



Psychometric properties of the critical care family needs inventory-emergency department



Gülten Sucu Dağ, Ph.D, RN^{a,*}, Aklime Dicle, Ph.D, RN^b, Mehmet Ziya Firat, Ph.D^c

^a Eastern Mediterranean University, Faculty of Health Sciences, Nursing Department, Famagusta, Cyprus

^b Istanbul Sabahattin Zaim University, Faculty of Health Sciences, Istanbul, Turkey

^c Akdeniz University, Faculty of Agriculture, Department of Animal Science, Antalya, Turkey

ARTICLE INFO

Article history:

Received 6 January 2016

Revised 8 October 2016

Accepted 6 November 2016

Keywords:

Family needs
Critical illness
Nursing
Emergency service
Factor
Analysis
Psychometrics

ABSTRACT

Purpose: The purpose of this study was to test the reliability and validity of the Turkish version of the Critical Care Family Needs Inventory-Emergency Department (CCFNI-ED) in Turkey.

Methods: This study used a cross-sectional survey design. The questionnaire was administered to 400 family members of patients with a critical illness in an emergency department. The 40-item English version of the CCFNI-ED was translated into Turkish following the standard back-translation methodology. Confirmatory and exploratory factor analyses (CFA and EFA, respectively) were carried out using principal component analysis with varimax rotation to test the scale's construct validity. We used Cronbach's alpha to examine the CCFNI-ED's internal consistency reliability.

Results: The CFA failed to confirm the original Australian factor structure for our sample. The original scale was then modified based on the EFA and the best possible fitting model was obtained for the Turkish family member sample. The Cronbach's alpha of the modified scale was 0.91 and those for the subscales ranged from 0.68 to 0.87.

Conclusions: The psychometric evaluation showed satisfactory validity and reliability estimates, supporting the use of the Turkish version of the CCFNI-ED with a sample of family members of critically ill patients in an emergency department.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Emergency departments (EDs) are health department units involved in treating emergency and unexpected health problems among the public. ED care consists of primary and emergency health care and management of life-threatening diseases or injuries. EDs are a traumatic environment for both patients and patients' family members (Redley & Beanland, 2004; Wentzel & Brysiewicz, 2014).

Families accompanying a critically ill relative to the ED are an integral part of the ED care unit. Thus, it is important to determine the needs of critical care patients' family members and take necessary actions within intensive care units and ED environments where such traumatic cases are experienced (Redley, Levasseur, Peters & Bethune, 2003a; Al Ghabeesh, Abu-Snieneh, Abu-Shahrer, Abu-Snieneh & Alhawamdeh, 2014). Stress induced by these situations typically makes family members feel disorganized and helpless (Lee and Lau, 2000).

Families experiencing emergency and unexpected situations frequently experience considerable stress caused by exchanges in family functions, unknown environments, role changes, uncertainty, loss of

control, permanent physical disabilities, economic problems, and fear of death (Redley et al., 2003a; Murphy & Nightingale, 2002; Horn and Tesh, 2000).

As key members of the multidisciplinary ED team, nurses are particularly challenged because of their high accessibility to patients and families (Sorocco, Tolson & Fleming, 2001). Nurses and other health professionals are responsible for providing physical and emotional support for family members throughout the traumatic experience of patients' hospitalization and possible death (Chien, Ip & Lee, 2000).

There are relatively few studies on patients' family members in the ED; however, there are several studies on family members' ED needs. The main focus of these studies were care following sudden death (Brysiewicz, 2008; Wisten & Zingmark, 2007; Zalenski, Gillum, Quest & Griffith, 2006; Li, Chan & Lee, 2002), crisis intervention (Washington, 2001; Kercher, 1991), invasive procedures, the experiences of patients' family members in the resuscitation room (Emergency Nursing Resources (ENA), 2007; Leske, McAndrew & Brasel, 2013; Hung & Pang, 2011; Critchell & Marik, 2007; Madden & Condon, 2007; Benjamin, Holger & Carr, 2004; Redley, Botti & Duke, 2004; Maclean et al., 2003) and experiences of family members of elderly patients aged 65 and older (Nikki, Lepistö & Paavilainen, 2012). In addition, in 2012, the Emergency Nurses Association (ENA) published clinical practice guidelines on the presence of the family during invasive

* Corresponding author.

E-mail addresses: sucugulten@gmail.com, gulten.dag@emu.edu.tr (G. Sucu Dağ).

procedures and resuscitation. The ENA suggests that a designated health care professional be assigned to family members to provide them with explanations and comfort, and that family member presence during invasive procedures or resuscitation should be offered as an option to family members and should be a written institutional policy (ENA, 2012). In particular, nurses can assist in the compensatory process leading to adaptation through structured family support. Supportive actions to promote family needs attainment can, for instance, include reflective inquiry and family inclusion in care (Davidson, 2009; Cypress, 2013, 2014).

Redley and Beanland, (2004) led the way in validating family needs with the development of the Critical Care Family Needs Inventory-Emergency Department (CCFNI-ED). The original CCFNI-ED was developed to measure the perceived needs and experiences of family members of critically ill patients as well as clinicians' self-reported attitudes and behaviors in the ED. Specifically, the CCFNI-ED was developed to specify patients' family members' needs within emergency services (Redley et al., 2003a).

