A psychometric evaluation of the Chinese version of the Nursing Home Adjustment Scale

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Abstract

Purpose For older adults, psychological adjustment has a great impact on successfully making the transition to living in a nursing home. However, a tailored Nursing Home Adjustment Scale (NHAS) for Chinese nursing home residents is not available. The aim of this study was to develop and psychometrically test properties of the NHAS for Chinese residents.

Methods A total of 425 residents were recruited from 10 nursing homes from September 2017 to February 2018 in Fujian, China, to examine the psychometrics of the NHAS Chinese version. exploratory structural equation modeling (ESEM) was applied to evaluate the NHAS scale. Internal consistency, test–retest reliability, and construct validity were examined.

Results The final structure for the NHAS was categorized into five domains, including emotional distress, relationship development, acceptance of new residence, depressed mood, and feeling at home. The goodness-of-fit indices of ESEM supported the five-factor model with satisfactory internal consistency (Cronbach's $\alpha = 0.87$) and test–retest reliability of 0.72 for the entire scale.

Conclusions The Chinese version of the NHAS is a reliable and valid instrument to assess the level of nursing home adjustment among nursing home residents in China.

Keywords Nursing home adjustment · Factor analysis · Instrument development

Introduction

Population aging is an inevitable process, in which older adults become a larger proportion of the total population [1]. According to the National Bureau of Statistics of the People's Republic of China, in 2017 there were approximately 158 million Chinese citizens older than 65 years, accounting for 11.4% of the population [2]. When the burden of care exceeds the resources of the family or causes deficits in the lives of family members, nursing home placement commonly ensues [3].

Transition is often associated with uncertainty and stress. Much depends upon the preparation of older adults and the attitude of the nursing home staff. A majority of new residents fail to establish a sense of home at the beginning of nursing home life, although they gradually change their

attitude toward the facility and themselves, to better adjust to living in a care facility [4]. Oswald and Wahl presented that generating a feeling of 'home' is critical for an older adult's successful relocation to a nursing home [5]. Brandburg further proposed that adjustment is a process in which older adults develop new relationships, maintain old friendships, and reflect on their new home environment [6].

Many measures for nursing home adjustment are defined as positive affect, negative affect, and activity level, which are the components of life satisfaction [7, 8]. However, the assumption of the equivalence between life satisfaction and successful adjustment is confusing. The factors involved in nursing home adjustment may not be reflected in the measurement of life satisfaction [9]. Furthermore, nursing staff acknowledgement of their role in managing nursing home residents would certainly be related to resident adjustment levels. This is a critical process of nursing practice in elder care [10]. A direct measurement for nursing home adjustment has been developed; however, it has not yet been validated for use in Chinese populations.

The Nursing Home Adjustment Scale has been validated in two languages, Korean and English [11, 12]. Both

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instruments have been developed to address the adjustment issues and demonstrate evidence for reliability and validity. However, they are not suitable for nursing home residents in China due to the language barrier and cultural differences. Thus, this study aimed to develop and test the psychometric properties of the Chinese-version Nursing Home Adjustment Scale (NHAS).

Methods

The study was designed to develop the Chinese version of the NHAS. The instrument development was performed in two major phases. The first phase involved scale translation and back translation. The second phase was conducted to evaluate the instrument's psychometric properties.

Instrument and measures

The Nursing Home Adjustment Scale (NHAS)

The questionnaire, which was first generated in Korean, included 23 items. The items were grouped into five dimensions: emotional distress (2 items), relationship development (7 items), acceptance of new residence (6 items), depressed mood (6 items), and feeling at home (2 items). Items were measured using a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Some items were scored reversely, with higher scores indicating greater levels of adjustment.

Single item Self-Rated Health (SRH)

Self-rated health was assessed by a single item, "In general, how would you rate your health?". The scoring system is a five-point Likert scale ranging from 1 "very bad" to 5 "very good" [13].

The Satisfaction with Life Scale (SWLS)

This was composed of five statements regarding life satisfaction. Responses are provided on a seven-point Likert scale that ranges from 'strongly disagree' to 'strongly agree' [14].

Personal information form

The residents' personal information was recorded, including age, gender, education, marital status, length of stay, and activities of daily living (ADL). Katz Index of Independence in Activities of Daily Living Scale (Katz ADL) was used to assess ADL in this study [15]. It has six items including bathing, dressing, going to toilet, transferring, continence, and feeding. Each item is rated as 0, 1, or 2, indicating 'dependent', 'partly dependent', and 'independent',

respectively. The total score ranges from 0 (fully dependent) to 12 (fully independent).

