

# Development and preliminary validation of a brief Nurses' Perceived Professional Benefit Questionnaire (NPPBQ)

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## Research article

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# Abstract

**Objective** To develop and psychometrically test a brief Nurses' Perceived Professional Benefit Questionnaire (NPPBQ). **Design** A cross-sectional study. **Methods** After expert consultation and nurse interviews, a primary questionnaire was developed for exploratory factor analysis(EFA). Seventeen items NPPBQ were used for a verification of content validity and the theorized factor structure using confirmatory factor analysis (CFA). The NPPBQ's concurrent validity was evaluated. Three samples with nurses were collected in Shanghai, Hangzhou and Nanjing between November 2017-August 2018. **Results** The results of EFA and CFA verified five dimensions of nurses' occupational benefit discovery. The results demonstrated adequate internal consistency of the NPPBQ and its fully consistent with theorized factor structure. This 5-factor solution explaining adequate percent of the total variance was supported. The Cronbach's alpha for each dimension of the NPPBQ was good. Concurrent validity with every aspect of the MBI showed significant correlation. **Conclusions** The results suggests that the NPPBQ is a psychometrically sound measure for evaluating perceived professional benefits in a wide range of nurses.

## Impact

- A new composite questionnaire has been developed to measure registered nurses' perceptions of professional benefits in practice.
- This study suggests that the NPPBQ is a valid and reliable measure
- The NPPBQ may assist nursing managers in exploring and improving staff perceptions towards professional benefits by enhancing the assessment of the NPPB and monitoring its changes in practice.
- Future work using NPPBQ could explore correlations between nurses' NPPB levels and other related variables, such as nurses' job satisfaction.

## Introduction

Nurses' perceived professional benefits (NPPB) refer to nurses' perceptions of the gains and benefits they receive in their profession in the process of employment and the belief that engaging in the nursing profession can promote their all-round growth and development[1, 2], An appropriate sense of professional gain makes significant contributions to the improvement of job satisfaction and the will to stay of nurses and the retention of nursing staff [3, 4] but is poorly understood from the perspective of the nurses themselves because nursing and nurses were long given a relatively low social and economic status due to the nature of their work, cultural perceptions of social status, income, and gender [5, 6]. With the prevalence of NPPB and increased empirical interest in the positive significance of improving nurses' sense of professional benefits, there is a need for measures of NPPB that are brief and can be used more practically while assessing the construct comprehensively.

## Background

In a review of the currently available and utilized measures of NPPB published from 1999 to 2019, four articles [7–10] were identified, but only one study [10] involved general registered nurses. The 33-item NPPB questionnaire (NPPBQ) [10] revealed some issues to be resolved. The study on the scale's development was conducted using a homogenous Chinese sample from only one hospital, and the questionnaire has never been verified by confirmatory factor analysis (CFA). Thus, the reliability and validity of the questionnaire need to be further studied. Moreover, considering the busy nature of nurses' work, the questionnaire, which has 33 items reflecting 5 factors, is not concise enough. Although the literature review identified the use of one tool to assess occupational benefit, it only measured nurse preceptors [7, 9]. Preceptors are mainly responsible for providing students with skills and reality-based learning experiences and helping newly hired nurses become familiar with hospital policies, clinical settings, and practical routines. However, preceptors' perceived professional benefits do not represent the general condition of nurses. Therefore, the development of a reliable and valid tool for assessing NPPB is necessary and meaningful for practice and further studies. To address the above issues, the current study aimed to develop and test a relevant composite NPPBQ that measures nurses' perceptions of the benefits and rewards they receive from their nursing career and to evaluate its reliability and validity.

## Aims

The aims of this study were to:

1. Develop a psychometrically sound instrument that measures nurses' perceptions of their professional benefits.
2. verify whether the internal structure of this scale is consistent with a consistent conceptual framework Using exploratory factor analysis and confirmatory factor analysis
3. Determine the initial psychometric properties of the instrument: internal reliability (Cronbach's alpha), construct and content validity.