The literature has defined family members' needs as communication and information, proximity, support, and comfort. Based on a systematic review, researchers have made a number of suggestions to improve care of patients' family members (Redley, Beanland & Botti, 2003b). Specifically, they advise that ED personnel should communicate regularly with patients' family members as early as possible when the family members arrive at the emergency room. Furthermore, the literature suggests that active listening techniques such as reflecting and clarifying, asking open-ended questions, and attending to verbal and non-verbal cues should be used in order to establish effective communication. When attending to information needs, ED personnel should regularly inform patients' family members about changes in patients' situations and evaluate family members' statuses to determine if it is appropriate to explain potentially risky results pertaining to patients' health statuses. Family members' proximity needs include interaction with patients through touch, speech, or intimacy; allowing families to be at patients' bedsides. Recommended measures to assist staff in meeting family members' needs for support include listening to family members' fears and concerns, encouraging their emotional expression, providing them with directions on what to do at the bedside, and providing explanations about the environment. Suggested measures for personal comfort needs include providing privacy, food, fluids, access to bathroom facilities, and a private place to wait. Overall, it appears that the CCFNI-ED may be useful for exploring the needs of family members in EDs (Redley et al., 2003a, 2003b). Therefore, identifying and addressing family members' needs can help nurses provide patients with the necessary support and establish effective communication with family members (Redley et al., 2003b). Nevertheless, nurses can provide guidance in the development of tools for determining the ED needs of family members of critical care patients and in planning necessary initiatives in which these tools can be used for family members' care and education (Redley and Beanland, 2004).

Thus far, there are no reports on a Turkish version of the CCFNI-ED. There are three purposes of the study were to (1) translate the CCFNI-ED into Turkish, and (2) adapt it to the cultural specificities of Turkish critical care patient families in the ED, and (3) to investigate its reliability for this population.

2. Methods

2.1. The study design

In this study, we assessed the validity and reliability of the Turkish version of the CCFNI-ED originally developed by Redley and Beanland, (2004) by performing a cross-sectional survey using this self-report questionnaire.

2.2. Setting

The setting for this study was a Turkish University Hospital's emergency department (ED) located in İzmir. The ED contains 10 beds for patients with a variety of life-threatening illnesses as well as trauma patients. In 2004 specialized health care was provided to 5000 patients in this facility.

2.3. Instrument

The CCFNI-ED is a 40-item self-report questionnaire consisting of four subscales. First, the "communication with family members" subscale consists of 10 items and includes sharing and understanding information exchanged between family members and health teams. Second, the "family member participation in ED care" subscale consists of 14 items and reflects family members' demands to participate in care and be with critical patients. Third, the "organizational comfort" subscale consists of 10 items and reflects the institution's systemic and structural comfort. Finally, the "family member support processes" subscale consists of 6 items and relates to the support provided by ED personnel. The CCFNI-ED's Cronbach's alpha coefficient was 0.90 in a past study, while the subscale coefficients were 0.87, 0.86, 0.83, and 0.56, respectively (Redley, 2005). Participants rate the importance of the 40 CCFNI-ED family needs statements using a four-point Likert-type scale (1 = not important, 2 = slightly important, 3 = important, 4 = very important).

2.4. Translation procedure

The CCFNI-ED was translated using a back-translation procedure. First, the CCFNI-ED was translated from English into Turkish separately by two experts. The translated versions were both given to two native Turkish speakers (one an English lecturer, one a nursing lecturer) for back-translation. Each item's translation was discussed two days and consensus was reached. In addition, the content of each CCFNI-ED item in the translated instrument was evaluated by several academic specialists (one emergency physician, one English lecturer, six nursing lecturers, and two expert ED nurses) to ensure that this content was suitable and that semantic equivalence had been achieved. Following assessment of the linguistic and content validity, a pilot study was conducted whereby the adapted CCFNI-ED was completed by 18 family members who had accompanied a critically ill relative into the ED at the university hospital. Subsequently, it was determined that the questions were understandable and no changes were made.

2.5. Data collection and data collection procedure

In this study, 400 family members meeting inclusion criteria were interviewed in the ED. Data were collected before the patient was discharged from the ED or referred to another clinic. Following a full explanation of the study's purpose and procedure, written consent was obtained from all participants. The researcher assured family members that they were under no obligation to participate and could withdraw at any time. The researcher asked each participant to complete the questionnaire individually in an ED interview room. The questionnaire required approximately 15–20 min to complete. No family member withdrew from the study; thus, 400 participants were included in analyses.

2.6. Sample and sampling technique

The sample size required for confirmatory factor analysis (CFA) has not yet been clearly established in the literature. Researchers usually follow conventions ranging from a participant ratio of 3:1 to as high as 12:1. Simulation studies indicate that stable factor models can be achieved with samples as small as 100 (Fabrigar, Wegener,

MacCallum, & Strahan, 1999) or with samples as small as 150 if 10 or more items load at 0.30 or higher (Guadagnoli and Velicer, 1988). For purposes of this study, a total of 400 family members of patients with a critical illness who had been hospitalized within 24 h were recruited from the ED. Since the CCFNI-ED consists of 40 items, our sample size of 400 fell well within most guidelines.

Families' self-perceived needs may change over a relatively short 24-h timeframe (Rose, 1995) Thus, we made the absolute sample size 10 times the number of variables to ensure that it was substantial enough to adequately represent all family members and exceed the recommended sample sizes. Our sample size was also adequate to ensure the reliability of the factor structure, as the participant-to-variable (item) ratio exceeded the common criterion of 5–10 participants for each variable (Shultz and Whitney, 2004; Waltz, Strickland & Lenz, 2010; Andrew, Pedersen & McEvoy, 2011).

