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Development and psychometric properties of the Caring Behaviors Assessment Tool Nursing Version-Short Form

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Abstract

Objectives: To develop and examine the psychometric properties of the Caring Behaviors Assessment Tool Nursing Version-Short Form (CBAN-SF) based on the Theory of Human Caring to assess the nurses' perceptions about caring behaviors.
Design: This study is based on the Consensus-based Standards for the Selection of Health Measurement Instruments checklist.
Setting: The study was conducted at the medical-surgical services of Akdeniz University Hospital between October 2019 and January 2020.
Participants: This study was conducted with 216 nurses working in the surgery and internal clinics.
Main Outcome Measures: Psychometric properties of the Turkish version of the CBAN-SF with 27 items.
Results: It was found that the Content Validity Index (CVI) for the items of the draft scale was between 0.972 and 1.00 and the instrument's CVI had an average score of 0.994. The CBAN-SF had good fit indexes (chi-square goodness of fit / degrees of freedom = 2.914, root mean square error of approximation = 0.075, comparative fit index = 0.984, non-normed fit index = 0.983, normed fit index = 0.972 and standardized root mean square residuals = 0.054) in structural validity. For internal consistency, the Cronbach's alpha, Spearman–Brown and the Guttman split-half coefficients were all 0.974. The Cronbach's alpha coefficient for the seven subfactors of the scale ranged between 0.793 and 0.904 and had acceptable internal consistency. The item-total score correlation of the scale was 0.648–0.829, and the factor loadings were 0.455–0.769.
Conclusion: The structural validity, internal consistency and content validity of the CBAN-SF supported to be a reliable and valid tool for assessment of caring behaviors by nurses.

Key words: Caring Behaviors Assessment Tool Nursing Version-Short Form, Theory of Human Caring, Nursing, psychometric properties

Introduction

Caring behaviors are defined as all verbal and nonverbal interventions performed by nurses in the caring process. Caring behaviors are specifically defined by Watson [1] in the Theory of Human Caring. According to Watson [2], caring behaviors are defined being understanding, smiling, touching, effective listening, empathy, accepting emotions, respecting the privacy and individuality of the patient. Additionally, the Theory of Human Caring emphasizes that encouraging patients to believe in themselves, helping them to understand their own feelings, providing sufficient information about their

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illness/health, being willingness and readiness to provide nursing care are caring behaviors [1, 2]. In addition, these behaviors coincide with the themes of metasynthesis and systematic review studies examining the concept of care [3–6]. The caring behaviors increase nurses' feelings of self-accomplishment, self-confidence, emotional well-being and professional satisfaction, thus increasing the quality of care provided to patients [7].

Evaluation of caring behaviors by nurses

To assess the nurses' perceptions about caring behaviors enables monitoring the caring quality, implementation of necessary regulations and improvements regarding the caring process [8]. Caring behaviors are known to evaluate through three scales such as 'Caring Behaviors Inventory (CBI)-24' [9], 'Caring Behavior Measurement (CBM)' [10] and 'Caring Behaviors Assessment (CBA)' Tool [11] in the literature.

CBI was developed by Wolf in 1994 and included 75 items [12]. Then, CBI-24 was developed and it had four subfactors: 'assurance of human presence,' 'knowledge and skill,' 'respectful deference to others' and 'positive connectedness' [9]. The Turkish version of the CBI-24 scale was developed by Kurşun and Kanan [13]. Although the CBI-24 is widely used to assess the nurses' and patients' perceptions about caring behaviors in the literature [14], the 'assurance of human presence' and 'knowledge and skill' subfactors focused more on the technical aspect of caring. Similarly, CBM was first developed by Lee-Hsieh in 2002 and had 48 items [15]. CBM was then revised to consist of 28 items and 2 subfactors, namely 'sincerity, empathy and respect' and 'professional caring behaviors', and it contained only 1 subfactor that focused on caring behaviors [10]. Moreover, the CBM had limited use to assess the nurses' and patients' perceptions about caring behaviors in the literatüre [14].

Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) recommends that the origin of the measurement tool construct should be clear about using a theory, a conceptual framework or a model [16]. But, CBI [9] and CBM [10] scales were not based on any nursing theory. Only the CBA tool was based on the Watson's Theory of Human Caring, which is a nursing theory [11]. It is important to evaluate the nurses' views on their caring behaviors with a valid and reliable measurement tool, which is based on a nursing theory with a theoretical basis [17]. The CBA scale was developed by Cronin and Harrison and consists of 7 subfactors and 63 items [11]. Akgün et al. developed the Caring Behaviors Assessment Tool Patient Version-Short Form (CBAP-SF) consisting of 7 subfactors and 27 items [18]. The subfactors of CBA categorize caring behaviors according to the caritas processes described in the Theory of Human Caring. CBAP-SF was observed to focus more on evaluating the nurses' caring behaviors and the frequency of these behaviors rather than technical accuracy. COSMIN recommends that feasibility and interpretability aspects should be taken into consideration in the selection of the most appropriate scale in case of instruments that are very difficult to differentiate in terms of quality. Feasibility is the ease of application of the scale such as the completion time, length of the scale, and type and ease of administration. Interpretability is defined as the degree to which one can assign qualitative meaning to quantitative scores [19]. The CBA scale is thought to be preferable to other scales to assess the nurses' perceptions about caring behaviors since its items are based on Watson's the Theory of Human Caring.

In the literature, three studies have been found to evaluate own caring behaviors by nurses using CBA nursing version [20–22]. In these studies, the most important caring behaviors were determined as 'to treat patients individually' for Saudi nurses in medical-surgical services [20], 'to answer patients' questions clearly' for Jordanian nurses in coronary care units [21] and 'knowing what you are doing' for Irish nurses in critical care units [22]. Studies show that the most important caring behaviors perceived by nurses vary in different countries, cultures and clinical settings [20–22]. Personal values are shaped by societies and culture, and thus, the personal values of nurses and patients affect nursing care [13, 23]. Systematic reviews emphasize that the caring behaviors practiced by nurses are influenced by cultural factors such as ethnicity and religion [24, 25].

In Turkey, Akgün et al. adapted the CBA patient version with 63 items to Turkish and then the CBAP-SF with 27 items was developed [18]. However, no adaptation study has been carried out regarding the use of the CBA scale to evaluate the caring behaviors that are considered important from a nurse perspective. Besides, the length of any scale is proven to be important for applicability in pratice [26]. For example, as the number of items increases in scales, the number of missing data increases and items are evaluated more carelessly by the participants. Accordingly, the CBAP-SF was used to develop the Caring Behaviors Assessment Tool Nursing Version-Short Form (CBAN-SF) in this study. It would be very beneficial in future studies to develop the nursing version of the CBAP-SF based on the nursing theory and the comprehensive assessment of caring behaviors of researchers and nurses. The aim of this study was to develop the CBAN-SF and to examine the psychometric properties of this new instrument.

Methods

Study design

In this study, the CBAN-SF was developed, and its psychometric properties were evaluated. The study design was based on the COSMIN methodology [16, 19, 27].

Participants and sampling

The study was conducted with nurses working at the surgery and internal medicine clinics of Akdeniz University Hospital between October 2019 and January 2020. Participants were selected using a nonprobability sampling method. It is recommended that the sample size should be 5–10 times as high as the number of the items in scale adaptation studies [28]. Therefore, the sample size was calculated to be as 216, which is 8 times of the 27 items in CBAP-SF.

The sample of the study consisted of female and male nurses. Inclusion criteria were nurses who (i) volunteered to participate in the study, (ii) have worked in the medical-surgical services and (iii) have been working for >6 months in the current clinic. Exclusion criteria were nurses (i) who do not actively care for in an emergency and outpatient clinic and (ii) whose mother tongue is not Turkish with communication barrier.

