

# Establishing the validity and reliability of the Chinese version of the Satisfaction with the Nursing Home Instrument

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## ABSTRACT

**Background.** Accurate assessment of residents' satisfaction can provide valuable information for the implementation of quality residential care for elderly people. No validated Chinese tool is available, so this study aimed to establish the psychometric properties of the Chinese version of the Satisfaction with the Nursing Home Instrument (SNHI-C).

**Methods.** The SNHI-C content validity was assessed by an expert panel. Construct validity was determined by assessing the correlation between satisfaction and depression, health-related quality of life (HRQOL) and global quality of care. The internal consistency and stability of the SNHI-C were determined by Cronbach's method and 2-week test-retest reliability. The six-factor structure of the SNHI-C was assessed by confirmatory factor analysis. Testing was performed on a cluster sample of 330 residents from 16 residential care homes for the elderly in Hong Kong.

**Results.** The SNHI-C demonstrated good content validity (content validity index=0.93) and high construct validity. Satisfaction was found to correlate significantly with depression ( $r = -0.42$ ,  $p < 0.001$ ), the physical component of the HRQOL ( $r = 0.16$ ,  $p < 0.05$ ), the mental component of the HRQOL ( $r = 0.41$ ,  $p < 0.001$ ), and global quality of care ( $r = 0.49$ ,  $p < 0.001$ ). The SNHI-C demonstrated satisfactory internal consistency and good stability by having a Cronbach's alpha of 0.79 and an intra-class correlation coefficient of 0.94 respectively. The six-factor structure of the SNHI-C was not fully supported by the confirmatory factor analysis.

**Conclusion.** The SNHI-C is a useful tool for measuring satisfaction among Chinese elderly residential care home residents. These findings provide initial evidence of its psychometric properties.

**Key words:** Aged; Chinese; Nursing homes; Patient satisfaction; Psychometrics; Reproducibility of results

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## INTRODUCTION

With the increasing demand for residential care homes for the elderly, the quality of care provided by these homes has become an important issue. Resident satisfaction is regarded as an important

indicator of the quality of residential care for elderly people.<sup>1-3</sup> This is because satisfaction is assessed directly from the recipient's perspective and thus reflects the provider's success in meeting the recipient's values and expectations.<sup>4</sup> Accurate assessment of residents' satisfaction can provide

valuable information for implementation of quality care. Since no valid and reliable Chinese language tool is available for assessing residents' satisfaction, adopting an established tool developed in another language has been considered. The Satisfaction with the Nursing Home Instrument (SNHI) is a comprehensive satisfaction tool and has undergone psychometric testing.<sup>5</sup> It was originally developed in English, so to adopt it for the Chinese population, translation, then psychometric testing is required. The aim of this study was to establish the psychometric properties of the Chinese version of the Satisfaction with the Nursing Home Instrument (SNHI-C). The Chinese version was written in traditional Chinese characters (a type of Chinese character widely used in Hong Kong). Testing was performed on a group of Chinese residents in Hong Kong.

### **The Satisfaction with the Nursing Home Instrument**

The SNHI contains 29 items covering six dimensions: (1) respect for resident's values and preferences, (2) information, (3) physical care, (4) psychological care, (5) involvement of family, and (6) satisfaction with the environment.<sup>5</sup> Each question requires a "yes/no" response. A "yes" response indicates satisfaction while the reverse is true for a negatively phrased question. When scoring, each satisfaction response is worth one point. The total satisfaction score has a possible range of 0-29, with higher scores indicating a better satisfaction level. The SNHI content validity was supported by an expert panel of five nurses, all experienced in long-term care, and 30 nursing home residents. The SNHI construct validity was established by finding a significant association between the satisfaction score and other theoretically related constructs including depression, morale, and global quality of care. The SNHI had satisfactory internal consistency with a Cronbach's alpha of 0.81.<sup>5</sup>

The SNHI was translated from English to Chinese by following Brislin's model of translation.<sup>6</sup> This model is regarded as the most reliable method for developing an equivalent translated instrument.<sup>7,8</sup> To establish the semantic equivalence of the SNHI-C, 20 bilingual registered nurses were invited to rate the equivalence of translation between each item in the SNHI and the SNHI-C with the use of a 4-point Likert scale (1=most disagree; 2=disagree; 3=agree; 4=most agree). When the evaluator rated an item as "disagree" or "strongly disagree", he/she was also

advised to comment on the Chinese translation of the item. Any item that was rated three or above by more than 80% of evaluators was regarded as appropriately translated. On the contrary, items that could not fulfill the above criteria were revised.<sup>9</sup> Overall, 24 out of 29 items in the SNHI-C were rated as appropriately translated. The translation of the other five items was reviewed and revised according to the evaluators' suggestions. After equivalence testing, the SNHI-C was ready for psychometric testing.