Critically ill patients were defined as those who had been admitted to a critical care unit, had been transferred to a critical care unit at another hospital, or had died in the ED. Four-level triage system was used to triage critically ill patients according to 4 classifications (*emergency* patients, or patients who should be seen immediately; *urgent* patients, or patient who should be seen in <15 min; *less urgent* patients, or patients who should be seen in <60 min; and *non-urgent routine* patients, or patients who should be seen in <120 min). Family members were defined as a basic societal unit of two or more individuals that were genetically connected and had a commitment to nurture each other emotionally, physically, and spiritually (Redley and Hood, 1996). The inclusion criteria were that the family members must (1) fit the definition of a family member, (2) have been present in the ED with the critically ill person, (3) be over the age of 18 years, and (4) have been present in the ED for 30 min or longer.

2.7. Ethical considerations

Written permission to use and translate the CCFNI-ED into Turkish was granted by one of the developers, B. Redley. Permission to conduct this study was received from the Ethics Board of Clinical and Laboratory Research, Dokuz Eylul University, Faculty of Medicine. Written consent was also obtained from the hospital Director, the head of the Emergency Medicine Department, and from all study participants. Family members were informed about the purpose of the study and what would be expected of them. Participants were assured of their rights to refuse to participate in or withdraw from the study at any stage without any negative consequences. Participants' anonymity and confidentiality were guaranteed. Family members' verbal and written consent was obtained following explanation of the study objectives.

2.8. Data analyses

All items were coded and scored, and all the data were entered, checked for missing values, and analyzed using the statistics programs of SPSS version 18.0 (SPSS, Inc., Chicago, IL, USA) and SAS version 7.0 (SAS Institute, Cary, NC, USA). There were no incomplete questionnaires or missing information. Descriptive statistics were performed using SPSS, and CFA and exploratory factor analysis (EFA) were performed using SAS. The main variables were described using descriptive statistics, including means, skewness, and standard deviations. The Kolmogorov–Smirnov test was conducted to assess the variable distribution to determine if parametric or non-parametric tests were required in the analysis. Unless otherwise stated, the statistical significance level was set at $p < 0.05$.

To confirm Redley's exploratory model (Redley, 2005), a CFA with the normal theory maximum likelihood estimation method was conducted on our sample. Next, we performed an EFA to modify the factor structure. We sought to test Redley's exploratory model using a CFA with the normal theory maximum likelihood estimation method. In the event that the model did not fit the data, we proceeded to an EFA

to extract the factor structure of the Turkish version. In this EFA, the model specifications were the same as those used in the original four-factor model. We identified the most appropriate factor structure in the EFA by fixing the factor variances at 1.0. Factors with eigenvalues of > 1.0 were retained, and items with factor loadings ≥ 0.30 (including those that rounded to 0.30) and that did not load on more than one factor were retained.

3. Results

3.1. Sample characteristics

A total of 400 family members were interviewed. Family members' average age was 43.46 (SD = 14.55 years), 50.2% were female, 46% were university graduates, and 33.5% were the children of critically ill patients. Family members stayed at the ED for between 1 and 24 h (mean = 4.3 h \pm 3.4 SD). Specifically, 76.8% of family members ($n = 307$) stayed 1–6 h, 19.2% ($n = 77$) 7–12 h, and 4% ($n = 16$) 13–24 h. A high proportion of family members (80.5%) arrived at the ED with their critically ill relative, and 81.8% of patients had a retirement fund as health insurance.

3.2. Confirmatory factor analysis

First, data were examined for univariate normality. Means, standard deviations, the EFA results, and skewness values are shown in Table 1 and means and standard deviations (SD) of the subscales of the Turkish CCFNI-ED are shown in Table 2.

The mean skewness value was -2.327 . An examination of skewness values showed that most items were normally distributed. Some items had a skewness value of greater than the recommended cut-off of $|3|$, indicating a slightly skewed or non-normal distribution. However, given the sample size, we believed it appropriate to perform the CFA using all 40 items.

Based on the original conceptualization of the CCFNI-ED, we tested the fit of a four-factor model to the data. The criteria used to assess the model fit are illustrated in Table 3. While some criteria indicated an acceptable model fit, others did not achieve recommended values. The CFA revealed a close to adequate fit of the model developed for the Australian sample to our data according to the root mean square error of approximation [0.0713 (90% CI = 0.0713–0.0747)], and a moderate fit according to the goodness-of-fit index (0.754); however, a poor fit was found according to the following fit indices: a χ^2 (734) of 2222.9085 ($p < 0.0001$) and adjusted goodness-of-fit index (0.725), comparative fit index (0.709), and normed fit index (0.691) values of < 0.90 . Thus, none of the fit statistics indicated an acceptable fit. Specifically, only two fit statistics were close to an acceptable model fit and four fit statistics indicated an unacceptable fit. Therefore, the CFA did not confirm the original factor model. These results indicate that the fit between the model and data requires improvement. Consequently, we proceeded with the EFA to modify the model.

3.3. Exploratory factor analysis

The 40 items were analyzed with the maximum likelihood extraction method using a varimax rotation. Four factors with eigenvalues of over 1.00 were identified. We used the scree plot presented in Fig. 1 to determine the number of factors to retain and rotate, which again suggested a four-factor solution. Several other criteria were employed to determine the number of factors, including the Tucker–Lewis Reliability Coefficient (TLC) (Tucker and Lewis, 1973), which ranges between 0 and 1.0 and where higher TLC values indicate better reliability; the Akaike information criterion (AIC) (Akaike, 1987); and the Schwarz Bayesian criterion (SBC) (Schwarz, 1978). We retained the factor structure that yielded the lowest AIC and SBC values and the highest TLC value. To choose a factor solution that both satisfied the

Table 1
Means, standard deviations (SD), and skewness values of the Turkish CCFNI-ED ($n = 400$).

