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Translation and validation of the Arabic version of the Dutch heart failure knowledge scale in Sudanese context

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ABSTRACT

Background: Sudanese heart failure patients (HF) face challenges in self-care due to limited disease knowledge. **Aim:** To translate, culturally adapt, and validate the Dutch Heart Failure Knowledge Scale (DHFKS) into Arabic for use in Sudan. **Methodology:** Following a standard forward-backward translation, two bilingual translators and a panel of cardiologists and linguists produced the Arabic version. After pilot-testing with local patients, the scale was administered to 110 outpatients. Internal consistency (Cronbach's α) and test-retest reliability (p -value) were evaluated. Results: The Arabic DHFKS demonstrated strong internal consistency ($\alpha = 0.824$) and acceptable test-retest reliability ($p < 0.05$). Mean score was 5.34 ± 2.41 , highlighting areas for targeted educational interventions. **Conclusion:** These findings confirm that the Arabic DHFKS is a reliable and valid instrument for assessing HF knowledge, supporting its use in clinical practice and research to guide patient education and improve outcomes.

KEYWORDS

Dutch heart failure knowledge scale, Arabic translation, cultural adaption, validation, selfcare, Sudan

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1. INTRODUCTION

HF remains a significant public health burden worldwide, characterized by high morbidity, mortality, and frequent hospitalization. Effective self-

care, including adherence to medications, diet, and symptom recognition, is crucial for improving patient outcomes. However, limited health literacy often hinders effective self-management [1,2].

The Dutch Heart Failure Knowledge Scale (DHFKS) is a validated instrument assessing HF knowledge across general information, treatment, and symptom recognition domains [3]. Despite its widespread global adoption, no Arabic version has been validated for Sudanese patients. Because language and culture shape how people interpret health information, it's really important to make sure the DHFKS works well in this setting. That's why our study set out to translate it into Arabic, tweak it for the local context, and confirm that it's both accurate and reliable for heart failure patients in Sudan. This study aimed to translate, adapt, and validate the DHFKS for Sudanese HF patients, ensuring its applicability in clinical and educational settings.

2. METHODOLOGY

Confirmed HF diagnosis, Arabic speaker, and informed consent were inclusion criteria. Patients with cognitive impairment were excluded. A cross-sectional study was conducted among HF outpatients in Sudan.

2.1. Sample size

The target sample size was set at 100 patients to ensure precise assessment of the study's reliability and validity [4]. Streiner and Norman (1995) recommended at least 10 subjects per questionnaire item for validity evaluation [5]. Since the DHFKS consists of 15 items, 150 patients were required for validation. A convenience sample of 110 HF patients was selected. Additionally, 20 patients (one-fifth of the sample) were randomly chosen and agreed to participate in a one-month test-retest reliability analysis.

The DHFKS was translated and culturally adapted following international guidelines. The process included forward translation, expert review, consensus refinement, back translation, pilot testing, and final expert validation. The panel encountered a challenge with the question 15. In the original DHFKS version, the answer is "take a dropje," referring to a salty lozenge a candy found Netherlands but not known in Sudan. To improve clarity, we translated it as "take a lozenge." While this captures the general meaning, it may not fully convey the original nuances. Future studies could explore alternative translations or provide additional context.

2.2. Statistical analysis

Data were analyzed using SPSS version 26.0 (IBM Corp, Armonk, NY, USA). Reliability was assessed using Cronbach's alpha for internal consistency and Spearman's correlation for test-retest reliability. Results were considered statistically significant at $p < 0.05$.

2.3. Ethical approval

The study received ethical approval from the Khartoum State Ministry of Health's Medical Ethical Committee (KMOH-REC-2020-NO.3). Informed consent was obtained from all participants, and permission to use DHFKS was obtain from founder.

3. RESULTS

A total of 110 HF patients completed the Arabic DHFKS, with a mean age of 58.3 years and 57.2% being male. Most participants (72.7%) had heart failure with reduced ejection fraction (HFrEF) and 81.8% were on guideline-directed therapy, yet only 47.3% demonstrated adequate knowledge of HF symptoms. The Arabic DHFKS showed strong reliability, with a Cronbach's alpha of 0.822 indicating high internal consistency, and a one-month test-retest Spearman's correlation of 0.810 ($p < 0.05$), confirming excellent stability over time as shown in Table 1.

4. DISCUSSION

The findings confirm that the Arabic version of the DHFKS is a reliable and valid tool for assessing HF knowledge among Sudanese patients. The high Cronbach's alpha value (0.822) suggests strong internal consistency, comparable to the original DHFKS validation study and Turkish version [3,9]. Additionally, the test-retest reliability (0.810) indicates excellent stability, affirming the scale's reproducibility over time.