Scale translation

The NHAS scale was originally developed for Korean-speaking older adults. This cross-cultural adaptation of the NHAS for a Chinese population was based on the guidelines by Beaton [16]. First, two bilingual translators whose mother tongue was Chinese conducted independent forward translations of the NHAS scale from Korean to Chinese. Ambiguities or poor wording in the original was identified and negotiated by the translators. Second, backward translations were conducted by another two translators whose first language was Korean, which ensured a consistent translation. Third, an expert committee, composed of a language professional, a health professional, a methodologist, and four translators reviewed all versions and reached a consensus on the semantic, idiomatic, experiential, and conceptual aspects of the translation. Fourth, the pre-final version was tested for acceptability by a pilot sample of residents in nursing homes in China. Consequently, we examined the survey items to prevent any ambiguity in meaning or comprehension issues for respondents from the Chinese culture.

Sample/participants

A list of 23 local nursing homes was obtained from the Civil Affairs Bureau in southeast China. Ten nursing homes voluntarily agreed to participate in this study. A total of 425 nursing home residents were recruited for this study from September 2017 to February 2018. The inclusion criteria for the participants were: (1) able to speak Chinese; and (2) healthy enough to carry on a conversation. The exclusion criteria were: (1) refusal to participate; (2) unable to communicate because of poor hearing; (3) intellectual impairment (SPMSQ ≥ 3; the Short Portable Mental Status Questionnaire) [17].

Before the study commenced, approval was obtained from the first author's university Human Ethics Committee of Fujian Medical University (Fuzhou, Fujian, China). Eligible participants, identified by facility staff, were fully informed about the study purpose and procedures. Written or oral informed consent was obtained from each participant. Five senior undergraduate nursing students were trained to collect the data. They read each statement of the questionnaire aloud, asked the participants to respond verbally, and then objectively wrote down their responses. The individual data collection interviews were conducted in a private room in the nursing home. Each interview lasted approximately 15 min. The survey response rate was 96.6% (425/440). The continuous missing values were replaced by mean substitution to prevent loss of sample because the number of omitted items is less than 1% in this study [18].

Statistical analysis

Descriptive statistics

The continuous variable (age and ADL) was presented as mean ± standard deviation (SD), and category variables (gender, marital status and education) were expressed using frequency and percentage.

Item analysis

Item analysis included corrected item-total correlations, and the change in the Cronbach's alpha if the item was removed. Corrected item-total correlations of 0.20–0.80 were considered satisfactory [19]. The intraclass correlations were used to analyze differences in the nursing home allocation.

Psychometric analysis

Structural equation modeling analyses were performed with the WLSMV (weighted least-squares with mean and variance adjustment) estimator for categorical variables, because the WLSMV estimator is more suitable for the ordered-categorical nature of Likert scales than the traditional maximum likelihood estimation [20]. The following cutoff criteria were used to establish the model's goodness-of-fit: the root mean square error of approximation (RMSEA) < 0.08; comparative fit index (CFI) > 0.90; Tucker–Lewis Index (TLI) > 0.90 [21–23].

Convergent validity and divergent validity (construct validity) were evaluated by examining the correlations between the NHAS (total and subscale scores) and self-rated health and satisfaction with life scores using Spearman's correlation coefficient. Internal consistency analyses were evaluated with Cronbach's alpha, with a value greater than 0.7 considered to be satisfactory [24]. The value of the test–retest intraclass correlation coefficient (ICC) that exceeded 0.60 was considered good [25].

Exploratory structural equation modeling (ESEM) was conducted with Mplus version 7.0. All other analysis was performed using IBM SPSS version 25.0 for Windows. Construct validity was assessed using the Spearman's correlation coefficient, with significance $P < 0.01$.

Results

Sample characteristics

The total of the 425 participants' characteristics is summarized in Table 1. The mean age was 83 years (SD = 52.3). The majority were widowed (71.4%) and female (62.6%).

Item analysis

As shown in Table 2, the coefficients of item-total scale correlations ranged from 0.21 to 0.63 of the original 23 items, which demonstrated the associations with the whole scale. The deletion of any item could not improve its reliability. The intraclass correlations due to the nursing home allocation were very low, ranging from 0.001 to 0.041.

Factor structure of the NHAS

We conducted a data driven exploratory process. Table 3 presents the results from ESEM models, including one to eight factors estimated on the 425 participants. Looking at approximate fit indices, they continued improving with an increasing number of factors, reaching a satisfactory level for solutions including five factors or more. However, an examination of the six factor, seven factor, and eight factor solutions shows that these solutions are not optimal, resulting in only one item loading on a factor.