Item	Mean ± SD	Skewness
I-1. Have a doctor or nurse meet you on arrival at the hospital	3.90 ± 0.02	-4.785
I-2. To have a person to care for the family	3.46 ± 0.04	-1.352
I-3. To find out the condition of your relative before being asked to sign papers	3.84 ± 0.02	-3.228
I-4. To have friends and relatives with you while in the emergency department	2.77 ± 0.05	-0.365
I-5. To have a private place to wait	3.54 ± 0.04	-1.653
I-6. To have explanations given in understandable terms	3.93 ± 0.02	-5.345
I-7. To be kept updated frequently	3.87 ± 0.02	-3.528
I-8. To know all the specific facts concerning your relative's progress	3.87 ± 0.02	-3.861
I-9. To know why things were done for your relative	3.80 ± 0.03	-2.746
I-10. To be spared distressing details about your relative's illness or injury	3.47 ± 0.05	-1.621
I-11. To talk to a doctor	3.91 ± 0.02	-4.286
I-12. To talk to a nurse	3.54 ± 0.04	-1.588
I-13. To know about the expertise of staff caring for your relative	3.26 ± 0.05	-0.995
I-14. To know about the expected outcome	3.86 ± 0.02	-3.328
I-15. To have questions answered honestly	3.95 ± 0.01	-5.678
I-16. To be told about transfer plans while they are being made	3.85 ± 0.02	-3.173
I-17. To be assured that the best care possible has been given to your relative	3.93 ± 0.02	-5.627
I-18. To stay out of the way during your relative's care	3.17 ± 0.05	-0.865
I-19. To see your relative as soon as possible	3.69 ± 0.03	-2.151
I-20. To have explanations about the treatment area before going in to see your relative for the first time	3.54 ± 0.04	-1.577
I-21. To have a staff member with you while visiting your relative	2.77 ± 0.05	-0.271
I-22. To see what was happening to your relative	3.63 ± 0.04	-1.970
I-23. To be with your relative at any time	3.33 ± 0.04	-1.076
I-24. To be given directions regarding what to do at the bedside	3.72 ± 0.03	-2.334
I-25. To feel helpful to your relative's care	3.55 ± 0.04	-1.670
I-26. To be included when decisions are made	3.55 ± 0.04	-1.817
I-27. To have time alone with your relative	3.11 ± 0.05	-0.727
I-28. To feel accepted by hospital staff	3.60 ± 0.04	-1.890
I-29. To be treated as an individual	3.80 ± 0.03	-2.951
I-30. To feel hospital staff care about your relative	3.90 ± 0.02	-4.757
I-31. To be assured of the comfort of your relative	3.92 ± 0.02	-4.940
I-32. To encouraged to express emotions	3.19 ± 0.05	-0.847
I-33. To be reassured as to what normal emotional responses should be	3.31 ± 0.04	-1.054
I-34. To share emotions with staff	2.98 ± 0.05	-0.579
I-35. To feel there is hope	3.83 ± 0.02	-3.101
I-36. To be told about religious services	2.68 ± 0.06	-0.204
I-37. To have food and refreshments nearby	2.98 ± 0.05	-0.617

Table 1 (continued)

Item	Mean ± SD	Skewness
I-38. To have a telephone in or near the waiting room	3.64 ± 0.03	-1.948
I-39. To have toilet facilities nearby	3.70 ± 0.03	-2.137
I-40. To be able to contact staff at a later date to ask questions	3.72 ± 0.03	-2.235

retention rules and was theoretically meaningful, several factor solutions were rotated and examined. Subsequently, the four-factor solution was used because it satisfied all three criteria. Specifically, with four common factors, the AIC and SBC were the lowest and the TLC was the highest ($TLC = 0.8250$) compared with two or three common factors. Thus, there is little doubt that four factors were appropriate for the data. After selecting a four-factor solution, factor loadings were sorted from the largest to the smallest values for each factor (Table 4). Since no items had factor loadings greater than or equal to 0.30 or loaded onto more than one factor, we retained all 40 items of the original scale. Each factor was then interpreted by examining item content coefficient patterns, and all four factors were labeled the same as in the original Australian study (i.e., family member participation in ED care, organizational comforts, communication with family members, and family member support processes).

3.4. Item analysis and reliability

Finally, the internal reliability for each of the four subscales was estimated using Cronbach's alpha. Item analysis refers to the specific methods used to evaluate individual items in terms of their quality, both qualitatively and quantitatively. The goal is to help scale developers to improve their instruments by revising or discarding items that do not meet a minimally acceptable standard. In the last column of Table 4, headed "Cronbach's alpha if item deleted," the values represent the impact of removing each item from the analysis. These values can be compared to the overall alpha of 0.912, and if any of the values in the column are higher than the overall alpha, the corresponding item should be removed from the scale. As can be seen from the last column, none of the items had values higher than the overall alpha.

The scale homogeneity was in a reasonable range, with the Cronbach's alpha coefficients for the subscales ranging from 0.68 to 0.87. Thus, the subscales were internally consistent. The Cronbach's alpha coefficient of the total CCFNI-ED score was somewhat higher, at 0.91.

3.5. Correlations

Table 5 presents the correlations between the subscales and total scores of the Turkish CCFNI-ED. As can be seen from this table, each subscale of the Turkish CCFNI-ED was significantly correlated with the total scores. Furthermore, significant correlations were demonstrated between the subscales.