## Methodology

### Participants

Participants were recruited from seven hospitals with registered nurses. The surveys were conducted by the authors of the present study in Shanghai, Hangzhou, and Nanjing, China (samples 1–2; ZhB), and in Shanghai (sample 3; HJ). Participants in sample 1 were invited to complete the initial 33-item NPPBQ; participants in sample 2 were invited to complete the final 17-item NPPBQ; and participants in sample 3 were invited to complete the 17-item NPPBQ and the Maslach Burnout Inventory (MBI) to evaluate the concurrent validity of the NPPBQ. Participants in samples 1–3 provided written informed consent to complete the 33-item NPPBQ, the 17-item NPPBQ, and the MBI and to supply their demographic

characteristics (gender, years working, education, and marital status). Data for three samples were shared with all authors of the present study through data use agreements. The detailed demographic characteristics are listed in *Table 1*.

## Instruments

The survey consisted of a demographic information form, the NPPBQ and the MBI.

The MBI [11] is a self-evaluation tool that uses the 7-point Likert rating method. It has a total of 22 items in three domains: emotional exhaustion; depersonalization; and reduced personal accomplishment. The MBI has been translated into a variety of languages and is currently a universal tool for measuring job burnout in various occupational groups. It is also widely used in the field of nursing with high reliability and validity.

### *Step 1: item generation*

Development of the items on the pilot and final versions of the NPPBQ occurred in four steps, which are described as follows.

## Concept definition:

First, the definition of preceptors' perceived professional benefits, the 5-dimension NPPB conceptual framework developed by Hu and Liu [12], existing measures, interviews with 23 nurses, and the empirical literature discussing professional benefits or rewards were reviewed and evaluated to provide the definition and to generate items. Considering the impact of understanding and support from the medical team, society, family and patients on the perceived benefits of the nursing profession, NPPB was defined as the gains and benefits nurses perceived that they received from their profession in the process of employment and the belief that engaging in the nursing profession can promote their all-round growth and development. Specifically, five dimensions were distinguished as follows: (1) positive occupational perception; (2) good nurse-patient relationship; (3) recognition from family, relatives, and friends; (4) sense of belonging to a team; and (5), and self-growth (see *Supplementary Table 1*).

## Initial pool of items:

Thereafter, thirty-seven potential items were created to reflect the NPPB construct. The criterion for including an item in the potential items pool was that the item should fit one of the five potential dimensions described above (positive occupational perception, good nurse-patient relationship, recognition from others, sense of belonging to a team, and self-growth) and/or relate to the benefits perceived by the nurse as a nurse.

## **Content validity:**

A panel of independent experts and judges (five associate nursing professors, two clinical psychology professors, and 14 clinical nurses with more than five years of experience) discussed, evaluated, and modified the potential items based on the above three principles: (1) whether the items were consistent with the content of professional benefits; (2) whether the items were suitable and in accordance with the NPPB definition and conceptual dimensions; and (3) whether the wording of the items was accurate. Following the above procedure, the first pool of items was reduced to 33 items after examination by the judges.

## **Creation of the pilot version:**

Following the recommendations of Jing Hu and Xiaohong Liu [10] that the measurement of NPPB is more suitable for the five-level Likert scale, 5 response categories, ranging from 1 (strongly disagree) to 5 (strongly agree), were used. The following instructions were given: "Nurses' perceived professional benefits are the gains and benefits that nurses perceive that the profession brings to them in the process of practice and the belief that the nursing profession can promote the overall growth of the self. What benefits and gains do you feel you have experienced from your career? Please read the statements carefully, consider how well each statement relates to you, and click "√" according to your personal experience (1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree). There are no "right" or "wrong" answers. Please choose one answer for each statement".