Data collection

The data were obtained through an online survey developed by researchers using the Google Forms. An online survey was prepared by the researchers because the leisure time spent by the nurses during the working hours is short and the hospital environment made it difficult for them to focus on data collection forms. The nursing directorate of Akdeniz University Hospital was informed about the research, and data collection forms were sent to nurses via WhatsApp groups. The consent form was obtained by the participants'

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approval of button 'I agree to participate in the study' on the online survey. After the consent form is approved by participants, the online data collection forms of the study appear on the screen. Also, the data collection process was supported by face-to-face interviews. As a result, the sample of the study consisted of a total of 216 nurses, 17 (7.87%) of them with face-to-face interviews and 199 (92.13%) using the online platform. In this study, 20 nurses refused to participate in data collection process with the face-to-face interview. In addition, data from 12 nurses were not included in the study because of the missing data obtained from the online platform.

Personal information form

The personal information form was structured by the researchers based on the relevant literature [20–22]. The form consisted of 10 questions, including sociodemographic characteristics of the nurses, such as age, gender, educational status and career information.

Caring behaviors assessment tool patient version

The CBA was developed by Cronin and Harrison to investigate patients' and nurses' perceptions about caring behaviors [11]. The CBA tool is based on Watson's the Theory of Human Caring including caritas process. The CBA tool consists of 63 items depicting caring behaviors. Items are clustered into seven subfactors: humanism/faith/sensitivity, helping/trust, expression of positive/negative feelings, teaching/learning, supportive/protective/corrective environment, human needs assistance and existential/phenomenological/spiritual forces. The first subfactor of the CBA was 'humanism/faith/sensitivity,' including the first three of the Watson's caritas process. During the caring process, the sixth caritas process of Watson (creative problem-solving caring process), which has a dominance on all the caring behaviors, was believed to be a process that was inherent in all aspects of nursing care, and thus imperceptible to patients. Therefore, this factor was deleted as a subfactor by the original authors of the scale [29].

The Turkish adaptation of the CBA was conducted by Akgün et al. Then, a 27-item short form patient version of the scale (CBAP-SF) was developed by Akgün et al. The Cronbach's alpha was 0.96 for the CBAP-SF [18]. The CBAP-SF was used in this study.

Development of CBAN-SF

The CBAN-SF was developed by the researchers after getting permission from Cronin and Harrison, the original authors of the scale. The relevant literature on the nurse version of the scale was examined [20–22], and the Turkish version of the CBAN-SF was prepared by benefitting from the expert opinion of the original author of the scale.

The self-reported patient items in CBAP-SF were modified so that the assessment subject was the nurse, providing an opportunity for nurses to evaluate their own caring behaviors. The CBAP-SF was modified to investigate nurses' perceptions on caring behaviors. For example, item from the original CBAP-SF 'Treats me as an individual' was modified to 'I treat patients as an individual' in the CBAN-SF.

CBAN-SF consists of seven subfactors and 27 items. The 5-point Likert-type scale evaluates the importance of different caring behaviors from a nurse perspective from 1 'least important' to 5 'most important.' The lowest possible score is 27, and the highest possible score is 135. The scale does not have a determined cut-off value, but it is indicated that a higher score indicates a more positive perception of nursing behaviors. The cultural adaptation process of the scale was conducted in three stages: (i) content validity, (ii) preliminary application and (iii) linguistic validity.

Content validity

The CBAN-SF draft scale prepared by the researchers was sent to six nurse academicians, who used Watson's the Theory of Human Caring in nursing education and practices, in order to get expert opinion. Davis technique was applied for content validity. The Davis technique ranks the opinions of the experts as (i) 'extremely suitable,' (ii) 'very suitable,' (iii) 'somewhat appropriate' and (iv) 'unsuitable.' The Content Validity Index (CVI) is calculated by dividing the number of experts marking options (i) and (ii) by dividing the total number of experts for items in this technique [30]. The CVI for the items of the draft scale was between 0.97 and 1.00 with an average score of 0.99. At this stage, minor revisions were made in four items of draft scale according to expert's opinions, finalizing the CBAN-SF.

The preliminary application

The preliminary application of CBAN-SF, which was organized in line with the recommendations of experts, was carried out with five nurses. The results obtained from the preliminary application are not included in this study. It was identified that there are no misunderstood questions on the scale as a result of the preliminary application.