### **Aim**

The aim of this study was to establish the psychometric properties of the SNHI-C. The objectives were (1) to establish the content and construct validity of the SNHI-C; (2) to establish the internal consistency and stability of the SNHI-C; and (3) to confirm the factor structure of the SNHI-C.

## **METHODS**

### **Design and sample**

This study adopted a cross-sectional design. Cluster sampling was performed to recruit subjects from care home residents in Hong Kong. Residential care homes for the elderly were randomly selected from a list provided by the Social Welfare Department, a government body responsible for supervising residential care for the elderly in Hong Kong. After obtaining approval from the superintendent of each selected residential care home, the researcher approached every resident within the homes. If they met the inclusion criteria by being: (1) ethnically Chinese, (2) >65 years of age, and (3) with intact cognitive function (abbreviated mental test score >6/10), they were invited to participate in the study. These criteria were set in order to recruit subjects who were able to both understand the questions being asked and give reliable answers.

A verbal explanation of the purpose and procedures of the study was provided to the residents. They were also assured that confidentiality and anonymity governed the use of the data. If they agreed to participate, their written consent was then obtained. Sixteen residential care homes were selected, from which 330 subjects were recruited from June 2003 to August 2003. A power analysis was used to evaluate the adequacy of the sample size. A sample size of 330 was sufficient to achieve a power >0.80 at the 0.05

level of significance for a small to medium effect size in a correlation analysis.<sup>10</sup> This sample size could also meet the requirement for performing a confirmatory factor analysis which was based on the number of paths estimated in the model.<sup>11</sup> A correlation analysis and confirmatory factor analysis were the two major statistical methods being used in this study.

### Procedure

The SNHI-C content validity was assessed by an expert panel of six registered nurses specialising in the care of elderly people in residential homes and two care home residents with a secondary educational level. They were invited to rate the appropriateness of the SNHI-C content as an assessment of the level of satisfaction with residential care homes using a 4-point Likert scale (1=not relevant; 2=unable to assess relevance without item revision or item is in need of such revision that it would no longer be relevant; 3=relevant but needs minor alteration; 4=very relevant and succinct). The content validity index (CVI) was based on the percentage of items rated relevant by the panel members. A CVI of >0.8 indicates high content validity.<sup>12</sup>

The SNHI-C construct validity was assessed by using hypothesis testing. The relationships between satisfaction and other theoretically related constructs were assessed. The three constructs selected in this study were depression, health-related quality of life (HRQOL) and global quality of care. It was hypothesised that the correlation between satisfaction and depression would be negative whereas the correlation between satisfaction and HRQOL as well as global quality of care would be positive.<sup>5,13,14</sup>

Depression was measured by the Chinese version of the Geriatric Depression Scale (GDS). This scale contains 30 questions asking the participants how they feel using a "yes/no" format. A "yes" response for a negatively phrased question is given one point as is a "no" response for a positively phrased question. The GDS score has a possible range of 0-30. A score of 11 indicates mild depression and 17 indicates severe depression. The Chinese version of the GDS has a test-retest reliability of 0.85 and a Cronbach's alpha coefficient of 0.89. Its criterion-related validity was established with the psychiatric diagnosis of depression. The concurrent validity of the Chinese version of the GDS was established with the Center for Epidemiological Studies-Depression Scale.<sup>15</sup>

Health-related quality of life was measured by the Chinese (Hong Kong) SF-12 Health Survey-Standard version 1 (SF-12). This scale has 12 items that are rated on a Likert-type scale. Two scores representing the physical and mental components of HRQOL can be calculated. They are expressed as the physical component score (PCS) and the mental component score (MCS) respectively. The scores are calculated according to published scoring algorithms, in which the response to each item is weighted separately by the PCS and MCS regression coefficient and then summated to give the PCS and MCS respectively.<sup>16</sup> For both PCS and MCS, a higher score indicates better health and functioning. The scores are norm-based on the US general population whose mean is 50 and standard deviation (SD) is 10. A score higher than 50 is above average for the US population and a score lower than 50 is below average for the US population.<sup>17</sup> A previous study using a sample of Hong Kong adults found that the PCS and MCS of the Chinese SF-12 explained 82% and 89% of the variance of the PCS and MCS of the Chinese SF-36 (full-length version) respectively.<sup>18,19</sup>

Global quality of care was assessed by one single question "Overall, how would you rate the quality of care you receive in this nursing home?". It was scored on a 4-point Likert scale ranging from 0-3 (0=poor; 1=fair; 2=good; 3=excellent).