## **Step 2: item reduction (exploratory factor analysis)**

For this step, IBM Statistics SPSS version 22.0 was used for the sample 1 data analysis to carry out the preliminary psychometric validation of the NPPBQ. The primary aim of this analysis was to test the hypothesized factor structure and to reduce the 33-item questionnaire to a smaller set of high-performing items to create the final version of the NPPBQ. Exploratory factor analysis (EFA) was conducted to test whether the items were consistent with the pre-defined sub-dimensions of the questionnaire (item homogeneity). Inconsistent items were removed based on the results [13] (items were inconsistent with the pre-defined sub-dimensions; low factor loadings, i.e., <0.70; low total Cronbach's alpha if item deleted; and low item-questionnaire correlations, i.e., <0.40) to retain those items that best reflected the definition and theoretical dimensions of the perceived professional benefits described above. Sixteen items were removed during the initial screen, and the items with factor loadings greater than 0.70 were retained. Finally, the 17 items retained in this phase were randomly ordered to create a pilot questionnaire (see *Supplementary Table 1*).

## **Step 3: verification**

The analysis in step 3 was conducted to further verify the NPPBQ using a different sample from similar groups. Confirmatory factor analysis (CFA) with maximum likelihood estimation was conducted to test the underlying factor structure of the NPPBQ. There are clear predictions regarding the factor structure of the measure analyzed. In terms of the CFA analyses, multiple indices of fit were considered: the ratio of the  $\chi^2$  to its degrees of freedom (df), the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the normed fit index (NFI), the Tucker-Lewis index (TLI, also known as the non-normed fit index), and the goodness of fit index (GFI). Amos 24.0 was used to analyze the data of sample 3 in step 3. RMSEA and RMR values of 0.06 or below are indicative of a good fit, and values >0.06 to 0.08 are considered an acceptable fit. For the CFI, GFI, NFI, and TLI, values of  $\geq 0.90$  are taken as a good fit.

## Step 4: further validation (concurrent validation)

The primary objective of this step was to assess the stability of the NPPBQ (Guttman split-half coefficient) and to examine its validity in terms of the relationship of the 17-item, five-dimension NPPBQ with the MBI [11]: emotional exhaustion, depersonalization, and reduced personal accomplishment.

## Ethical considerations

Informed written consent was obtained from all participants. The present study has been reviewed and approved by the Institutional Review Board of the School of Nursing, Jilin University (access number: 2017092701).

## Results

### Sample characteristics

A total of 1447 (out of a possible 1500) nurses completed the survey, for a response rate of 96.5%. The majority of participants were female ( $n = 1456, 99.0\%$ ), with a median years worked range of 10–14 years. The majority had an undergraduate education ( $n = 1156, 78.6\%$ ) and were married (1031, 70.1%). The sample characteristics are presented in *Table 1*.

## Questionnaire validation

### Step 1: Item generation

The primary objective of stage 1 was to develop the pilot version of the NPPBQ according to Jing Hu's five-dimension NPPB model. Thirty-seven items were generated during the initial screen in step 1, and three items were removed after consultation with a panel of experts. The reasons for item deletion were

as follows: (a) items were not relevant to the theme of NPPB according to 21 experts' opinions, (b) items were too similar to other items, and (c) items applied to a minority of respondents (e.g., As a preceptor, clinical teaching work has promoted my continued learning). A total of 33 remaining items were carried forward to step 2.