Table 2
Means and standard deviations (SD) of the subscales of the Turkish CCFNI-ED ($n = 400$).

Subscales	Mean ± SD	Min	Max
Organizational comforts	3.864 ± 0.272	2.00	4.00
Family member support processes	3.773 ± 0.317	1.14	4.00
Communication with family members	3.475 ± 0.418	1.90	4.00
Family member participation in ED care	3.289 ± 0.537	1.36	4.00
Total	3.549 ± 0.339	1.98	4.00

Table 3
Goodness-of-Fit Indices for the Turkish CCFNI-ED Factor Models.

Index	Value
Goodness of fit index (GFI)	0.7542
GFI adjusted for degrees of freedom (AGFI)	0.7254
Chi-square	2222.9085
Chi-square degrees of freedom (DF)	734
Pr > Chi-square	<0001
The root mean square error of approximation (RMSEA) estimate	0.0713
RMSEA 90% lower confidence limit	0.0713
RMSEA 90% upper confidence limit	0.0747
Bentler's comparative fit index	0.7094
Bentler & Bonett's (1980) non-normed index	0.6912
Bentler & Bonett's (1980) normed fit index (NFI)	0.6912

4. Discussion

There is a need for periodic screening to identify which family members of critical care patients are in distress and require intervention. Simple validated tools that measure critical care family members' needs would be useful in the ED. However, the validity of such tools requires confirmation. To fulfill this purpose, a quick assessment tool to reliably measure family members' needs in Turkey is required. The aim of this study was to determine whether the Turkish CCFNI-ED was a relevant, valid, and reliable instrument for assessing family members' needs in the ED.

In this study, we conducted a CFA using the CCFNI-ED data of a sample of Turkish family members to confirm whether the hypothesized factor structure of the original Australian CCFNI-ED was applicable to Turkish family members. However, the CFA failed to confirm the original factor structure for our sample. Thus, we modified the original scale and identified the model with the best possible fit for Turkish family members.

To the best of our knowledge, the current study is the first to perform a CFA based on the original Australian factor structure in a relatively large Turkish sample. As a result of cultural and health system differences, the results indicate some differences in the factor structures of the CCFNI-ED scale between Turkish and Australian samples. Our findings contribute to existing literature on Turkish culture, and knowledge

of the psychometric properties of such a measure is essential for understanding the nature of the needs and experiences of Turkish family members of critically ill patients. In Turkish society, family plays a major role in patient treatment because of Turkish cultural expectations and obligations. This is consistent with the Turkish social structure, where the family is the most important source of patient support. Specifically, in Turkish culture, all extended and nuclear family members support each other when a family member falls ill and needs support (Özer, Firat & Bektas, 2009), and any family member may serve as a caregiver. Consequently, Turkish family members often believe that they are expected to help their ill family members during their 24-h hospitalization. Furthermore, as a result of the lack of health care personnel, family members are often expected to undertake some patient and hospital operations such as patient care, bringing patients to examinations (e.g., ultrasound, tomography), retrieving results from different units, and obtaining drugs from non-hospital pharmacies. For these reasons, it is important that families are involved in the nursing care process.

The current study is among the first to modify the factor structure of the CCFNI-ED using an EFA. Our study results open up new directions for research because of our use of an EFA to modify the factor structure. Specifically, the EFA enables us to make cross-cultural comparisons of the CCFNI-ED. Although the CFA fit indices of the model were unacceptable, the model appears to capture the distinctiveness of the four CCFNI-ED dimensions.

In our study, all CCFNI-ED items were retained in the Turkish version of the factor structure. In other words, the Turkish version of the CCFNI-ED yielded the best fit when it consisted of 40 items. The results indicate differences in some aspects of the CCFNI-ED factor structure between Turkish and Australian populations. However, to confirm the factor structure derived from our EFA, the present findings must be replicated in other samples.

After the Turkish CCFNI-ED's factor structure was established, its internal consistency was determined. Based on these results, the modified Turkish CCFNI-ED factor structure had satisfactory reliability and internal consistency for the Turkish population. The alpha coefficients for the CCFNI-ED subscales in the Turkish sample were similar to those reported for the subscales in the Australian sample (Redley, 2005).

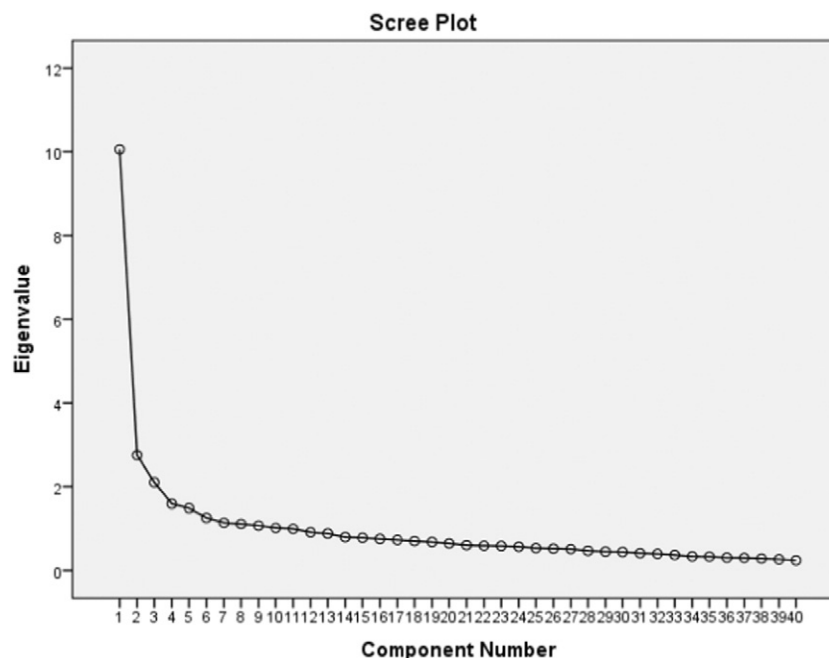


Fig. 1. The scree plot.