Linguistic validity

Translation of the CBAN-SF from Turkish to English was carried out by researchers and two specialized linguists. The scale items translated into English were re-examined by two specialist linguists, and CBAN-SF was compared. In the comparison, it was determined that there was no change in the meaning of the items, and thus, the linguistic validity was completed for CBAN-SF. Finally, the CBAN-SF was translated into English and sent to original authors of the scale.

Ethical considerations

Permission was obtained from Cronin by e-mail to develop the CBAN-SF from the CBAP-SF. This study was approved by the Akdeniz University Clinical Research Ethics Committee (number 687, 10 July 2019), and application approval was obtained from the hospital. The consent of the participants was obtained using the web-based form based on the Helsinki Declaration. Due to the privacy policy, no identifying information was requested from the participants.

Data analysis

Data were analyzed with Statistical Package for Social Sciences 23.00 (SPSS) for Windows. The validity on the CBAN-SF was tested using confirmatory factor analysis (CFA). The CFA was calculated by using Linear Structural Relations 8.80 (LISREL 8.80).

Sociodemographic data were analyzed by using the frequency, mean and standard deviation through SPSS 23.00. Using the CBAN-SF total scores, the kurtosis value of the scale was calculated to be 8.300 and the skewness −2.102, indicating nonnormal data distribution. Therefore, the relationship between the subfactors and the correlation between the scores obtained according to data collection methods were analyzed with nonparametric tests.

The Cronbach's alpha coefficient, Guttman split-half method and item-total correlation were analyzed for internal consistency. The Cronbach's alpha coefficient was calculated in order to evaluate the internal consistency of the scale: values >0.7 were considered acceptable [16, 19, 27].

The structural validity of the scale was evaluated with CFA. The goodness of fit indexes, which are independent evaluation criteria

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Table 1 Factor loadings and item-total correlations for the CBAN-SF

CBAN-SF	Mean ± standard deviation	Factor loading	Item-total correlation	Cronbach's alpha
Factor 1: Humanism/faith-hope/sensitivity	18.15 ± 2.21			0.854
1. I treat patients as individual.	4.75 ± 0.57	0.558	0.686	
2. I encourage my patients to believe in themselves.	4.48 ± 0.69	0.605	0.746	
3. I praise the efforts of the patients.	4.53 ± 0.69	0.520	0.695	
4. I know when patients have 'had enough' and act accordingly (for example: limiting visitors).	4.39 ± 0.70	0.492	0.671	
Factor 2: Helping/trust	17.61 ± 2.37			0.793
5. I introduce myself to patients.	4.43 ± 0.76	0.455	0.648	
6. I answer quickly (go to their rooms) when patients call for me.	4.52 ± 0.69	0.548	0.675	
7. I touch my patients when they need comfort.	4.22 ± 0.90	0.483	0.663	
8. I do on time what I say to patients I will do.	4.43 ± 0.66	0.561	0.711	
Factor 3: Expression of positive/negative feelings	12.87 ± 1.99			0.812
9. I encourage my patients to talk about how they feel.	4.31 ± 0.74	0.709	0.792	
10. I help patients to understand their own feelings.	4.19 ± 0.81	0.720	0.763	
11. I maintain my care even when my patients are difficult to get along with.	4.36 ± 0.78	0.516	0.659	
Factor 4: Teaching/learning	16.89 ± 2.87			0.893
12. I encourage patients to ask questions about their illness and treatment.	4.22 ± 0.88	0.616	0.686	
13. I answer patients' questions clearly and inform them.	4.47 ± 0.74	0.609	0.734	
14. I help patients to set goals for their health/disease.	4.11 ± 0.86	0.769	0.756	
15. I help patients to plan ways to meet those goals.	4.09 ± 0.84	0.737	0.728	
Factor 5: Supportive/protective/corrective environment	27.13 ± 3.30			0.904
16. I offer things (for example: changes in sleeping positions, blankets, back rub, lighting) to make patients more comfortable.	4.51 ± 0.70	0.595	0.740	
17. I explain safety precautions to patients and their families.	4.43 ± 0.71	0.567	0.713	
18. I encourage patients to do what they can for themselves.	4.38 ± 0.74	0.725	0.829	
19. I respect modesty of patients (for example: keeping them covered).	4.75 ± 0.54	0.748	0.727	
20. I consider the spiritual needs of patients.	4.45 ± 0.70	0.575	0.696	
21. I treat patients kindly and genially.	4.61 ± 0.64	0.691	0.744	
Factor 6: Human needs assistance	13.86 ± 1.70			0.845
22. I help them with their care until they are able to do it for themselves.	4.50 ± 0.69	0.593	0.733	
23. I give the patient medications and treatments on time by knowing how to give injections, intravenous solutions, etc.	4.77 ± 0.56	0.753	0.714	
24. I check their condition very closely.	4.59 ± 0.69	0.607	0.739	
Factor 7: Existential/phenomenological/spiritual forces	12.88 ± 1.93			0.854
25. I sense how patients feel.	4.29 ± 0.72	0.575	0.734	
26. I help patients to see that their past experiences are important.	4.20 ± 0.78	0.683	0.778	
27. I help patients to feel good about themselves.	4.38 ± 0.68	0.611	0.743	
Total CBAN-SF	119.40 ± 14.54			0.974