Since the SNHI-C is a self-reported measure, internal consistency and stability can adequately reflect instrument reliability. Internal consistency was determined by using Cronbach's method and the stability assessed by testing then retesting the subjects at a 2-week interval. Lastly, the six-factor structure of the SNHI-C was assessed by confirmatory factor analysis.

### Data analysis

Descriptive statistics were used to illustrate subjects' demographic characteristics and their responses in different instruments. Pearson correlation coefficients were used to assess the correlations between satisfaction and depression, HRQOL, as well as global quality of care. An intraclass correlation coefficient was used to assess the correlation between the total satisfaction scores obtained at the test and retest occasions. The confirmatory factor analysis was used to assess the six-factor structure of the SNHI-C. The significance level was set at  $p < 0.05$ .

**TABLE**  
**Demographic characteristics of the subjects (n=330)**

Demographic characteristics		No. (%)
Gender	Female	213 (65)
	Male	117 (35)
Age (years)	66-75	69 (21)
	76-85	150 (45)
	86-95	104 (32)
	≥96	7 (2)
Education level	No	152 (46)
	<Primary	79 (24)
	Primary	53 (16)
	Secondary	41 (12)
	Tertiary	5 (2)
Length of stay in the elderly residential care home (years)	0-1	146 (44)
	2-3	101 (31)
	4-5	41 (12)
	6-7	11 (3)
	8-9	23 (7)
	≥10	8 (2)
Number of chronic illnesses	1	32 (10)
	2	63 (19)
	3	50 (15)
	4	56 (17)
	5	48 (15)
	6	38 (12)
	>6	43 (13)

## RESULTS

### Subjects' characteristics and response in the instruments

The subjects' mean age was 81.52 (SD, 7.44) years and their mean length of stay in the residential care home was 2.77 (SD, 2.61) years. On average, the subjects had 4.28 (SD, 2.63) chronic illnesses. The most common chronic illnesses reported were hypertension (34.9%), diabetes mellitus (18.9%), and osteoarthritis (18.9%). More subjects, 65%, were female and almost half, 46%, had not received any education. The subjects' demographic characteristics are summarised in the **TABLE**.

The subjects' responses in the SNHI-C were generally positive. The mean total satisfaction score was 21.98 (SD, 4.48) while their mean GDS was 12.20 (SD, 5.67), indicating that they were mildly depressed. Their responses to the SF-12 were expressed in terms

of PCS and MCS. The mean PCS was 43.89 (SD, 8.90). With a score of 50 representing the average performance of the US adult population, these findings indicated that participants' performance in the physical component of the HRQOL was poorer than that of the US adult population.<sup>17</sup> A comparison was made with local figures: it has been reported that the PCS for the Hong Kong general adult population is 51.4 and that for adults with chronic diseases is between 41.7 and 47.4.<sup>19</sup> As all the participants in the current study have chronic diseases, the PCS of 41.06 reported in this study concurred with local figures. The subjects' mean MCS was 50.87 (SD, 11.70), a performance in the mental component of HRQOL that is comparable to the US adult population.<sup>17</sup> Local research indicates that the MCS for the general adult population in Hong Kong is 48.0 while the performance for adults with chronic diseases ranges from 40.2 to 48.6.<sup>19</sup> Even though participants' responses in this study do not fit perfectly with

local figures, they were only slightly above the local reference range. Finally, the mean score for the global quality of care question was 1.76 (SD, 0.70). Such a score indicates that subjects' perception of the global quality of care fell between the fair and good category.

### Psychometric properties of the SNHI-C

These findings provide initial evidence supporting the psychometric properties of the SNHI-C as a measure of satisfaction among elderly Chinese care home residents. The SNHI-C demonstrated good content validity with a CVI of 0.93. It also demonstrated high construct validity by having significant correlation with depression ( $r = -0.42$ ,  $p < 0.001$ ), the physical component of HRQOL ( $r = 0.16$ ,  $p < 0.05$ ), the mental component of HRQOL ( $r = 0.41$ ,  $p < 0.001$ ), and the global quality of care ( $r = 0.49$ ,  $p < 0.001$ ). All of the hypotheses were supported. The SNHI-C demonstrated satisfactory internal consistency and good stability, with a Cronbach's alpha of 0.79 and an intra-class correlation coefficient of 0.94 respectively.<sup>20</sup>

