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RESEARCH ARTICLE

Development and Validation of the Greek version of Self-Care Heart Failure Index (Gr-SCHFI) in Patients with Heart Failure

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ABSTRACT
Background: Self-care of patients with heart failure (HF) is essential for the effective self-management of their disease, especially during the pandemic era. Self-care assessment instruments give the opportunity to Health Professionals to early recognize possible self-care needs and management of patients with HF.
Aim: The translation and validation of the Greek version of the instrument "Self-Care of Heart Failure Index" (Gr-SCHFI), as well as the investigation of the psychometric properties of the instrument in a Greek-speaking population with HF.
Methods: It's a methodological study of an instrument validation. The psychometric properties of the Greek version of Gr-SCHFI were evaluated through reliability factors (Cronbach's a and Composite Reliability), reliability of repeat test-retest and validity measures (content validity and concurrent validity). Brislin's (1970) methodology was used to translate the instrument to Greek language.
Results: The study involved 176 patients, of whom 138 (78%) were men with an average of 69 years old. Most participants were in the NYHA III category [76 (57%)]. Confirmatory factor analysis showed very good measurements in the criteria: RMSEA = 0.07, CFI = 0.97, GFI = 0.98, AGFI = 0.98, NFI = 0.95, TLI = 0.97. The Cronbach's alpha index and the Composite reliability index had satisfactory internal coherence indicators (Cronbach's alpha 0.80-0.92, and Composite reliability 0.88-0.96, respectively).
Conclusions: The Gr-SCHFI scale is a reliable and valid self-care assessment instrument for patients with HF. Self-care is necessary in HF where the evaluation and assessment of the self-care of the specific population is very important along the trajectory of the disease.
Keywords: Heart failure, Self-care, Self-management, Psychometric properties, Self-Care of Heart Failure Index

INTODUCTION

Heart Failure (HF) is a complex clinical syndrome related with many comorbidities, which complicate the long-term management of the disease, one of the major problems of public health[1]. In order to remain healthy, patients with HF must adhere to several behaviors and actions such as medication adherence, following a low-salt diet and staying physically active making this process difficult) [2].

Self-care is defined as a naturalistic decision-making process that involves the choice of behaviors which maintain the physiologic stability (self-care maintenance) and the response to symptoms when these symptoms occur (self-care management) [3–4]. It is fundamental for the clinical outcomes of patients with HF like in all chronic illnesses[5].

Self-care is substantial for the effective management of HF resulting to a better health related quality of life (QOL), lowering readmission rates, and reducing mortality[6]. To evaluate the adherence to self-care recommendations valid and reliable measures of self -care are needed. The evaluation of the self-care of patients with HF require the use of valid and reliable instruments. The most widely used scales are the European Heart Failure Self-care Behaviour Scale (EHFScBS)[7] and the Self-care Heart Failure Index (SCHFI)[3].

During the COVID-19 pandemic, the self-care management for these patients has become more essential, since patients with HF stay at home with minimum contacts and/or to their health professionals/clinics even though close monitoring is critical[5,9]. Therapeutic inertia in HF care is an ongoing risk and during this period communication and monitoring are impaired and patients with HF or other cardiovascular diseases are at risk for severe infection and complications[8,10]. The instruments assessing self-care management are now more than ever helpful to identify gaps in self-management, place of improvement and educational needs or lack of knowledge. Alternative therapeutic pathways and forms of monitoring are developed during the pandemic to ensure the continued provision of evaluation and good healthcare and prevention strategies, and the prompt management of deterioration while social distancing[11].

The validation of the SCHFI was decided to be established as is a comprehensive instrument giving the possibility to researchers and cardiology specialists of an alternative instrument, since Gr9-EHFScBS[12] has already been evaluated and used among Greek speaking populations. The SCHFI gives further the possibility to assess confidence as well[12]. The purpose of this study was to evaluate the psychometric properties of the Greek version of "Self-Care of Heart Failure Index" (Gr-SCHFI) questionnaire in Greek-speaking population.

