q3	Equipment matters	Cognitive	0.38
Q7	Patients leave after prescription	Behavioural	0.824
Q6	Small clinics are better	Behavioural	0.452

The three retained factors explained 36.4% of the total variance (Table 3).

Table 3. Total Variance Explained by Retained Factors

Component	Initial Eigenvalue	% of Variance	Cumulative %
Factor 1 – Behavioural	3.129	15.644	15.644
Factor 2 – Affective	2.188	10.94	26.585
Factor 3 – Cognitive	1.969	9.846	36.431

Figure 1: The eigenvalues scree plot.



Results

Participants Characteristics

A total of 103 physicians participated in the study. Among them, 56 (54.4%) were males and 47 (45.6%) were females. Regarding clinical experience, 55 physicians (53.4%) reported practising for fewer than ten years, whereas 48 physicians (46.6%) had over ten years of professional experience.

Reliability Analysis

The internal consistency of the SHCS was acceptable for the total scale ($\alpha = 0.753$). For the individual subscales, Cronbach's alpha values were as follows: Affective = 0.712, Behavioural = 0.689, and Cognitive = 0.701, indicating acceptable reliability for each dimension.

Scale Score Distribution

Participants' total SHCS scores ranged from 58 to 118 and were categorised into four levels of healthcare provision: Severely Deficient (20–58), Below Standard (58–90), Moderately Effective (90–118), and Highly Proficient (118–140). Notably, a striking 67.96% of physicians (n = 70) scored in the "Below Standard" category, indicating widespread gaps in the quality of physician-delivered care under crisis conditions. In contrast, 32.02% of participants (n = 33) scored within the "Moderately Effective" range, while no participants achieved scores in the "Highly Proficient" category. These results underscore the critical need for targeted interventions, professional development, and support systems to enhance healthcare delivery in conflict-affected regions.

Table 4 presents the detailed distribution of responses across the 20 SHCS items, highlighting specific areas where physician practices and attitudes may require improvement.

Table 4: Distribution of Participant Responses to Health Care Statements (n and %)

*Statements marked with an asterisk are negatively phrased and may require reverse scoring for composite scale calculation.

No.	Statement	Strongly Disagree	Disagree	Partially Disagree	Not Decided	Partially Agree	Agree	Strongly Agree
1	A smile and a cheerful face are essential elements for treatment success.	1 (1%)	2 (1.9%)	2 (1.9%)	1 (1%)	19 (17.1%)	39 (37.1%)	41 (39%)
2	Listening carefully to the patient is one of the most important elements in providing treatment.	1 (1%)	1 (1%)	1 (1%)	1 (1%)	7 (6.7%)	36 (34.3%)	59 (56.2%)
3	Access to high-quality medical equipment in clinics is crucial for ensuring effective healthcare delivery	–	12 (11.5%)	19 (18.1%)	3 (2.9%)	36 (34.3%)	27 (25.7%)	8 (7.6%)
4	There is a significant correlation between a doctor's clinical experience and their effectiveness in addressing patient complaints.*	1 (1%)	2 (1.9%)	8 (7.6%)	5 (4.8%)	12 (11.4%)	50 (47.7%)	27 (25.7%)
5	Newly graduated doctors tend to prioritize foundational healthcare principles.*	4 (3.8%)	27 (25.7%)	10 (9.6%)	20 (19%)	15 (14.3%)	26 (24.8%)	3 (2.9%)
6	Clinics with fewer daily patients may provide a more effective application of patient-cantered care compared to overcrowded clinics.	3 (2.9%)	12 (11.5%)	9 (8.6%)	8 (7.6%)	14 (13.3%)	31 (29.5%)	28 (26.7%)
7	Many patients prefer to leave the clinic quickly after receiving their prescriptions*	16 (15.2%)	31 (29.5%)	14 (13.3%)	14 (13.3%)	17 (16.2%)	21 (20%)	2 (1.9%)
8	Providing patient care is an essential component of achieving successful treatment.	–	4 (3.8%)	5 (4.8%)	5 (4.8%)	5 (4.8%)	66 (62.9%)	20 (19%)
9	When taking a clinical history, I only commit to filling out a pre-written card.*	5 (4.8%)	20 (19%)	10 (9.5%)	9 (8.6%)	14 (13.3%)	31 (29.5%)	16 (15.2%)
10	Being aware of patients' circumstances and their social lives is an interference in their personal affairs and is not beneficial to treatment.*	4 (3.8%)	19 (18.1%)	18 (17.1%)	5 (4.8%)	25 (23.8%)	31 (29.5%)	3 (2.9%)