Before performing the confirmatory factor analysis, it was noticed that two items in the SNHI-C revealed a multicollinearity problem and had a tetrachoric correlation equalling 1.00. These two items, which formed the "involvement of family" dimension, were removed from the item list. The remaining 27 items, covering five dimensions were considered for confirmatory factor analysis. A number of fit indices were used to illustrate the degree of overall data-model fit. Findings revealed that the chi-squared/degrees of freedom ratio ( $\chi^2/\text{d.f.}$ )=2.45, the non-normed fit index (NNFI)=0.88, the comparative fit index (CFI)=0.90, the goodness-of-fit index (GFI)=0.91, and the root mean square error of approximation (RMSEA) at a 90% confidence interval=0.068. As a reference, the goodness-of-fit criteria for the indices were  $\chi^2/\text{d.f.} < 5.00$ ,<sup>21</sup> NNFI, CFI, and GFI  $> 0.90$ ,<sup>22,23</sup> and RMSEA  $< 0.05$ .<sup>24</sup> These findings affirmed the five-factor structure of the remaining 27 items in the SNHI-C.

## DISCUSSION

### Value of the SNHI-C as a satisfaction instrument

The SNHI-C has a number of advantages that make it a desirable instrument for measuring satisfaction

among residential care home residents. First of all, the SNHI-C is specific. Unlike other satisfaction instruments that were originally developed for acute care settings, the SNHI-C was developed primarily for the residential care for the elderly setting. It is comprehensive and its content covers a wide range of aspects that pertain to residential care for elderly people. It is practical for use in a residential care home setting, taking elderly residents only 5 to 7 minutes to complete, and is easy to administer and score. It also has high applicability because it can be administered either by residential home staff or independent examiners.

This study provides strong support for the content validity, construct validity, internal consistency, and stability of the SNHI-C. Although the original SNHI-C factor structure has not been fully confirmed, its use as a tool for measuring resident satisfaction as a whole construct is still supported. Nonetheless, there may be concerns about the face validity of the instrument. The reported total satisfaction score was 21.98 (range, 5-29). Considering that the potential range of responses was 0-29, subjects' responses generally reflected a high level of satisfaction. Such a phenomenon highlights concerns about whether the subjects were able to understand and interpret the questions.

In fact, positive and favourable responses are common findings in satisfaction studies within residential care homes.<sup>3,5,25-27</sup> A number of factors have been identified as predisposing to high ratings in these studies: resident characteristics, service nature, and methodological pitfalls.<sup>25</sup> Among these three factor categories, methodological pitfalls is the aspect that falls within the researcher's arena. To deal with potential methodological pitfalls, we adopted a number of strategies including not using convenience sampling or other types of non-probability sampling to avoid selection bias; not excluding subjects who were physically frail in order to obtain a more representative sample; interviewing subjects in a private room to guarantee data confidentiality; and empowering subjects to express themselves frankly.<sup>25,28,29</sup>

With the methodological issues settled, analysis then focused on characteristics of the data. Although the data reflected subjects' favourable attitudes towards their own residential care homes, the data

still revealed a considerable degree of variation in responses as evidenced by the broad range of subjects' responses. This suggests that the subjects were able to interpret the questions and that meanings were clear. Thus, our experience lent support to the face validity of the SNHI-C.

In summary, the SNHI-C is valid, reliable and has a number of advantages. It is recommended as a useful instrument for assessing satisfaction among elderly Chinese residential care home residents.

### Limitations and recommendations

Owing to the large variation in the size and nature of residential care homes for the elderly in Hong Kong, use of cluster sampling might not recruit subjects from all types of homes. It might be desirable to control the characteristics of these homes more vigorously by performing stratified random sampling. In such a case, homes with specific characteristics are first grouped into strata from which sample selection will be made accordingly. As a result, a more representative sample can be obtained. Furthermore, as the original six-factor structure of the SNHI-C was not well supported by the confirmatory factor analysis, future study is recommended to explore or perhaps reduce the factor structure of the SNHI-C.

### CONCLUSION

The SNHI-C is a valid and reliable instrument. Since it can provide valuable guidance for both the implementation and evaluation of quality improvement programmes within residential care homes for the elderly, it is highly relevant for researchers, policymakers, administrators and practitioners who are working enthusiastically to improve the quality of residential care for the elderly Chinese population in Hong Kong.