METHODS

Study Design

It's a methodological study assessing measures of construct and discriminant validity, as well as the internal consistency and factor determinacy of the Gr-SCHFI and its factors.

Setting and sample

The sample consisted of 176 Greek speaking diagnosed patients with HF (NYHA class I-IV), that were recruited from cardiology units and outpatient departments of all large public hospitals of Cyprus, and outpatients of the Heart Failure Clinic from a large University Hospital in Athens, Greece. The participants completed a questionnaire which included questions on demographic and clinical characteristics, the Greek version of Self-Care management of Heart Failure Index (Gr-SCHFI) and the Greek version of the European Heart Failure Self-Care Behaviour Scale (Gr9-EHFScBS)[12].

Nurse researchers screened the patients during their hospitalization or scheduled visit in the HF clinic for possible participation. Only patients who were able to give written consent were included in the study. Patients who did not speak Greek, those with impaired cognitive function or with other conditions that severely affected their QoL (e.g. degenerative diseases, mental disorders, active cancer, on dialyses) were excluded. The questionnaire was administered by the nurse researcher who supervised the completion procedure. Participants with literacy problems or experiencing difficulty completing the questionnaire were interviewed by the nurse researcher.

Instruments

Self-Care of Heart Failure Index

The SCHFI (version 6.2) includes three sub-scales (dimensions) with 22 items measuring self-care maintenance (10 items), self-care management (6 items) and self-care confidence scale which includes six items. Each SCHFI sub-scale uses a 4-point Likert-type response options [3,4,13]. Each sub-scale is scored separately. Response choices for all items in the scale are summed and standardized to achieve a possible score of 0 to 100, with higher scores indicating better self-care and a score of 70 or greater as a cut point to judge self-care adequacy[13,14]. The cut point was found to be associated with the best 1-year event-free survival [14,16] and one half of a standard deviation, or an 8-point difference in the standardized score, was

praised as a minimal clinically relevant change in scores[17].

Other instruments and measurements.

European Heart Failure Self-Care Behaviour Scale

Gr9-EHFScBS is a 5-point Likert scale, from 1 ("I completely agree") to 5 ("I do not agree at all"), that measures HF-related self-care behaviors. The total score is calculated by summing the ratings for each item. The total score ranges from 9 to 45 with higher scores indicating poorer self-care behaviors. Gr9-EHFScB is better supported by a one-factor[12], so it is suggested to be used as an uni-dimensional scale, while in parallel considering each item as a stand-alone aspect of self-care. Each item of EHFScBS was very well chosen by the researchers who created the instrument as it represents an important self-care behavior for the management of HF[7,18]. To assess the concurrent validity between Gr-SCHFI and Gr9-EHFScBS. Correlations between variables were examined with the Spearman linear correlation coefficient.

Translation and equivalence of the Greek version

Permission to use and translate the English version of SCHFI was obtained from the authors of the original questionnaire[13]. The process followed the classic approach of translation and back-translation[19]. Two bilingual cardiology nurses translated the questionnaire into Greek while two blinded bilingual cardiology nurses undertook the back-translation. A research team consisting of bilingual experts in cardiology nursing and heart failure nursing reviewed the differences of the back-translation in order to establish semantic equivalence. All the members of the team agreed to the final version. For assessing the readability of the final version, ten patients with HF were asked to appraise it. No difficulties were encountered in understanding or in explaining the items of the questionnaire.

Statistical Analysis

Descriptive statistics were used to describe demographic and clinical characteristics of the participants as well as to calculate central tendency and standard. Reliability and validity tests were employed to test the psychometric properties of the translated Greek version of the questionnaire.

The content validity was assessed by the research team (panel of experts) who evaluated the suitability of the Greek translation as previously described. Construct validity was assessed by performing a confirmatory factor analysis (CFA) to determine the dimensionality of the Greek version of the questionnaire in the dimensions of the questionnaire as proposed by the author of the instrument[2]. Spearman rank correlation coefficient was used to assess concurrent and discriminant validity between Gr-SCHFI and Gr9-EHFScBs. Both factor scores determinacy and Chronbach's alpha coefficients and test-retest (using a 15-day interval) were utilized to provide measures of internal consistency of the instrument and the composite reliability[20]. For the test-retest the Spearman r correlation coefficient was used.