## Step 2: Exploratory factor analysis (EFA)

The primary aim of step 2 was to further reduce the 33-item questionnaire to a smaller set of high-performing items to create a final version of the NPPBQ. Sixteen items were removed during step 2. The reasons for item deletion were as follows: (a) items were inconsistent with the pre-defined sub-questionnaires, and (b) factor loadings were  $<0.70$ . The results of the EFA models shown in Table 2 supported the expected number of factors, with positive occupational perception (with 3 items), good nurse-patient relationship (with 4 items), recognition from family, relatives, and friends (with 3 items), sense of belonging to a team (with 3 items), and self-growth (with 4 items); all items loaded onto the anticipated factor. Five factors explained 60.98% of the total variance (detailed information on the extraction sums of the squared loadings can be seen in *Supplementary Table 2 and Table 2*). All internal consistency coefficients (alpha,  $\alpha$ ) for the NPPBQ demonstrated good internal consistency, with all values above the generally accepted threshold of 0.70. *Table 3* shows the means (M), standard deviations (SD), reliability values (Cronbach's  $\alpha$ ), and inter-correlations between the NPPBQ's sub-dimensions and the correlations with the NPPBQ total score. In summary, the step 2 analyses supported the presence of five aspects representing nurses' sense of the benefits brought by their profession, with all of items loading onto the anticipated factors. Sixteen low-performing items were deleted during step 2, and 17 items were carried forward to step 3.

## Step 3: Confirmatory factor analysis (CFA)

The factorial structure of the NPPBQ was tested using CFA. The results confirmed and validated the previously proposed hypothesis that the theory-driven model reflecting five correlated factors was the best-fitting model of the NPPBQ. The vast majority of the fit indices proved to be good (see *Fig. 1*). The relative chi-square ( $\chi^2/df$ ) = 3.70; RMR = 0.017; RMSEA = 0.067; GFI = 0.924; NFI = 0.939; RFI = 0.924; IFI = 0.955; TLI = 0.943; and CFI = 0.954. The goodness of fit indices (GFI, NFI, RFI, IFI, TLI, and CFI) were greater than 0.90. All the regression coefficients were greater than 0.70 (as shown in *Fig. 1*), and no modifications to the model were performed, demonstrating that the 5-factor model solution of the NPPBQ is robust across samples and meets the previously specified criteria.

## Step 4

Table 4 presents the mean scores on the final NPPBQ obtained from sample 3, the Cronbach's alpha of every sub-questionnaire of the NPPBQ, and the correlations with the MBI. The full correlation matrix summarizing the correlations between all the questionnaires and sub-questionnaires (i.e., the correlations

of the two questionnaires' total scores and the interfactor correlations) is included in *Table 4*. The correlations between the NPPBQ scores and existing measures of the MBI supported the convergent validity of the questionnaire. All correlations were in the anticipated direction (i.e., there was a negative correlation between all of the dimensions of the NPPBQ and the emotional exhaustion dimension of the MBI, but there was a positive correlation with the personal achievement dimension).

## Discussion

This paper reports the development and preliminary validation of the brief Nurses' Perceived Professional Benefits Questionnaire (NPPBQ), which was derived from a conceptual framework established by Hu J. and Liu X. H. [12]. The psychometric evaluations provided an initial assessment of the NPPBQ across clinical samples. The four steps provided promising evidence to support the NPPBQ as a factorially stable and psychometrically sound brief measure of NPPB (the final version of the NPPBQ see the additional file: the English version and the Chinese version of the NPPBQ).

Across the studies, the reliability (internal consistency Cronbach's alpha, Guttman split-half reliability), factor structure, and convergent validity of the NPPBQ were examined. Psychometric analyses of the NPPBQ provided support for the good internal consistency, stability, and validity of the instrument. The NPPBQ has a simple five-factor structure that showed good validity and can be described as follows: (1) positive occupational perception; (2) good nurse-patient relationship; (3) recognition from family, relatives, and friends; (4) sense of belonging to a team; and (5) self-growth. The Cronbach's alpha of every sub-questionnaire of the NPPBQ were 0.84, 0.83, 0.74, 0.79, and 0.85, respectively. And the Guttman split-half were 0.795, 0.826, 0.674, 0.725, and 0.877, respectively. The five dimensions revealed good consistency with the components of J. Hu and X. H. Liu's model and the current literature on NPPB [4, 7, 8, 9, 12, 14]. The results suggest that the NPPBQ is theoretically and empirically valid.