Table 4
Four factors with factor loadings for the Turkish CCFNI-ED.

Item	Factor Loadings			α^*
Family member participation in ED care				
I(34) To share emotions with staff	0.696			0.907
I(32) To encouraged to express emotions	0.669			0.909
I(25) To feel helpful to your relative's care	0.644			0.908
I(33) To be reassured as to what normal emotional responses should be	0.631			0.907
I(36) To be told about religious services	0.619			0.912
I(37) To have food and refreshments nearby	0.599			0.909
I(28) To feel accepted by hospital staff	0.575			0.908
I(27) To have time alone with your relative	0.564			0.908
I(23) To be with your relative at any time	0.506			0.908
I(4) To have friends and relatives with you while in the emergency department	0.478			0.909
I(26) To be included when decisions are made	0.414			0.908
I(39) To have toilet facilities nearby	0.391			0.909
I(38) To have a telephone in or near the waiting room	0.363			0.910
I(19) To see your relative as soon as possible	0.362			0.909
Organizational comforts				
I(31) To be assured of the comfort of your relative	0.736			0.911
I(30) To feel hospital staff care about your relative	0.701			0.910
I(17) To be assured that the best care possible has been given to your relative	0.685			0.911
I(11) To talk to a doctor	0.594			0.911
I(35) To feel there is hope	0.584			0.910
I(15) To have questions answered honestly	0.565			0.911
I(29) To be treated as an individual	0.517			0.910
I(16) To be told about transfer plans while they are being made	0.455			0.910
I(40) To be able to contact staff at a later date to ask questions	0.381			0.909
Communication with family members				
I(9) To know why things were done for your relative		0.553		0.911
I(14) To know about the expected outcome		0.531		0.910
I(13) To know about the expertise of staff caring for your relative		0.518		0.909
I(20) To have explanations about the treatment area before going in to see your relative for the first time		0.451		0.909
I(10) To be spared distressing details about your relative's illness or injury		0.450		0.913
I(12) To talk to a nurse		0.439		0.910
I(24) To be given directions regarding what to do at the bedside		0.435		0.909
I(21) To have a staff member with you while visiting your relative		0.413		0.910
I(18) To stay out of the way during your relative's care		0.329		0.912
I(22) To see what was happening to your relative		0.292		0.909
Family member support processes				
I(6) To have explanations given in understandable terms			0.697	0.911
I(1) Have a doctor or nurse meet you on arrival at the hospital			0.665	0.911
I(3) To find out the condition of your relative before being asked to sign papers			0.645	0.912
I(7) To be kept updated frequently			0.627	0.910
I(8) To know all the specific facts concerning your relative's progress			0.577	0.911
I(2) To have a person to care for the family			0.425	0.911
I(5) To have a private place to wait			0.389	0.911
Cronbach's alpha	0.87	0.80	0.74	0.68
% Of variance accounted for after rotation	13.70	10.99	8.76	7.78
Cumulative variance	13.70	24.69	33.46	41.24

* Cronbach's Alpha if item deleted.

This study has a number of strengths. First, it used a multidimensional assessment of the needs of family members of critical care patients in the collectivistic Turkish culture. Second, it recruited enough family members ($n = 400$) to attain sufficient power to perform factor analyses and had an excellent enrollment rate (100%). Finally, it applied an analytical approach (i.e., CFA).

Thus, the CCFNI-ED is a valid and reliable scale for identifying family needs during critical illness in the ED. However, it must be noted that the psychometric properties of the CCFNI-ED have not been evaluated in countries other than Turkey and Australia.

The results of this study suggest that the Turkish version of the CCFNI-ED is a reliable and valid tool for supplementary analysis of the needs of family members of critically ill patients in Turkish EDs. Additionally this study has demonstrated cross-cultural differences in the factor structure of the CCFNI-ED between Turkish and Australian samples.

However, this investigation has several limitations in its scope and applicability. First, family members' perceptions of incidents and their feelings may have been influenced by events or factors such as the morbidity and mortality of the ill relative. Second, there was no concurrent

Table 5
Correlations between the subscales and total scores of the Turkish CCFNI-ED.

	Family member participation in ED care	Organizational comforts	Communication with family members	Family member support processes
Organizational comforts	0.558**			
Communication with family members	0.657**	0.528**		
Family member support processes	0.418**	0.418**	0.454**	
Total	0.925**	0.720**	0.841**	0.610**

** Correlation is significant at the 0.01 level.

validity that could be used to cross-validate the Turkish version of the measure across different groups. Consequently, further work is needed to test the concurrent validity of the CCFNI-ED in relation to other well-established measures with proven cross-cultural validity and reliability. Third, there is no definitive single assessment of cross-cultural equivalence. In other words, confidence in a measure's utility is attained through converging evidence from a number of studies using alternative approaches. Nevertheless, this study has demonstrated some differences in the factor structures of the CCFNI-ED scale between Turkish and Australian samples. As a preliminary study, this research lends only partial support for the relevancy and construct validity of the scale for Turkish family members.