A critical finding was that only 47.3% of patients had sufficient knowledge of HF symptoms, highlighting a gap in patient education. Inadequate symptom recognition may contribute to delayed medical intervention and higher hospitalization rates. These findings align with prior studies emphasizing the need for improved HF education, particularly in low-resource settings.

Cultural and linguistic adaptations are essential when applying knowledge assessment tools across different populations. The rigorous translation process ensured semantic and conceptual

equivalence with the original scale. The expert review and pilot testing phases further refined the questionnaire to enhance clarity and applicability in clinical practice.

Table 1. Item analysis of the Arabic version of the Dutch Heart Failure Knowledge Scale (DHFKS) (N = 110).

	Mean ± SD	Corrected item – total correlation	*Cronbach's alpha if item deleted
Question 1	0.98 ± 0.134	0.160	0.822
Question 2	0.9 ± 0.3	0.583	0.805
Question 3	0.55 ± 0.49	0.655	0.793
Question 4	0.98 ± 0.13	0.122	0.826
Question 5	0.89 ± 0.31	0.416	0.814
Question 6	0.463 ± 0.5	0.206	0.832
Question 7	0.79 ± 0.4	0.717	0.791
Question 8	0.563 ± 0.49	0.557	0.802
Question 9	0.7 ± 0.46	0.644	0.795
Question 10	0.89 ± 0.313	0.157	0.827
Question 11	0.59 ± 0.49	0.556	0.802
Question 12	0.636 ± 0.48	0.526	0.805
Question 13	0.718 ± 0.45	0.572	0.801
Question 14	0.92 ± 0.275	0.269	0.821
Question 15	0.163 ± 0.37	0.230	0.825

*Cronbach's alpha was 0.822 for the total scale with significant intra-class correlation coefficient ($p < 0.001$).

5. CONCLUSION

This study successfully translated and validated the DHFKS for Sudanese HF patients. The Arabic version demonstrated strong reliability and validity, making it a valuable tool for assessing HF knowledge in Arabic-speaking populations. Future research should explore the impact of educational interventions using this tool on HF self-care and clinical outcomes.

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CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest.

REFERENCES

- Bozkurt B., Ahmad T., Alexander K. M., Baker W. L., Bosak K., Brethett K., *et al.*: Heart failure epidemiology and outcomes statistics: a report of the Heart Failure Society of America. *J Card Fail.* 29(10): 1412-1451 (2023). DOI: [10.1016/j.cardfail.2023.07.006](https://doi.org/10.1016/j.cardfail.2023.07.006)
- Zhang Z., Koirala B., Gong G, Bai X., Mao J., Davidson P. M.: Predictors of self-care among Chinese patients with chronic heart failure: a situation-specific theory-guided structural equation model analysis. *J Cardiovasc Nurs.* 38(3): E87-E97 (2023). DOI: [10.1097/JCN.0000000000000918](https://doi.org/10.1097/JCN.0000000000000918)
- van der Wal M. H., Jaarsma T., Moser D. K., van Veldhuisen D. J.: Development and testing of the Dutch heart failure knowledge scale. *Eur J Cardiovasc Nurs.* 4(4): 273-277 (2005). DOI: [10.1016/j.ejcnurse.2005.07.003](https://doi.org/10.1016/j.ejcnurse.2005.07.003)
- Peat J. K., Johnson B. J., Zarnowiecki D., Hendrie G. A., Golley R. K.: Predictors of parental discretionary choice provision using the health action process approach framework: Development and validation of a self-reported questionnaire for parents of 4–7-year-olds. *Nutr. Dietet.* 75(4): 431–442 (2018). DOI: [10.1111/1747-0080.12413](https://doi.org/10.1111/1747-0080.12413)
- Streiner D. L., Norman G. R.: Health measurement scales: a practical guide to their development and use. New York: *Oxford University Press*, (1995).
- Guillemin F., Bombardier C., Beaton D.: Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol.* (1993) 46: 1417-1432 (2005). DOI: [10.1016/0895-4356\(93\)90142-N](https://doi.org/10.1016/0895-4356(93)90142-N)
- Wild D., Grove A., Martin M., Eremenco S., McElroy S., Verjee-Lorenz A., *et al.*: Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR task force for translation and cultural adaptation. *Value Health.* 8: 94-104 (2005). DOI: [10.1111/j.1524-4733.2005.04054.x](https://doi.org/10.1111/j.1524-4733.2005.04054.x)
- Robinson J. P., Shaver P. R., Wrightsman L. S.: Measures of personality and social psychological attitudes. San Diego: CA: *Academic Press* (1991).
- Saritas S. C., Cevik S., Ozden G., Salik S.: Turkish version of the Dutch heart failure knowledge scale: validity and reliability. *Pak Heart J.* 53(3): 269-274 (2020). DOI: [10.47144/phj.v53i3.1956](https://doi.org/10.47144/phj.v53i3.1956)