were used for CFA. Although there is no judgment in the literature on which of these fit indexes to use, the most commonly used are chi-square goodness of fit / degrees of freedom ($\chi 2$/df), root mean square error of approximation (RMSEA), comparative fit index (CFI), non-normed fit index (NNFI), normed fit index (NFI), and standardized root mean square residuals [16, 19, 27]. Goodness of fit indexes are evaluated as poor, acceptable and excellent based on cut-off values [31].

The readability level of the scale was calculated by using the 'Measurement of Turkish Readability' formula. This formula, which was developed by Ateşman based on Flesch's 'Reading Ease' formula, examines the length of 'sentence' and 'word' [32]. A higher score means that the text is more readable. Readability scores between 90 and 100 are considered 'very easy'; between 70 and 89, 'easy'; between 50 and 69, 'medium difficulty'; between 30 and 49, 'difficult' and between 1 and 29, 'Very difficult' [32].

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Results

Sample characteristics

The mean age of nurses was 33.64 ± 6.71 years old (min = 20, max = 53); 94.5% of the nurses were females; 76.0% were high school graduates and 60.4% were married. It was determined that the average nursing experiences of the participants was 11.27 ± 7.24 (min = 1, max = 32) years, and the average duration of working in the current clinic was 2.36 ± 1.00 (min = 1, max = 5) years; 77.9% of the participants were determined to do the nursing profession willingly, and 86.2% of them were willingly working in the current clinic. The nurses (69.6%) have worked both day and night shift and the average weekly working time was 43.36 ± 4.47 (min = 40, max = 60).

CBAN-SF scores

The mean total CBAN-SF score of the 216 nurses was 119.40 ± 14.54 (min = 27, max = 135), and the mean total CBAN-SF score collected by face to face ($n = 17$) was 120.00 ± 6.15 (min = 108, max = 135) and online ($n = 199$) was 110.49 ± 13.87 (min = 25, max = 125). However, the difference between the total scores of collected by face to face and online was not statistically significant ($z = -0.222$, $P = 0.825$). The caring behaviors item with the highest average score (4.77 ± 0.56) was 'I give the patient medications and treatments on time by knowing how to give injections, intravenous solution (IVs), etc.' and the item with the lowest average score (4.09 ± 0.84) was 'I help patients to plan ways to meet those goals' (Table 1).

The results of structural validity analysis

In this study, CFA was used in order to confirm the fitness of the factors and to evaluate the structural validity of the scale. In CFA, it is initially expected that the significance of the difference (value) should be sought between the expected covariance matrix and the observed covariance matrix, in other words the *P*-value, and it is expected that the *P*-value should be significant [33]. In this study, the value of the difference between the expected covariance matrix and the observed covariance matrix was determined as $P = 0.000$. The difference between the expected covariance matrix and the observed covariance matrix was significant. Goodness of fit indexes concerning the model were evaluated based on Brown [31] and Prinsen et al. [28] in Table 2.