Statistical analysis was performed in Rv. 4 [21] using the tidy verse suit of packages [22]. Confirmatory factor analysis was performed in the Lavaan package[23]. The minimum sample size was determined based on specific parameters (estimated fraction size, maximum error of the estimate, level of statistical significance, and size of general population)[24].

Ethical considerations

Signed license of use from the copyright holders of the questionnaire was ensured, in order to ensure the legal framework and cover by the copyright party. The study protocol was submitted and reviewed by the Ethics Committee of the university Departments and Clinics in Cyprus and Greece. Approvals were also granted by the Cyprus Bioethics Committee and the Cyprus Ministry of Health and all parties involved were informed about the study. Administration of all hospitals were informed and reviewed the study protocol, and agreed to the implementation of the study. The administration of each hospital reviewed the study protocol and agreed to the implementation of the study. The investigation conforms to the principles outlined in the Declaration of Helsinki.

All procedures-maintained confidentiality of participant personal data as instructed by GDPR Law. Participation in the study was voluntary, and participants provided a signed consent from after being informed about the details of the study who held no harm or risk for the participants.

RESULTS

Description of the sample

The demographic and the clinical characteristics of the 176 participants are presented in Table 1. The majority of the participants were male (78%), the mean age was 69 years (SD 11. 8) and married were the 73% of the participants. Regarding clinical severity patients 57% were classified as NYHA III , 39% as NYHA II, only 0.7% as NYHA I and 3,7% as NYHA IV. Most of the participants were living with their family (75%).

Table 1: Clinical and demographic characteristics

Characteristics	**N = 176**
Hospital	
Hospital 1 in Cyprus	3 (1.7%)
Hospital 2 in Cyprus	11 (6.25%)
Hospital 3 in Cyprus	22 (12.5%)
Hospital 4 in Cyprus	6 (3.4%)
University Hospital in Greece	134 (76%)
Sex	
Male	138 (78%)
Female	38 (22%)
Age - Mean (SD)	69 (11,8)
Unknown	5
Education	
Primary or nil	69 (47,4%)
High School	52 (35%)
Post-secondary education	12 (8.2%)
Higher education	1 (0.7%)
College or University education	13 (8.9%)
Unknown	29
Family status	
Divorced	17 (10%)
Unmarried	4 (2.4%)
Married	121 (73%)
Widower	24 (14%)
Unknown	10
NYHA	
I	1 (0.7%)
II	52 (39%)
III	76 (57%)
IV	5 (3.7%)
Unknown	42
Living status	
Lives with his/her family	127 (75%)
Lives home alone/with help from family	38 (22%)
Lives home alone/with domestic helper	4 (2.4%)
Unknown	7

Validity

Construct validity

CFA showed an acceptable fit[24] for the whole scale and the three scales (maintenance, management and self-confidence): RMSEA (0.07) [95% CI (0.06-0.08)], CFI (0.97), GFI (0.98), AGFI (0.98), NFI (0.95, TLI (0.97) and x^2 (181) =359.4, p value < 0.001 (Table 2).

Table 2. Confirmatory factor analysis (CFA) of the Greek Version of the Self – Care Management of Heart failure Index – (Gr-SCHFI)