For the five factor ESEM, the approximate fit indices all indicate good model fit ($\chi^2 = 531.450$, $df = 148$, $P < 0.001$;

Table 1 Distribution of participant characteristics ($N = 425$)

Characteristics	Frequency (%)	Mean (SD)
Age (years)		83 (52.3)
< 65	13 (3.1%)	
65–74	30 (7.1%)	
75–84	182 (42.8%)	
85–94	187 (44.0%)	
≥ 95	13 (3.1%)	
Gender		
Male	159 (37.4%)	
Female	266 (62.6%)	
Marital status		
Unmarried	6 (1.4%)	
Married	107 (25.2%)	
Divorced	10 (2.4%)	
Widowed	302 (71.4%)	
Education		
Primary school or less	106 (24.9%)	
Secondary school	90 (21.2%)	
Technical or other college	112 (26.4%)	
Tertiary graduate or postgraduate	117 (27.5%)	
ADL score		11 (1.4)
Bathing (0–2)		1.7 (0.4)
Dressing (0–2)		1.8 (0.3)
Toileting (0–2)		1.9 (0.2)
Transferring (0–2)		1.9 (0.2)
Continence (0–2)		1.9 (0.1)
Feeding (0–2)		1.8 (0.2)

Table 2 Nursing Home Adjustment Scale: Item Analysis

Items	Corrected item-total correlation	Cronbach' α if item deleted	ICC due to nursing home allocation
1. I am friendly with my roommates	0.214	0.872	0.004
2. I often feel angry	0.391	0.867	0.037
3. I am often displeased about trivial things	0.437	0.866	0.041
4. I don't like to participate in group activities	0.278	0.871	0.021
5. This is not my permanent home, but rather a temporary residence	0.315	0.870	0.018
6. I am not friendly with other residents	0.405	0.867	0.000
7. My mind is at ease here	0.559	0.863	0.008
8. I want to make friends	0.250	0.872	0.000
9. I am bored living here	0.524	0.863	0.000
10. I try to help other residents	0.364	0.868	0.000
11. I am satisfied with living here	0.569	0.862	0.026
12. Daily living has no meaning for me	0.468	0.865	0.004
13. It's difficult to get along with other residents	0.507	0.864	0.000
14. I don't want to live here, although it's impossible to return home	0.550	0.862	0.000
15. My life has value in this world	0.391	0.867	0.014
16. I wish to live well here	0.557	0.863	0.037
17. I have resolved to live here	0.463	0.865	0.037
18. I try to help other residents	0.490	0.864	0.000
19. I often feel lonely	0.632	0.859	0.000
20. It pains me to think about my children (family)	0.478	0.865	0.007
21. I often feel like crying	0.482	0.865	0.000
22. I often shed tears without reason	0.490	0.865	0.000
23. I often think about my previous home and that makes me sad	0.486	0.864	0.018

Table 3 Goodness of fit statistics for all models

Model	χ^2	df	CFI	TLI	RMSEA (90% CI)
1 factor ESEM	3232.453	230	0.796	0.776	0.175 (0.170–0.181)
2 factor ESEM	2055.067	208	0.875	0.848	0.145 (0.139–0.150)
3 factor ESEM	1226.458	187	0.929	0.905	0.114 (0.108–0.120)
4 factor ESEM	767.020	167	0.959	0.938	0.092 (0.085–0.099)
5 factor ESEM	531.450	148	0.974	0.956	0.078 (0.071–0.085)
6 factor ESEM	402.356	130	0.982	0.964	0.070 (0.062–0.078)
7 factor ESEM	290.001	113	0.988	0.973	0.061 (0.052–0.069)
8 factor ESEM	174.468	97	0.995	0.986	0.043 (0.033–0.054)

CFI = 0.974; TLI = 0.956; RMSEA = 0.078). And the final structure for the 23 items was grouped into five domains, entitled emotional distress, relationship development, acceptance of new residence, depressed mood, and feeling at home; see Table 4 for details. In this Chinese version, two cross-loading items (items 7 and 11) on two factors were found, but the English language version had eight cross-loading items (items 6, 8, 11, 12, 13, 15, 18 and 23).

Reliability and validity

The Cronbach's alpha of the Chinese-version NHAS was 0.87. The internal consistency of the five dimensions ranged from 0.70 to 0.84, indicating an acceptable internal consistency; see Table 4 for details. The ICC of the test–retest measure was 0.72 for the total scale, showing that each respondent's scores were highly correlated.