The current research has provided promising evidence to support the 5-factor NPPBQ model and suggests that the solution is robust across Chinese samples, recognizing that additional validation in other cultures is a required future research direction. The results suggest that the factor structure for the NPPBQ is stable and clear. The five-factor model showed good fit in terms of both the relative fit indices (e.g., TLI, CFI, and NFI) and absolute fit indices (e.g.,  $\chi^2/df$ , RMR, and RMSEA). Importantly, the 5-factor structure fits the conceptual framework that underlies the NPPBQ [12]. The NPPBQ supports NPPB as a multidimensional construct and the foundational role of cognitive evaluation processes in the generation and maintenance of reasonable vocational cognition and evaluation; it also indicates that NPPB has an intermediate regulating effect on the relationship between job stress and job burnout. The five dimensions of the NPPBQ represent professional benefits in terms of both the material and non-material benefits of being a nurse. Thus, the NPPBQ contributes significantly not only by providing a valuable instrument measuring NPPB but also by assessing the unique aspects of this construct, such as nurses' perceived nurse-patient relationships and support from important others. Therefore, targeted measures can be taken to improve those relevant aspects.

Concurrent validity analyses found that the NPPBQ was significantly negatively correlated with the emotional exhaustion and depersonalization dimensions' scores (measured by the MBI). These results were anticipated given the strong relationship between the degree of nursing burnout and NPPB [15, 16]. Thus, the findings provide further support for the validity of the newly developed instrument.

According to a previously published study, the sense of occupational benefit can explain 31.6%, 13.1%, and 9.5% of the variance in emotional exhaustion, depersonalization and reduced personal achievement [15]. Similar to results from the present study, it has also been shown that NPPB is significantly positively associated with reduced personal accomplishment scores on the MBI. It seems plausible that nurses low in NPPB might tend to lack motivation and initiative in their work, resulting in a lower sense of job satisfaction and personal accomplishment. Moreover, a cognitive intervention program for nurses' sense of occupational benefit can improve the level of professional benefit of nurses and alleviate their burnout [17]. Conversely, a nurse with a higher sense of professional benefit will have a higher sense of personal accomplishment. Accordingly, it is well established that NPPB is associated with self-efficacy and reduced nursing burnout.

In short, a new, theory-driven measure of NPPB was developed using three samples. The findings of the studies provide support for the psychometric properties of the NPPBQ in terms of internal consistency and construct validity. The NPPBQ has five sub-questionnaires. Thus, the NPPBQ reflects important features of NPPB, such as specific career cognition, sense of support from important others and self-development and, moreover, is a brief instrument that assesses all the constructs underlying NPPB as posited by Hu and Liu's model [12]. Importantly, the NPPBQ is a simple assessment measure. A brief questionnaire with a reasonable number of items will solve the shortcomings of a lengthy questionnaire, such as potential, missingness, and reduced data quality and response burden.

The NPPBQ was developed as a multidimensional instrument to assess registered nurses' perceived professional benefits. The systematic literature review revealed relatively little research on the development of tools to measure the multiple aspects of professional benefits that nurses perceive. Although there are some related tools, few have focused generally on clinical nurses' perspectives of their professional benefits, and few have been psychometrically verified with respect to their factor structure. The 5-factor NPPBQ is consistent with a former NPPB conceptual framework and further confirmed it in theory and practice.