11	I feel it is helpful to listen to a patient's household problems when providing health care.	1 (1%)	2 (1.9%)	2 (1.9%)	1 (1%)	19 (17.1%)	39 (37.1%)	41 (39%)
12	The clinical examination phase should be completed within five minutes before initiating any treatment in the clinic. *	22 (21%)	38 (36.2%)	9 (8.6%)	6 (5.7%)	12 (11.4%)	17 (16.2%)	1 (1%)
13	As a doctor, it is important for me to empathise with patients, feel their problems, and appreciate their condition in order to achieve successful treatment.	4 (3.8%)	5 (4.8%)	11 (10.5%)	2 (1.9%)	23 (21.9%)	47 (44.8%)	13 (12.4%)
14	I use a standardized protocol for reporting bad medical news to all patients.*	16 (15.2%)	45 (42.9%)	17 (16.2%)	7 (6.7%)	13 (12.4%)	6 (5.7%)	1 (1%)
15	Patients want reassurance about their health condition rather than information about their actual health status.*	9 (8.6%)	22 (21%)	14 (13.3%)	12 (11.4%)	19 (18.1%)	29 (27.6%)	–
16	Sensitivity to a patient's problems may complicate my healthcare delivery to patients.*	6 (5.8%)	28 (26.9%)	18 (17.3%)	14 (13.5%)	21 (20.2%)	16 (15.4%)	1 (1%)
17	Responsiveness to a patient's specific needs may influence the quality of clinical healthcare decisions.*	9 (8.6%)	16 (15.2%)	4 (3.8%)	17 (16.2%)	27 (25.7%)	31 (29.5%)	1 (1%)
18	Patients must comply with my instructions as a doctor without asking too many questions.*	12 (11.4%)	30 (28.6%)	21 (20%)	–	23 (21.9%)	17 (16.2%)	2 (1.9%)
19	I prefer for the patient to comply with my recommendations without trying to identify his own condition individually.*	31 (29.8%)	40 (38.5%)	9 (8.7%)	3 (2.9%)	6 (5.8%)	14 (13.5%)	1 (1%)
20	I feel that a good doctor is one who provides the correct diagnosis and treatment without interfering in the affairs of individual patients.*	6 (5.7%)	19 (18.1%)	14 (12.4%)	5 (4.8%)	22 (21%)	26 (24.8%)	13 (12.4%)

Gender Differences

The comparison between males and females in the mean scores of the SHCS is presented in Table 5.

Table 5: Independent Samples t-Test Results Comparing Syrian Health Care Scale (SHCS) Scores by Gender

Dimension	Gender	Mean Score	Standard Deviation	t-value	p-value
Affective	Male	35.71	5.18	0.326	0.745
	Female	35.39	4.71		
Behavioural	Male	33.80	3.96	2.125	0.036
	Female	31.96	4.82		
Cognitive	Male	16.50	3.22	-1.160	0.249
	Female	17.28	3.57		
Total SHCS Score	Male	86.02	8.95	0.815	0.417
	Female	84.62	8.02		

In the behavioural dimension, male physicians scored significantly higher than female physicians ($t = 2.125$, $p = 0.036$), while no statistically significant differences were observed in the affective or cognitive dimensions, nor in the total SHCS scores. These findings suggest that gender may influence behavioural aspects of patient-centred care, whereas overall care quality appears comparable between male and female physicians.

Differences Based on Years of Clinical Experience

Further analysis using an independent samples t-test was performed to compare SHCS scores based on physicians' years of experience (<10 years vs ≥10 years), as presented in Table 6.

Table 6: Independent Samples t-Test Results Comparing Syrian Health Care Scale (SHCS) Scores by Years of Clinical Experience

Dimension	Years of Practice	Mean Score	Standard Deviation	t-value	p-value
Affective	<10 years	35.57	4.89	0.012	0.991
	≥10 years	35.56	5.07		
Behavioural	<10 years	32.74	4.58	-0.552	0.582
	≥10 years	33.23	4.32		
Cognitive	<10 years	16.51	3.23	-1.107	0.271
	≥10 years	17.25	3.56		
Total SHCS Score	<10 years	84.81	8.02	-0.722	0.472
	≥10 years	84.62	8.02		

There were no statistically significant differences in any dimension or the overall SHCS scores between physicians with fewer than ten years and those with more than ten years of experience.

Discussion

This study presents the development and validation of the Syrian Health Care Scale (SHCS), a novel instrument designed to assess the quality of healthcare provided by medical

professionals in Syria. The SHCS uniquely integrates cognitive, affective, and behavioural dimensions, reflecting the multifaceted nature of healthcare delivery, particularly within the context of Syria's protracted conflict.

Over the past decade, Syria's healthcare system has faced unprecedented challenges due to ongoing conflict, infrastructural damage, and resource constraints (7). Reports indicate that up to 50% of health facilities have been destroyed, and approximately 70% of healthcare providers have fled the country, leading to a significant strain on the remaining medical staff (29). Traditional metrics, such as mortality rates and hospital admissions, often fail to capture the nuanced experiences of healthcare providers and patients in such settings (30). The SHCS addresses this gap by offering a culturally sensitive tool that evaluates healthcare quality from the perspective of medical practitioners.

The study's findings indicate no statistically significant differences in the entire SHCS scores between male and female physicians. This aligns with previous research suggesting that, despite societal and systemic challenges, female healthcare providers in Syria have demonstrated resilience and commitment to patient care (31). However, it's essential to acknowledge that gender dynamics in healthcare are complex and influenced by various socio-cultural factors, which may not be fully captured by quantitative measures alone.