The goodness of fit indexes that should be firstly evaluated in the CFA is the $\chi 2$/df. In this study, the $\chi 2$/df was determined as 2.91 ($\chi 2 = 881.73$; df = 303; $P < 0.001$). Brown claims that the RMSEA and SRMR should be <0.06 and <0.08 respectively; SRMR suggests that CFI, NFI and NNFI values should be >0.90 with values closer to 1.00 indicating a better model fit [31]. The goodness of fit statistics were determined as RMSEA = 0.075, CFI = 0.984, NNFI = 0.983, NFI = 0.972 and SRMR = 0.054 for the CBAN-SF; this indicated satisfactory fit indexes for the structure of the scale with 7 subfactors.

Also, the readability level of the CBAN-SF scale was determined to be 39.63. This scale is considered 'difficult' in terms of readability [32].

Table 2 CFA for the CBAN-SF

Indexes	Cut-off criteria			Results	Interpretation
	Poor	Acceptable	Excellent		
$\chi 2$/df	>5	>3	>1	2.914	Excellent
RMSEA	>0.08	>0.06	<0.06	0.075	Acceptable
CFI	<0.90	>0.90	>0.95	0.984	Excellent
NNFI	<0.90	>0.90	>0.95	0.983	Excellent
NFI	<0.90	>0.90	>0.95	0.972	Excellent
SRMR	>0.10	>0.08	<0.08	0.054	Excellent

The results of internal consistency analyses

The Cronbach's alpha reliability coefficient of the CBAN-SF was 0.974, suggesting high reliability. Additionally, Spearman–Brown and Guttman split-half coefficient was similarly 0.974. The Cronbach's alpha was 0.854 for the subfactors 'Humanism/Faith-hope/Sensitivity,' 0.793 for the subfactor 'Helping/trust,' 0.812 for the subfactor 'Expression of positive/negative feelings,' 0.893 for the subfactor 'Teaching/learning,' 0.904 for the subfactor 'Supportive/protective/corrective environment,' 0.845 for the subfactor 'Human needs assistance,' and 0.854 for the subfactor 'Existential/phenomenological/spiritual forces' (Table 1).

In order to examine the relationship between the scores for items of the CBAN-SF and the total score of the scale, the item-total correlation coefficients were used. Also, factor loads of the scale items were analyzed. For the factor loading and item-total correlation coefficients, the recommendation that the acceptable coefficient is >0.20 is taken into consideration [16, 19, 27]. The reliability results for the items are shown in Table 1. While item-total correlation coefficients of the CBAN-SF ranged between 0.648 and 0.829, factor loadings of the CBAN-SF ranged between 0.455 and 0.769. Also, if item deleted, the Cronbach's alpha coefficient of each item was found to be 0.974. Thus, item-total correlation coefficients and factor loadings were not lower than 0.20 for any of the items.

The correlation coefficients between subfactors were evaluated [33]. There was a statistically significant, positive, moderate and strong correlation between the subfactors of CBAN-SF ($r = 0.606$–0.742; $P = 0.000$).

Discussion

This study makes an important contribution to the literature because of examining the psychometric properties of this scale based on the Theory of Human Caring. When measuring and evaluating the importance of different caring behaviors from a nurse perspective, it is of vital importance to use a measurement tool based on nursing theory reflecting the caring behaviors. In this study, the most important caring behavior perceived by Turkish nurses is 'I give the patient medications and treatments on time by knowing how to give injections, intravenous solution (IVs), etc.' It was also observed that this behavior was perceived as the most important behavior by Irish nurses [22]. However, it was determined that the least important caring behaviors perceived by Saudi [20], Jordanian [21], Irish [22], and Turkish nurses are not similar.