## limitations

As the current research is the first to evaluate the psychometric properties of the 17-item NPPBQ, the present results are in need of replication in other cultural contexts for further validation. There are several areas to be considered for future work that are necessary to continue the validation of the NPPBQ. First, the three samples in the current study were all samples of convenience, which could limit the generalizability of the results, and there is sufficient evidence to warrant a subsequent evaluation within a

large clinical sample. Second, an evaluation of the factor structure of the NPPBQ using different samples is warranted. Future studies using diverse populations should pursue measurement and structural invariance testing via CFA to determine if the factor structure of the NPPBQ varies for members of different sociodemographic groups (e.g., with religious beliefs vs. without religious beliefs). Third, the psychometric properties of the NPPBQ should also be assessed across different countries and languages to further evaluate its robustness as an assessment tool. Importantly, future studies should consider comparative assessments with existing measures of job satisfaction and nurses' professional benefits and provide extended evidence of the construct validity of the NPPBQ.

Despite the aforementioned limitations, the current research represents the first substantial step toward validation of the NPPBQ. There is promising evidence to suggest that the NPPBQ is reliable and a conceptually and empirically valid measure, assessing dimensions of the construct that are congruent with the NPPB conceptual model, and could prove useful to investigators. The four steps of the study have provided initial evidence to support the NPPBQ as a factorially stable and psychometrically sound brief measure of nurses' professional benefits perceptions, recognizing that additional validation in various cultural contexts is a required future research direction.

## Implications for nursing

There is increasing acknowledgement of the significance and value of guiding nurses to fully realize the benefits of their careers and of improving NPPB in practice. Empirical research has identified significant associations between NPPB, willingness to stay, job burnout, subjective well-being, innovative behavior, work engagement, a professional commitment, and sense of calling [18–24].

The NPPBQ may assist clinical nursing managers in exploring and improving staff perceptions, evaluations, and attitudes towards professional benefits. Findings from the NPPBQ could inform the selection of topics for improving nurses' good professional perceptions to enhance the assessment of the intensity and influencing factors of NPPB, monitoring changes in practice. Continued and increased facilitation of access to these benefits by medical institutions is vital for sustaining active involvement in the nurse role, and there is a need to improve nurses' intent to stay against the background of the global shortage of nursing staff and the predicted shortage of nurses.

Another potential use of the NPPBQ would be as an assessment or evaluation tool in education and continuing education departments to inform the content of career development programs and evaluate the effectiveness of such training in bringing about change in attitudes, perceptions and practices.

## CONCLUSION

While there are a few studies on the professional benefits perceived by nurses in specific specialties, there is no brief questionnaire with good reliability and validity to measure the general condition of the majority

of nurses. Given the prevalence of positive psychology, it is important to understand how paying attention to and improving nurses' sense of career benefit is related to their willingness to stay and can reduce job burnout, which is conducive to improving nurses' professional mentality and professional identity. The NPPBQ is a multidimensional measure that creates an opportunity to gain further insight and identify approaches to support reasonable professional evaluation and healthy professional attitudes in nurses.

## Declarations

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## Author Contributions

### *Criteria*

### *Author Initials*

Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data;

HYL, HJ, LXH, ZB, LLP, LF

Involved in drafting the manuscript or revising it critically for important intellectual content;

HYL, LXH

Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content;

HYL, HJ, LLP, ZB, LXH, LF

Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

LXH, LF

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## Conflict of Interest statement

The authors declare that they have no competing interests.

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## Tables

**Table 1**

Demographic characteristics

	Total Sample	Sample 1	Sample 2	Sample 3
	N=1471	N=588	N=612	N=271
Gender, female n (%)	1456 (99.0%)	580 (98.6%)	609 (99.5%)	267 (98.5%)
Working years, n (%)				
≤4	307 (20.9%)	117 (19.9%)	122 (19.9%)	68 (25.1%)
5-9	372 (25.3%)	153 (26.0%)	131 (21.4%)	88 (32.5%)
10-14	332 (22.6%)	122 (20.7%)	143 (23.4%)	67 (24.7%)
15-19	243 (16.5%)	93 (15.8%)	117 (19.1%)	33 (12.2%)
≥20	217 (14.8%)	103 (17.5%)	99 (16.2%)	15 (5.5%)
Education, n (%)				
Secondary vocational schools	44 (3.0%)	18 (3.1%)	15 (2.5%)	11 (4.1%)
Junior college	249 (16.9%)	104 (17.7%)	106 (17.3%)	39 (14.4%)
Undergraduate	1156 (78.6%)	456 (77.6%)	481 (78.6%)	219 (80.8%)
Postgraduate or above	22 (1.5%)	10 (1.7%)	10 (1.6%)	2 (0.7%)
Marital status, n (%)				
Married	1031 (70.1%)	424 (72.1%)	461 (75.3%)	146 (53.9%)
Unmarried	424 (28.8%)	159 (27.0%)	146 (23.9%)	119 (43.9%)
Others (divorced or separated)	16 (1.1%)	5 (0.9%)	5 (0.8%)	6 (2.2%)