Question	Maintenance	Management	Confidence
[1. Do you monitor your weight?]	0,59		
[2. Do you check your ankles for swelling?]	0,72		
[3. Do you try to avoid getting sick (e.g.)? (π.χ. flu vaccination, avoidance of sick people)]	0,69		
[4. Do you get some exercise?]	0,46		
[5. Do you keep your appointments with your doctor /nurse?]	0,83		
[6. Do you follow a low sodium diet?]	0,88		
[7.Do you get exercise for 30 minutes?]	0,61		
[8.Do you forget to take some of your prescribed medicines?]	0,53		
[9. Do you ask for low salt foods when visiting family and friends?]	0,77		
[10. Do you use a system or method to help you remember to take your medicines?	0,47		
[12Do you limit the salt you eat?]		0,88	
[13. Do you reduce your fluid intake?]		0,79	
[14. Do you take an extra diuretic medicine?]		0,86	
[15. Do you call your healthcare provider for guidance?]		0,92	
[16. Think of a treatment you used the last time you had symptoms. Did the treatment you used make you feel better?		0,26	
[1. Keep yourself stable and free of symptoms?]			0,77
[2Follow the treatment plan you have been given?]			0,96
[3Evaluate the importance of your symptoms?]			0,91
[4. Recognize changes in your health if they occur?]			0,87
[. 5Do something to relieve your symptoms?]			0,92
[6. Evaluate how well a remedy works?]			0,95
Composite Reliability	0,89	0,88	0,96
Cronbach's alpha	0,85	0,80	0,92
Goodness-of-fit			
Chi-Square (df)	359,4 (181)		
p-value	<0,001		
RMSE	0,07		
90% CI for RMSEA	(0,06 - 0,08)		
TLI	0,97		
NFI	0,95		
CFI	0,97		
GFI	0,98		
AGFI	0,98		

RMSEA, root mean square error of approximation; GFI, goodness-of-fit index; AGFI, adjusted goodness-of-fit index; TLI, Tucker Lewis Index;NFI, normed fit index; CFI comparative fit index.

Levels for an acceptable model fit: RMSEA≤0.08,TLI≥0.90;NFI≥0.90,CFI≥0.90.

Concurrent validity

Concurrent validity of the Gr-SCHFI was assessed by Spearman rank correlation coefficient between Gr-SCHFI and Gr9-EHFScBs (Lambrinou et al., 2014), which showed a strong correlation between the total scores of the two scales (r= 0.78,

p<0.001) and their dimensions as well (Table 3). Distribution of all items' scores for all dimensions of both instruments are shown in Figures 1 and 2.

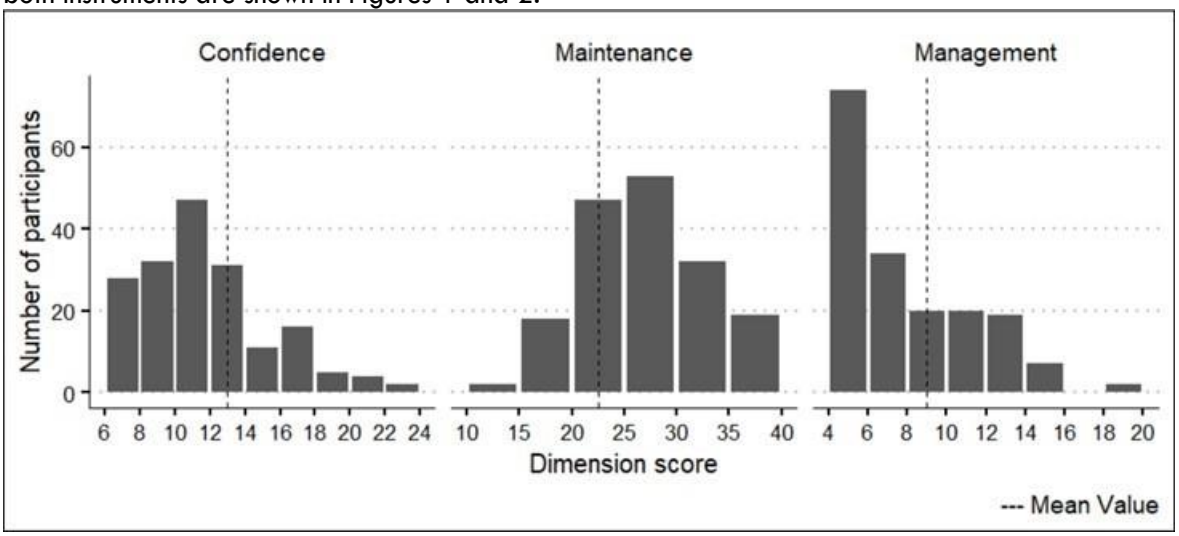

Figure 1. Distribution of scores for the Self – Care Management of Heart failure Index Gr9- SCHFI