Structural validity

The structural validity of the CBAN-SF scale with 27-items was assessed through the CFA. The CFA is used in the evaluation of structural validity and gives an idea about the extent that the existing data can explain the variables to be measured [34]. In the evaluation of the CFA, independent evaluation criteria were used. These values, named as goodness of fit indexes, ensured judgment on whether each model as a whole is supported at an acceptable level by the data [16, 19, 27, 34]. In this study, it was determined that the model was an acceptable model according to the goodness of fit indexes of

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Table 3 Correlation between the subfactors of CBAN-SF

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Factor 1	1	$r=0.619$ $P=0.000$	$r=0.691$ $P=0.000$	$r=0.619$ $P=0.000$	$r=0.689$ $P=0.000$	$r=0.660$ $P=0.000$	$r=0.635$ $P=0.000$
Factor 2	—	1	$r=0.736$ $P=0.000$	$r=0.652$ $P=0.000$	$r=0.728$ $P=0.000$	$r=0.670$ $P=0.000$	$r=0.633$ $P=0.000$
Factor 3	—	—	1	$r=0.742$ $P=0.000$	$r=0.738$ $P=0.000$	$r=0.626$ $P=0.000$	$r=0.682$ $P=0.000$
Factor 4	—	—	—	1	$r=0.714$ $P=0.000$	$r=0.606$ $P=0.000$	$r=0.716$ $P=0.000$
Factor 5	—	—	—	—	1	$r=0.700$ $P=0.000$	$r=0.711$ $P=0.000$
Factor 6	—	—	—	—	—	1	$r=0.707$ $P=0.000$
Factor 7	—	—	—	—	—	—	1

the CBAN-SF. The confirmatory factor analyses were not examined in English [22] and Arabic version [20] of the CBA nursing version with 63 items.

Internal consistency

The Cronbach's alpha coefficient of the CBAN-SF was determined as 0.974, which indicates that the scale has a high reliability. Similarly, the Cronbach's alpha was determined as 0.91 in the Arabic version of the CBA nursing version with 63 items [20]. However, the total Cronbach's alpha was not reported in the English version of the CBA nursing version with 63 items As a result, the reliability coefficient of this scale that can be accepted as sufficient should be as close as 1 in this study [16, 19, 27].

The Cronbach's alpha coefficients for the subfactors of the CBAN-SF scale varied between 0.793 and 0.904. However, the Cronbach's alpha coefficients on the subfactors of the scale with 63 items in English version varied between 0.75 and 0.90 [22] and between 0.70 and 0.93 in the Arabic version of the scale with 63 items [20]. Prinsen et al. reported that the subfactors of the scale should have Cronbach's alpha coefficient >0.70 [27]. As a result, the internal consistency reliability of these subfactors was found to be different between cultures.

Item-total correlation is the second method in testing the internal consistency of measurement tool [34]. The item-total correlation values of the CBAN-SF varied between 0.648 and 0.829 in this study (Table 3). Although there are opinions to support that it should be at least 0.20, the most accepted value is 0.25 [16, 19, 27, 34]. In recent studies, this value is accepted as 0.30 for higher reliability. The higher the correlation coefficient, the higher the reliability of the models [16, 19, 27]. As a result, the scale items were sufficient to explain the factor to be measured. In the CBA nursing version with 63 items developed in English [22] and Arabic [20], item-total correlation values of the scale items were not reported.

Limitations of the study

This study has some limitations. One of the limitations is that test–retest reliability could not be performed because it was not possible to re-reach the nurses from whom the data were collected. The other limitation is that the CBAN-SF was not supported using a parallel measurement tool used to evaluate caring behaviors. Also, this study used self-reported data, which may limit the validity of findings as nurses may have various reasons affecting their responses. The last limitation was that the CBAN-SF was difficult for the readability level.

Conclusion

This study provides support for the structural validity and internal consistency of the CBANSF scale developed to evaluate caring behaviors by nurses. Also, the CBAN-SF was a useful tool for general nurse population and an important contribution to introduce Watson's Theory of Human Caring to the world of those who do not speak English.

Additionally, the fact that the caring behaviors perceived as important by nurses are parallel to those perceived as important by patients indicates that the theory is successfully implemented. We recommend that the nurse and patient versions of the scale be used together in studies aiming to evaluate nurses' caring behaviors.

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Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Contributorship

I.B. and Z.O. designed the study and prepared manuscript. M.A. and S.T.K. collected the data. M.A., S.T.K. and I.B. analyzed the data. M.A. and I.B. prepared the manuscript. All authors approved the final version for submission and are in agreement with the content of the manuscript.

Data availability statement

The data underlying this article will be shared on reasonable request to the corresponding author.

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