5. Recommendations

Cross-cultural comparisons of the psychometric properties of the CCFNI-ED have been conducted. In research and practice, valid measurement instruments are needed to assess the needs of family members of critical care patients while the family members are in the EDs. The CCFNI-ED scale is simple to administer and nurses using this tool in routine appointments will be better able to identify families' needs in EDs. It also acts as an important instrument to assess the effects of family needs interventions in clinical trials or related research. Thus, this study is important to nursing science development and cross-cultural verification of measurements that foster more universal clinical nursing practices.

Understanding family needs is always important in nursing care research. Additionally, this study is important because it addresses families in health crisis and the use of a screening measure to help identify areas for nursing interventions. Analysis of the data obtained from this tool also provides useful information for clinical practice and research. Furthermore, issues raised in this study, including the differences in family needs by patient outcomes, how needs are influenced by demographic variables, nurses' role in meeting family members' needs, and the impacts of interventions targeting specific family needs, all provide an impetus for future investigations.

Conflict of interest

No conflict of interest has been declared by the author(s).

Contributions

GS and AD was responsible for the study conception and design. GS and AD performed the data collection. GS and MZF performed the data analysis. GS was responsible for the drafting of the manuscript. GS, AD and MZF made critical revisions to the paper for important intellectual content. MZF provided statistical expertise.

References

- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52(3), 317–332. <http://dx.doi.org/10.1007/bf02294359>.
- Al Ghabeeh, S. H., Abu-Snieh, H., Abu-Shahrer, L., Abu-Sneineh, F., & Alhawamdeh, M. (2014). Exploring the self-perceived needs for family members having adult critically ill loved person: Descriptive study. *Health*, 6, 3005–3012. <http://dx.doi.org/10.4236/health.2014.621338>.
- Andrew, D. P. S., Pedersen, P. M., & McEvoy, C. D. (2011). *Research methods in sport management*. Champaign: Human Kinetics, 203–207.
- Benjamin, M., Holger, J., & Carr, M. (2004). Personal preferences regarding family member presence during resuscitation. *Academic Emergency Medicine*, 11(7), 750–753. <http://dx.doi.org/10.1197/j.aem.2004.01.008>.
- Brysiwicz, P. (2008). The lived experience of losing a loved one to a sudden death in KwaZulu-Natal, South Africa. *Journal of Clinical Nursing*, 17, 224–231. <http://dx.doi.org/10.1111/j.1365-2702.2007.01972.x>.
- Chien, W. T., Ip, W. Y., & Lee, I. Y. (2000). Psychometric properties of a Chinese version of the critical care family needs inventory. *Research in Nursing & Health*, 28(6), 474–487. <http://dx.doi.org/10.1002/nur.20103>.
- Critchell, C. D., & Marik, P. E. (2007). Should family members be present during cardiopulmonary resuscitation? A review of the literature. *The American Journal of Hospice & Palliative Care*, 24(4), 311–317. <http://dx.doi.org/10.1177/1049909107304554>.
- Cyprus, B. S. (2013). Using the synergy model of patient care in understanding the lived emergency department experiences of patients, family members and their nurses during critical illness: A phenomenological study. *Dimensions of Critical Care Nursing*, 32(6), 310–321. <http://dx.doi.org/10.1097/DCC.000000000000005>.
- Cyprus, B. S. (2014). The emergency department: Experiences of patients, families, and their nurses. *Advanced Emergency Nursing Journal*, 36(2), 164–176. <http://dx.doi.org/10.1097/TME.000000000000017>.
- Davidson, J. (2009). Family-centred care: Meeting the needs of patients' families and helping families adapt to critical illness. *Critical Care Nurse*, 29(3), 28–34. <http://dx.doi.org/10.4037/ccn2009611>.
- Emergency Nurses Association; Health Resources and Services Administration, Maternal and Child Health Bureau (2007's). *Assessment of family-centered care in the emergency department*. (Available from: www.ena.org/pdf/Guidelines.PDF Accessed November 6).
- Emergency Nursing Resources (ENA) Development Committee (2012). *Clinical practice guideline: Family presence during invasive procedures and resuscitation [Internet]*. Des Plaines, concurrent validity II: ENA ([cited 2012 Mar 10]. Available from: <https://www.ena.org/practice-research/research/CPG/Pages/Default.aspx>).
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272–299. <http://dx.doi.org/10.1037/1082-989X.4.3.272>.
- Guadagnoli, E., & Velicer, W. F. (1988). Relation to sample size to the stability of component patterns. *Psychological Bulletin*, 103, 265–275. <http://dx.doi.org/10.1080/01446190601001620>.
- Horn, E. V., & Tesh, A. (2000). The effect of critical care hospitalization on family members: Stress and responses. *Dimensions of Critical Care Nursing*, 19(4), 40–49. <http://dx.doi.org/10.1097/00003465-200019040-00014>.
- Hung, M. S., & Pang, S. M. (2011). Family presence preference when patients are receiving resuscitation in an accident and emergency department. *Journal of Advanced Nursing*, 67(1), 56–67. <http://dx.doi.org/10.1111/j.1365-2648.2010.05441>.
- Kercher, E. E. (1991). Crisis intervention in the emergency department. *Emergency Medicine Clinics of North America*, 9(1), 219–232.
- Lee, L. Y. K., & Lau, L. L. (2000). Immediate needs of adult family members of adult intensive care patients in Hong Kong. *Journal of Clinical Nursing*, 12(4), 490–500. <http://dx.doi.org/10.1046/j.1365-2702.2003.00743.x>.
- Leske, J. S., McAndrew, N. S., & Brasel, K. J. (2013). Experiences of families when present during resuscitation in the emergency department after trauma. *Journal of Trauma Nursing*, 20, 77–85. <http://dx.doi.org/10.1097/JTN.0b013e31829600a8>.
- Li, S. P., Chan, C., & Lee, D. (2002). Helpfulness of nursing actions to suddenly bereaved family members in an accident and emergency setting in Hong Kong. *Journal of Advanced Nursing*, 40(2), 170–180. <http://dx.doi.org/10.1046/j.1365-2648.2002.02359.x>.
- Maclean, S. L., Guzzetta, C. E., White, C., Fontaine, D., Eichhorn, D. J., Meyers, T. A., & Désy, P. (2003). Family presence during cardiopulmonary resuscitation and invasive procedures: Practices of critical care and emergency nurses. *Journal of Emergency Nursing*, 29(3), 208–221. <http://dx.doi.org/10.1067/men.2003.100>.
- Madden, E., & Condon, C. (2007). Emergency nurses' current practices and understanding of family presence during CPR. *Journal of Emergency Nursing*, 33, 433–440. <http://dx.doi.org/10.1016/j.jen.2007.06.024>.
- Murphy, F., & Nightingale, A. (2002). Accident and emergency nurses as researchers: Exploring some of the ethical issues when researching sensitive topics. *Accident and Emergency Nursing*, 10(2), 72–77. <http://dx.doi.org/10.1054/aaen.2001.0342>.
- Nikki, L., Lepistö, S., & Paavilainen, E. (2012). Experiences of family members of elderly patients in the emergency department: A qualitative study. *International Emergency Nursing*, 20(4), 193–200. <http://dx.doi.org/10.1016/j.ienj.2012.08.003>.
- Özer, Z. C., Firat, M. Z., & Bektas, H. A. (2009). Confirmatory and exploratory factor analysis of the caregiver quality of life index-cancer with Turkish samples. *Quality of Life Research*, 18(7), 913–921. <http://dx.doi.org/10.1007/s11136-009-9503-1>.
- Redley, B. (2005). *Psychosocial care of family of critically ill patients in emergency departments [dissertation]*. Melbourne: Deakin University.
- Redley, B., & Beanland, C. (2004). Revising the critical care family needs inventory for the emergency department. *Journal of Advanced Nursing*, 45(1), 95–104. <http://dx.doi.org/10.1046/j.1365-2648.2003.02865>.
- Redley, B., & Hood, K. (1996). Staff attitudes towards family presence during resuscitation. *Accident and Emergency Nursing*, 4, 145–151. [http://dx.doi.org/10.1016/S0965-2302\(96\)90062-4](http://dx.doi.org/10.1016/S0965-2302(96)90062-4).
- Redley, B., Levasseur, S. A., Peters, G., & Bethune, E. (2003a). Families' needs in emergency departments: instrument development. *Journal of Advanced Nursing*, 43(6), 606–615. <http://dx.doi.org/10.1046/j.1365-2648.2003.02759>.
- Redley, B., Beanland, C., & Botti, M. (2003b). Accompanying critically ill relatives in emergency departments. *Journal of Advanced Nursing*, 44(1), 88–98. <http://dx.doi.org/10.1111/j.1742-6723.2004.00620.x>.
- Redley, B., Botti, M., & Duke, M. (2004). Family member presence during resuscitation in the emergency department: An Australian perspective. *Emergency Medicine Australasia*, 16(4), 295–308. <http://dx.doi.org/10.1046/j.1365-2648.2003.02771.x>.
- Rose, P. A. (1995). The meaning of critical illness to families. *The Canadian Journal of Nursing Research*, 27, 83–87.
- Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, 6(2), 461–464. <http://dx.doi.org/10.1214/aos/1176344136>.
- Shultz, K. S., & Whitney, D. J. (2004). *Measurement theory in action, case studies and exercises*. California: Sage Publications.