Construct validity was assessed by examining the associations between the NHAS total/subscale scores and other outcomes; see Table 5. The SRH score was significantly positively correlated with all subscales of the NHAS, with the exception of acceptance of new residence' ($P > 0.05$). The small correlations between SRH and all subscales of the NHAS (Spearman's ρ 0.05 to 0.23) demonstrated discriminant validity, indicating that these subscales measure dimensions of nursing home adjustment different from those of SRH. Moderate correlation between SWLS score and the 'acceptance of new residence' and 'feeling at home' subscales of the NHAS provides some evidence of convergent validity, indicating that both SWLS and these subscales measure the residents' experience of nursing homes.

Table 4 Exploratory structural equation modeling solution with five factors

Factor (Cronbach's α/no. of items)	Factor loadings				
	F1	F2	F3	F4	F5
Factor 1: emotional distress (0.836/2)					
2. I often feel angry	**0.902**	0.046	0.059	0.001	0.006
3. I am often displeased about trivial things	**0.823**	0.136	− 0.007	0.061	0.025
Factor 2: relationship development (0.742/7)					
6. I am not friendly with other residents	0.010	**0.818**	0.022	− 0.004	− 0.187
13. It's difficult to get along with other residents	0.072	**0.718**	0.185	0.052	− 0.158
18. I try to help other residents	− 0.057	**0.656**	0.084	0.066	0.057
8. I want to make friends	0.020	**0.598**	− 0.074	− 0.218	0.247
10. I try to help other residents	0.070	**0.458**	0.005	− 0.042	0.214
1. I am friendly with my roommates	− 0.077	**0.354**	− 0.025	0.024	0.050
4. I don't like to participate in group activities	0.146	**0.317**	− 0.039	− 0.020	0.213
Factor 3: acceptance of new residence (0.769/6)					
17. I have resolved to live here	− 0.014	− 0.037	**0.982**	− 0.107	− 0.056
16. I wish to live well here	0.017	0.129	**0.807**	− 0.056	0.022
5. This is not my permanent home, but rather a temporary residence	0.086	− 0.191	**0.645**	0.003	− 0.026
14. I don't want to live here, although it's impossible to return home	0.086	− 0.015	**0.594**	0.260	− 0.016
15. My life has value in this world	− 0.194	0.089	**0.400**	0.175	0.181
12. Daily living has no meaning for me	− 0.066	0.238	**0.357**	0.197	0.033
Factor 4: depressed mood (0.839/6)					
20. It pains me to think about my children (family)	0.019	− 0.028	0.020	**0.943**	− 0.281
23. I often think about my previous home and that makes me sad	0.065	0.003	− 0.045	**0.916**	− 0.208
21. I often feel like crying	0.126	− 0.057	− 0.006	**0.710**	0.039
22. I often shed tears without reason	0.129	0.003	− 0.028	**0.686**	0.037
19. I often feel lonely	− 0.092	0.101	0.242	**0.601**	0.146
9. I am bored living here	− 0.067	0.119	0.242	**0.423**	0.122
Factor 5: Feeling at home (0.700/2)					
7. My mind is at ease here	0.353	− 0.026	0.335	0.029	**0.528**
11. I am satisfied with living here	0.104	0.049	0.393	0.099	**0.416**

For ESEM solution with five factors, all parameter estimates are standardized and a priori target loadings designed to measure each factor are in bold

Table 5 Construct validity of NHAS subscales in Chinese

NHAS subscales	Outcome measure	
	SRH	SWLS
Emotional distress	0.232**	0.157**
Relationship development	0.130**	0.262**
Acceptance of new residence	0.051	0.347**
Depressed mood	0.130**	0.182**
Feeling at home	0.189**	0.370**
Total scores	0.173**	0.332**

The correlation is significant **$P < 0.01$ (bilateral). Spearman's correlation: correlations between 0.50 and 1.00 were considered strong; correlations between 0.30 and 0.50, moderate; correlations between 0.10 and 0.30, small, and correlations < 0.1, weak

Discussion

This is the first study to develop and validate the Chinese-version NHAS. It has demonstrated that the Chinese-version NHAS is a reliable and valid instrument for assessing psychological adjustment in China. It provides health providers with the first instrument targeted at the psychological adjustment of nursing home residents in China. The results are consistent with those of the English version NHAS. The Chinese-version NHAS showed an acceptable to good reliability with a Cronbach's alpha value 0.87 for the total and 0.70–0.84 for the five subscales. The English version, however, reported weaker internal consistency coefficients, with a Cronbach's alpha value 0.77 for the total and 0.46–0.77 for the five subscales [12].