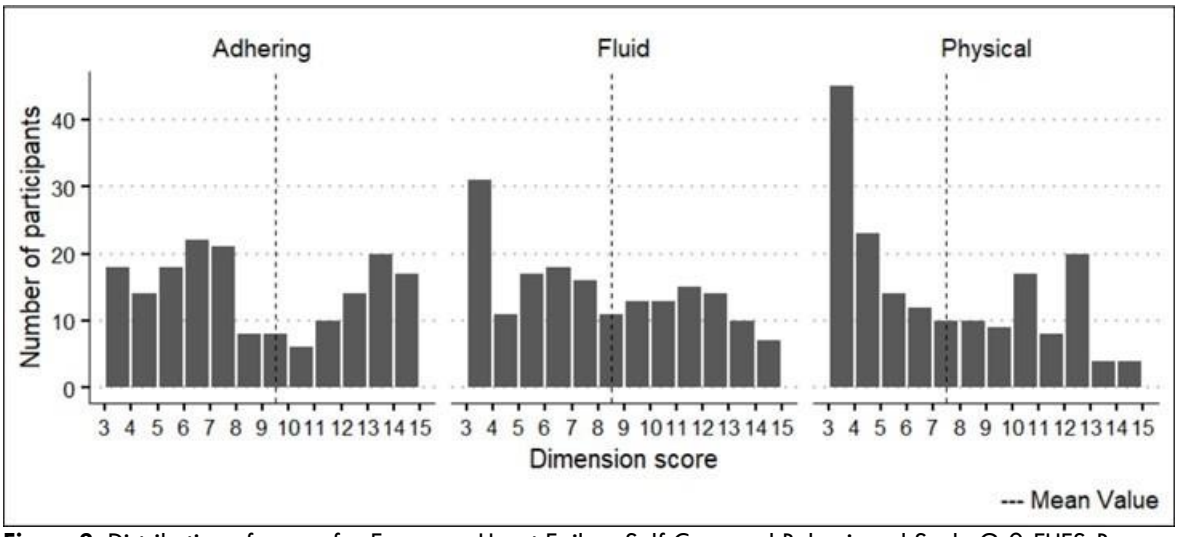

Figure 2. Distribution of scores for European Heart Failure Self Care and Behavioural Scale Gr9-EHFScBs

Reliability

Internal consistency

The CR in the level of Maintenance and Management were found to be 0,89 and 0,88, respectively, and in the level of Self-confidence was found to be 0,96; the values over 0,9 show are not accepted since they show that they measure the same item, and this is not a reliable constructive measure[24]. Only the item 16 was found to have a low CR (0.26); 'Think of a treatment you used the last time you had symptoms. Did the treatment you used make you feel better?'. Cronbach's alpha coefficients were found to be high: 0.9 for the whole scale, 0.89 for the dimension of Maintenance, 0.88 for the dimension of management and 0.92 for the dimension of confidence. All factors and reliability coefficients are presented in Table 2.

Test-retest reliability consistency was moderate to high with bivariate correlations ranging from 0.59 – 0.90 (Tables 3 and 4).

Table 3. Spearman Linear correlation between the dimensions of self-management instruments

	Maintenance	Management	Self confidence	Total (Riegel)	implementation	Fluids	Physical
Maintenance	-						
Management	0,68	-					
Self confidence	0,54	0,63	-				
Total (Riegel)	0,91	0,87	0,80	-			
Implementation	0,69	0,72	0,54	0,76	-		
Fluids	0,74	0,73	0,45	0,76	0,87	-	
Physical	0,67	0,69	0,53	0,74	0,92	0,85	-
Total (EHScBs)	0,73	0,74	0,53	0,78	0,97	0,95	0,96