Male physicians scored significantly higher than female physicians in the **behavioural dimension** (mean ± SD: 33.80 ± 3.96 vs. 31.96 ± 4.82; $p = 0.036$). This finding suggests potential gender differences in certain observable aspects of physician behaviour. However, the overall SHCS scores and other domains showed no significant differences, indicating that **gender may influence specific behavioural practices but not overall healthcare quality**. Further research is needed to explore underlying sociocultural and systemic factors that might contribute to these differences.

A striking 67.96% of physicians scored "Below Standard" on the SHCS, highlighting substantial gaps in physician-delivered care in Syria. While the lack of difference based on years of experience suggests that tenure alone may not determine care quality, these findings must be interpreted cautiously due to the limited sample size and potential response biases. The results underscore the urgent need for targeted professional development, clinical training, and supportive interventions, particularly in conflict-affected and resource-limited settings.

It also underscores the importance of continuous training and support for healthcare providers, regardless of their tenure. This finding diverges from previous studies (31) that reported a decline in empathy among more experienced practitioners. While empathy may fluctuate with time, the core quality of healthcare, at least as measured by this scale, remains unaffected by length of service. This reinforces the notion that professional care should remain consistent, regardless of the number of years in practice.

The SHCS demonstrated acceptable reliability, though the three-factor solution accounted for a modest 36.4% of the total variance. This indicates that while the factors correspond broadly to the intended affective, behavioural, and cognitive domains, a substantial proportion of variance remains unexplained. These findings highlight the exploratory nature of the current

analysis and suggest that further refinement of the scale, as well as subsequent confirmatory factor analysis (CFA), is warranted to more fully validate its structure.

The balanced inclusion of positively and negatively worded items, along with the use of a 7-point Likert scale (32), enhances its sensitivity and reduces response bias. Such methodological rigour ensures that the SHCS can serve as a valuable instrument for both research and practical applications in healthcare settings.

Despite its limitations, the SHCS provides valuable insights for healthcare policy and practice in Syria. The high prevalence of "Below Standard" scores highlights the need for targeted training, ongoing professional development, and system-level interventions to improve physician-delivered care. Additionally, the scale's multidimensional approach can help policymakers and educators identify specific domains—affective, behavioural, or cognitive—that require targeted support. Future studies should aim to expand sample diversity, include patient-reported outcomes, and conduct confirmatory factor analysis to strengthen the evidence base and guide actionable interventions.

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the **exploratory factor analysis (EFA) explained a modest 36.4% of the total variance**, indicating that a substantial proportion of variance remains unaccounted for and that the scale's factor structure should be considered preliminary. Second, participants were recruited using **convenience sampling through professional networks and online groups**, which may limit the generalizability of the findings to all Syrian physicians, particularly those in hard-to-reach or conflict-affected areas. Third, the **Kaiser–Meyer–Olkin (KMO) measure was 0.604**, reflecting only marginal sampling adequacy for factor analysis and further emphasizing the exploratory nature of the results. Fourth, while the scale demonstrated acceptable overall reliability (Cronbach's alpha = 0.753), **reliabilities of individual subscales were not separately reported**, limiting detailed assessment of the internal consistency within the affective, behavioural, and cognitive domains. Fifth, the study relied on **self-reported responses**, which may introduce social desirability bias, potentially inflating scores or misrepresenting actual healthcare behaviours.

Finally, while EFA provided preliminary insights into the multidimensional structure of the SHCS, **Confirmatory Factor Analysis (CFA) is a critical next step** to validate the factor structure and strengthen confidence in the scale's psychometric properties. Despite these limitations, the SHCS offers a promising framework for assessing physician-delivered care in conflict-affected settings and provides a foundation for further refinement, validation, and application in diverse contexts.

Conclusion

The Syrian Health Care Scale (SHCS) demonstrates validity and reliability as an instrument for assessing physician-delivered care in conflict-affected settings. Its application provides a practical means of monitoring healthcare quality and guiding targeted improvements, with the potential to enhance patient outcomes in regions facing the dual challenges of conflict and

resource limitations. Future studies will employ larger and more diverse samples, incorporate patient perspectives, and conduct confirmatory factor analysis to further validate and refine the SHCS, thereby strengthening its utility for both research and healthcare policy.

List of abbreviations

Syrian Health Care Scale (SHCS)
Principal Component Analysis (PCA)
Confirmatory Factor Analysis (CFA)
Exploratory Factor Analysis (EFA)

Declarations

Ethics approval and consent to participate:

Ethical approval for this study was obtained from the Ethical Committee of the Syrian Virtual University (approval number: 07-031-6678). All procedures were performed in accordance with relevant guidelines and regulations. Informed consent was obtained from all participants.

Consent for publication:

Not applicable

Availability of data and materials

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

Competing interests:

The authors declare that they have no competing interests.

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Authors' contributions

NB and MD conceived and designed the study and collected the data, JA conducted the statistical analysis and drafted the manuscript. NB, JA and MD reviewed the manuscript and provided critical revisions. All authors read and approved the final version of the manuscript.

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