**Table 2**

The factor loading results of the 17-item NPPBQ.

	Component					Communalities*	
	1	2	3	4	5	Initial	Extraction
A1_7	.824					.544	.599
A1_6	.808					.519	.588
A1_2	.766					.495	.571
A2_3		.799				.537	.645
A2_5		.788				.441	.533
A2_2		.748				.464	.475
A2_4		.642				.565	.578
A3_4			.718			.600	.613
A3_5			.718			.471	.605
A3_3			.708			.508	.608
A4_5				.773		.424	.526
A4_4				.762		.621	.658
A4_3				.720		.603	.675
A5_7					.826	.596	.701
A5_6					.809	.565	.683
A5_8					.750	.551	.616
A5_4					.737	.662	.695

\* Extraction Method: Principal Axis Factoring.

**Table 3**

Means(M), standard deviation (SD), reliabilities (Cronbach's  $\alpha$ ), and inter-correlations between the NPPBQ's subQuestionnaires and correlations with the NPPBQ total score in step 2 (n=588).

	M (SD)	Cronbach's $\alpha$	1.	2.	3.	4.	5.	6.
1. Positive occupational perception	11.90 (2.37)	0.84	-					
2. Good nurse-patient relationship	17.54 (2.30)	0.83	.712**	-				
3. recognition from family, relatives, and friends	12.89 (1.82)	0.74	.579**	.592**	-			
4. sense of belonging to a team	13.30 (1.55)	0.79	.610**	.671**	.573**	-		
5. self-growth	17.48 (2.22)	0.85	.704**	.731**	.602**	.732**	-	
6. Total score of the NPPBQ	73.13 (8.75)	0.94	.866**	.883**	.775**	.824**	.891**	-

Note: \*\*.  $R < 0.01$ , Correlation is significant at the 0.01 level (2-tailed). Guttman Split-Half coefficient of the total scale and every sub-questionnaire were 0.930, 0.795, 0.826, 0.674, 0.725, 0.877 respectively; and Spearman-Brown coefficient were 0.931, 0.855, 0.833, 0.746, 0.796, 0.878, respectively.

**Table 4**

Descriptive statistics (means and standard deviation) and correlations among variables in study 3 (n=271).

	M (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Total score of the NPPBQ	71.16 (9.42)	$\alpha=0.937$								
2. Positive occupational perception	11.47 (2.53)	.863**	$\alpha=0.840$							
3. Good nurse-patient relationship	17.08 (2.44)	.870**	.677**	$\alpha=0.828$						
4. recognition from family, relatives, and friends	12.74 (1.87)	.776**	.575**	.582**	$\alpha=0.737$					
5. sense of belonging to a team	12.86 (1.75)	.846**	.641**	.691**	.586**	$\alpha=0.788$				
6. self-growth	17.01 (2.40)	.905**	.728**	.723**	.639**	.752**	$\alpha=0.862$			
7. emotional exhaustion	30.13 (10.65)	-.514**	-.530**	-.407**	-.334**	-.402**	-.491**	-		
8. reduced personal accomplishment	38.99 (11.19)	.273**	.169**	.237**	.200**	.277**	.292**	-.076	-	
9. depersonalization	10.59 (4.94)	-.366**	-.318**	-.286**	-.290**	-.318**	-.352**	.616**	-.171**	-