Table 4. correlation between Test and Retest for each statement of the instrument (N=20)

Statement	r
[1. Do you monitor your weight?]]	0.75
[2. Do you check your ankles for swelling?]	0.86
[3. Do you try to avoid getting sick (e.g.)? (π.χ. flu vaccination, avoidance of sick people)]	0.80
[4. Do you get some exercise?]	0.90
[5. Do you keep your appointments with your doctor /nurse?]	0.78
[6. Do you follow a low sodium diet?]	0.80
[7. Do you get exercise for 30 minutes?]	0.89
[8. Do you forget to take some of your prescribed medicines ?]	0.80
[9. Do you ask for low salt foods when visiting family and friends?]	0.65
[10. Do you use a system or method to help you remember to take your medicines?	0.78
11. When you had difficulty in breathing or ankle swelling the last month… When you have heart failure symptoms, how likely are you to recognise these.	0.59
[12. Do you limit the salt you eat?]	0.65
[13. Do you reduce your fluid intake?]	0.69
[14. Do you take an extra diuretic medicine?]	0.73
[15. Do you call your healthcare provider for guidance?]	0.70
16. When you have symptoms of shortness of breath or ankle swelling, what ways you are likely to use to relieve these symptoms. How confident you are that this way make you feel or not better.	0.78
[1. Keep yourself stable and free of symptoms?]	0.73
[2. Follow the treatment plan you have been given?]	0.89
[3. Evaluate the importance of your symptoms?]	0.67
[4. Recognize changes in your health if they occur?]	0.69
[5. Do something to relieve your symptoms?]	0.72
[6. Evaluate how well a remedy works?]	0.70

DISCUSSION

HF is a complex syndrome with a long-term regimen, demanding self-management[5]. Self-care is also an important component of managing HF and is often used as an outcome for assessing the effectiveness of self-care interventions in HF management programs[12]. Although a population specific instrument (Gr9-EHFScBS) for measuring self-care in HF population[12] is available in Greek language, other important aspects of self-care may be measured by the SCHFI[7]. Specifically, the EHFScBS aims to assess the recognition of signs and

symptoms of decompensation and decision-making in the occurrence of these symptoms, as SCHFI in addition evaluates the recognition and actions to improve the signs and symptoms of clinical deterioration and includes aspects related to how confident the individual feels to perform activities related to self-care[7]. Even though more recent factorial structure and changes on scorings of both instruments to make their use more international highlighted once again the differences in items of both instruments; suggesting scoring of dimensions should be done with caution. Similar conclusions were suggested by the authors of the Gr9-EHFScBS[12,25].

Confidence, a dimension included in SCHFI, is an important aspect of self-care; is a person's belief in his or her ability to perform a set of actions; the stronger these beliefs are in a person, the more likely he or she will initiate and continue activities that aid the attainment of a positive outcome[26]. Patients with HF often find it challenging to engage in numerous self-care behaviors that require ongoing commitment, alongside copying with comorbidities and daily living. Confidence in performing these self-care behaviors are central factors in facilitating lifestyle changes. Thus, improving HF patients' confidence, while considering their readiness to change, is a promising avenue for enhancing self-care capabilities[27,28]. Needing support for self-management to feel confident and take over such a responsibility is so obvious when patients with HF describe their needs[29]. Empowerment for self-care management is warranted during these unprecedented times and using plans for alternating methods of evaluation and therapeutic approaches to improve treatment of HF. Instruments including such aspects are necessary to identify obstacles and gaps for self-care management and gives the possibility to re-organize patient-centred care through telemonitoring (e.g.telephone)[11].