- Sorocco, L. L., Tolson, D., & Fleming, V. (2001). Exploring Spanish emergency nurses' lived experience of the care provided for suddenly bereaved families. *Journal of Advanced Nursing*, 35, 562–570. <http://dx.doi.org/10.1046/j.1365-2648.2001.01872.x>.
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38(1), 1–10.
- Waltz, C. F., Strickland, O. L., & Lenz, E. R. (2010). *Measurement in Nursing and Health Research*. New York: Springer Publishing Company, 176–178.
- Washington, G. T. (2001). Families in crisis. *Nursing Management*, 32(5), 28–32. <http://dx.doi.org/10.1097/00006247-200105000-00013>.
- Wentzel, D., & Brysiewicz, P. (2014). The consequence of caring too much: Compassion fatigue and the trauma nurse. *Journal of Emergency Nursing*, 40(1), 95–97. <http://dx.doi.org/10.1016/j.jen.2013.10.009>.
- Wisten, A., & Zingmark, K. (2007). Supportive needs of parents confronted with sudden cardiac death—a qualitative study. *Resuscitation*, 74(1), 68–74. <http://dx.doi.org/10.1016/j.resuscitation.2006.11.014>.
- Zalenski, R., Gillum, R. F., Quest, T. E., & Griffith, J. L. (2006). Care for the adult family members of victims of unexpected cardiac death. *Academic Emergency Medicine*, 13(12), 1333–1338. <http://dx.doi.org/10.1197/j.aem.2006.06.029>.