Pearson's correlation coefficient test was used, two-tailed. Simplified Chinese version of Palliative Care Spiritual Care Competency Scale (NPPBQ). \*\*.  $R < 0.01$ , Correlation is significant at the 0.01 level (2-tailed). Cronbach's alpha on the diagonal in parenthesis

## Figures

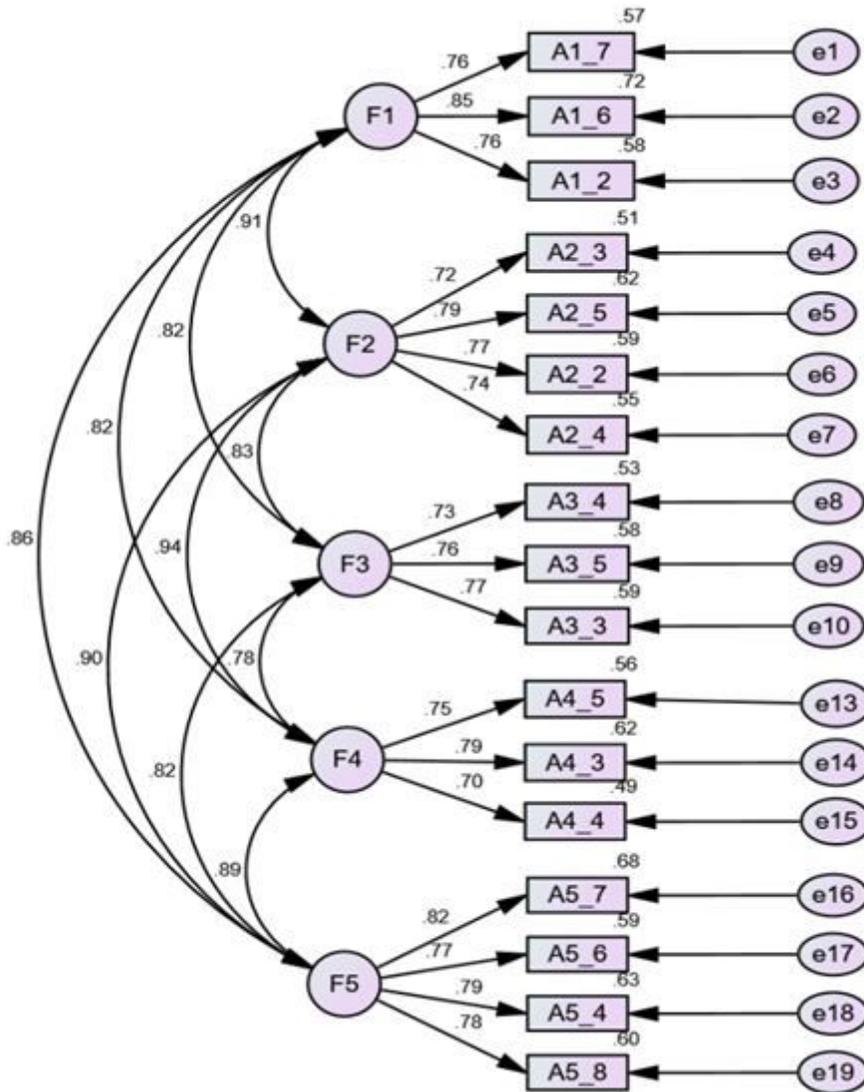


Figure 1

Results from confirmatory factor analysis models for the five-factor NPPBQ Model fit statistics: Chi-square=403.58 , df=109, p=0.00; RMR=0.017;RMSEA=0.067; GFI=0.924;NFI= 0.939; RFI=0.924; IFI=0.955; TLI=0.943; CFI=0.954

## Supplementary Files

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