The CFA of the Gr - SCHFI showed acceptable adaption in all three dimensions; for maintenance adequate implementation (>0,46) and for the management (>0,79) apart from the question 16 (0,26). For the third dimension of confidence there was also good adaption (>0,77). The Gr-SCHFI showed more acceptable fit in all of the following indexes (RMSEA=0.07, GFI=0.98, AGFI=0.98, NFI=0,95, TLI=0,97, CFI = 0,97) compared to the Gr9-EHFScBs (RMSEA = 0.08, GFI = 0.92, AGFI = 0.87, NFI = 0.75 και CFI = 0.81). Regarding reliability, Chronbach's alpha was used on both questionnaires. In the Gr9-EHFScBs questionnaire overall Chronbach's alpha was low (0.66) as well as in its sub-dimensions (adhering to recommendations a=0.57, fluid and sodium management a=0.75, recognition of worsening of symptoms a=0.62), indicating a low internal consistency. The findings agree with the first validation of the instrument when researchers suggested to use the short instrument either as a sum, or each item separately[12]. In contrast, the Gr-SCHFI weighted questionnaire had satisfactory internal consistency indicators for the entire instrument (a = 0.90) and all the subdimensions (Maintenance a= 0.85, Management a=0.80, Confidence a= 0, 93). Only the item 16 ('Think of a treatment you used the last time you had symptoms. Did the treatment you used make you feel better?') of the dimension Management had low loading (0.26). The particular item shows similar issues of fit in most of the validations as it may fit to more than one dimensions; maintenance and management[4]. More specifically, in the current version of the instrument (SCHFI v6.2), symptom monitoring was included in the Self-Care Maintenance Scale and symptom recognition was captured in the Self-Care Management Scale. Previous psychometric studies[3,4] found that these two items were loaded in a single factor, providing evidence that symptom perception deserved more attention, something that changed in the more updated version (SCHFI v7.2)[30,31] . Authors used the SCHFI v6.2 as data collection started before the availability of the last update version (SCHFI v7.2). Based on qualitative studies, both maintenance and management of symptoms are difficult for patients with HF. They also need continuing supportive care for both. So what seems to be important is to support the patients for self-care management, exercise etc[29]. Moreover, is also significant to find out whether they have the confidence to establish and maintain self-care and self-management [28]. This was obvious during the pandemic where the access to health care services was difficult. Measuring confidence was crucial to recognize the patients who needed more support. Recruitment of patients in greater need was important and measuring confidence was a helpful indicator to recognize the patients that needed greater attention.

Additionally, the composite reliability factor was checked, indicating a high composite reliability index (CR = 0.89). The test- retest was used to weight the reliability of the instrument, showing a strong positive correlation in each statement. Specifically, the coefficient r ranged from the values r=0.59 - r=0.90 in each statement of the instrument and for the sub-dimensions (maintenance r = 0.89, management r=0.75 and confidence r=0.70). Current results are in linear with the Italian

version of the instrument were the test- retest reliability showed moderate to high reliability coefficients (r = 0.64-0.89)[31]

A holistic approach of evaluation to care should target the management and treatment of all health concerns. Every patient brings his/her own complexity of comorbidities, sensitivity and contraindications to medications, cultural and health beliefs[11]. In the current era of pandemic, health professionals must have several instruments available to support continuing and distanced care, with clear lines and systems of communication, delegation and responsibility. By validating and comparing the Gr – SCHFI with the Gr9-EHFScBs questionnaire give the possibility to researchers and clinicians to use the instrument that is more convenient and appropriate each time and also combine them with other instruments in order to have a comprehensive reappraisal of the patient's condition and needs.

CONCLUSIONS

The Gr – SCHFI is a valid instrument and well adopted to Greek speaking populations even though has been validated before and accepted changes to newer versions. Its validation gives the opportunity of different kind of evaluations of patients with HF, even from a distance, during the pandemic period giving the possibility of person-centred approach and better management of a population which is at high risk for deterioration and acute events.

Implications to Nursing Practice:

- Validation and psychometric testing of the instrument SCHFI in Greek language, giving the opportunity to both; researchers and clinicians to use the questionnaire.
- Discussion and comparison of Gr-SCHFI and Gr9-EHFScBs, helping researchers and clinicians to select each time the most appropriate instrument based on the purpose.
- Highlights the possibility of long-distance patient's evaluation using self-administrated instruments of self-care management.
-

CONFLICT OF INTEREST

Nothing to be declared.

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