The NHAS tool validated in this study had 23 items grouped into five subscales. The content of the NHAS

covered various aspects of psychological adjustment. Some items reflected the transitional process associated with emotional reaction (e.g., items 2, 3, 9, 19, 20, 21, 22, 23) or relationship development (e.g., items 1, 6, 8, 10, 13, 18), whereas others focused on the outcome of the transitional process with adaptive acceptance (e.g., items 7, 11, 15, 16, 17), or maladaptive acceptance (e.g., items 5, 12, 14) to nursing homes. These subscales matched well with the previous theoretical conceptual framework [6].

The factor, "relocation distress symptom" in the original NHAS evolved into "emotional distress" and "depressed mood" in the Chinese version, which is the same as the English version. Wilson has found that the initial response to living in a nursing home is the expression of negative feelings and a sense of loss [26]. Various studies have also demonstrated that relocation to a nursing home is often accompanied by anxiety, loneliness, insomnia, depression, and suicide attempts [27–30]. The distress symptoms mainly result from deteriorating health, and the loss of family, friends, and familiar activities and living environment. It may also be due to the fact that institutional care tends to focus on residents' illnesses and incapacities, with few observations on psychological well-being. As people live longer, the need for high quality nursing home care for older adults is increasing. Nursing staff are expected to provide both emotional and social support for residents [31]. Therefore, it is necessary and important for health providers to recognize residents' emotional reactions and assist them in making a healthy transition.

The second factor, "relationship development", aggregated two dimensions of the original NHAS, including "making friends" and "difficulty in group life". Relocation to a nursing home means the loss of relationships with families, old friends, and relatives. If old relationships with friends and family outside the nursing home are not rebuilt, limited interpersonal relationships often cause individuals to feel isolated and maladaptive [32, 33]. Wolff has highlighted the benefits of making friends in an institution, rather than relying solely on visits from family members or relatives for social relationships [34]. Therefore, new residents are often encouraged to establish new social networks, share social experiences, and realize there is a future for them in their new home.

The third factor, "acceptance of new residence", was in line with the Korean NHAS. Acceptance of new residence refers to coming to grips with living life in a nursing home [6]. When new residents settle in, become accustomed to, and accept living in a nursing home, the transition period appears to end. Today, institutionalized elder care has gradually become accepted by older adults worldwide [35], including Chinese older adults who own their own home and have relied on a long Confucian tradition of filial piety for family care at home. It is noted that acceptance is the outcome of the transitional process, which can be adaptive or maladaptive.

The last extracted factor, "feeling at home", is a new dimension compared with the original NHAS. 'Home' can be experienced as 'a haven', 'a place where people feel at ease' and 'can be themselves'. Residents strive to find a home in long-term care settings [36]. For centuries, however, elderly Chinese have relied on the Confucian tradition of filial piety, which indoctrinates adult children to provide direct physical, social, and emotional care for their aging parents. It takes time for the elderly to redefine the meaning of 'home'. Therefore, it is necessary for nursing staff to support residents in their quest to feel at home.

Limitations

The present study has several limitations that warrant further discussion. First, the sample size of this study is not big enough, which may lead to less precise parameter estimates [37]. Future studies should attempt to replicate the factor structure of the Chinese version using a larger sample, and to confirm the present results. In addition, there was a higher proportion of women than men in this sample. The residents who refused and had no physical or psychological ability to participate in this study might possess particular characteristics, which would cause biases. Second, a cross-sectional design was used in our study. The longitudinal stability over time of the adjustment level is unknown. Third, the validation of the scale was only conducted in one city. Since 10 nursing homes were involved, individual nursing home characteristics are likely to cause heterogeneity. These would be important to note when using the NHAS.

Conclusion

This study aimed to validate the NHAS scale among Chinese elders in nursing homes. Our study provides evidence that the NHAS Chinese version is a promising tool with satisfactory reliability and validity. It could be used in clinical practice for screening high-risk nursing home residents suffering from poor psychological adjustment. It could also be adopted in research on nursing home adjustment to assess residents' levels of psychological adjustment and to evaluate the effects of relevant programs.

Relevance for clinical practice

The NHAS could be a tool for screening psychological adjustment issues in nursing home residents. It also provides a reference for developing and implementing transitional care for successful adjustment to living in a nursing home.

Further research is recommended to examine additional psychometric properties of the NHAS Chinese version, and to screen high-risk nursing home residents suffering from poor psychological adjustment by using NHAS scale.

Compliance with ethical standards

Conflict of interest We have no financial or non-financial conflicts of interest to report.

Ethics approval This survey was approved by the human ethics committee of Fujian Medical University.

Informed consent Informed consent was obtained from all individual participants included in the study.

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