### References

1. Kane RA, Kane RL. *Long-term care: principles, programs and policies*. New York: Springer; 1987.
2. Kruzich JM, Clinton JF, Kelber ST. Personal and environmental influences on nursing home satisfaction. *Gerontologist* 1992;32:342-50.
3. Pearson A, Hocking S, Mott S, Riggs A. Quality of care in nursing homes: from the resident's perspective. *J Adv Nurs* 1993;18:20-4.
4. Donabedian A. *Explorations in quality assessment and monitoring: the definition of quality and approaches to its assessment*. Ann Arbor:

- Health Administration Press; 1980.
5. Ryden MB, Gross CR, Savik K, Snyder M, Lee Oh H, Jang YP, et al. Development of a measure of resident satisfaction with the nursing home. *Res Nurs Health* 2000;23:237-45.
6. Brislin RW. The wording and translation of research instrument. In: Lonner WJ, Berry WJ, editors. *Field methods in cross-cultural research*. Beverly Hills: Sage; 1986:137-64.
7. Carlson ED. A case study in translation methodology using the Health-Promotion Lifestyle Profile II. *Public Health Nurs* 2000;17:61-70.
8. Jones PS, Lee JW, Phillips LR, Zhang XE, Jaceldo KB. An adaptation of Brislin's translation model for cross-cultural research. *Nurs Res* 2001;50:300-4.
9. Yu DS, Lee DT, Woo J. Issues and challenges of instrument translation. *West J Nurs Res* 2004;26:307-20.
10. Cohen J. *Statistical power analysis for the behavioral sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates; 1988.
11. Tabachnick BG, Fidell LS. *Using multivariate statistics*. 4th ed. Boston: Allyn & Bacon; 2001.
12. Lynn MR. Determination and quantification of content validity. *Nurs Res* 1986;35:382-5.
13. La Monica EL, Oberst MT, Madea AR, Wolf RM. Development of a patient satisfaction scale. *Res Nurs Health* 1986;9:43-50.
14. Davis MA, Sebastian JG, Tschetter J. Measuring quality of nursing home service: residents' perspective. *Psychol Rep* 1997;81:531-42.
15. Chan AC. Clinical validation of the Geriatric Depression Scale (GDS): Chinese version. *J Aging Health* 1996;8:238-53.
16. Ware JE, Kosinski M, Turner-Bowker DM, Gandek B. *How to score version 2 of the SF-12 health survey (with a supplement documenting version 1)*. Lincoln: Quality Metric Incorporated; 2002.
17. Resnick B, Nahm ES. Reliability and validity testing of the revised 12-item Short-Form Health Survey in older adults. *J Nurs Measure* 2001;9:151-61.
18. Lam C. Cross-cultural adaptation of the SF-36 and SF-12 physical and mental summary scales on the Chinese population [abstract]. *Qual Life Res* 2001;10:283.
19. Lam CL, Tse EY, Gandek B. Is the standard SF-12 health survey valid and equivalent for a Chinese population? *Qual Life Res* 2005;14:539-47.
20. Portney LG, Watkins MP. *Foundations of clinical research: applications to practice*. 2nd ed. Upper Saddle River: Prentice Hall; 2000.
21. Bollen KA. *Structural Equations with Latent Variables*. New York: John Wiley & Sons; 1989.
22. Marsh HW, Balla JR & McDonald RP. Goodness-of-fit indexes in confirmatory factor analysis: the effect of sample size. *Psychol Bull* 1988;103:391-410.
23. Muller RO. *Basic principles of structural equation modeling: an introduction to LISREL and EQS*. New York: Springer; 1996.
24. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA & Long JS, editors. *Testing structural equation models*. Newbury Park: Sage; 1993:136-42.
25. Chong AML. Validating the accuracy of the resident satisfaction measure. *J Cross Cult Gerontol* 2003;18:203-26.
26. Kane RA, Caplan AL, Urv-Wong EK, Freeman IC, Aroskar MA, Finch M. Everyday matters in the lives of nursing home residents: wish for and perception of choice and control. *J Am Geriatr Soc* 1997;45:1086-93.
27. Levkoff S, DeShane MR. Evaluation of service by clients: an idea whose time is yet to come. *J Gerontol Social Work* 1979;2:55-65.
28. Chou SC, Boldy DP, Lee AH. Measuring resident satisfaction in residential aged care. *Gerontologist* 2001;41:623-31.
29. Zinn JS, Lavizzo-Mourey RL, Taylor L. Measuring satisfaction with care in the nursing home setting: the Nursing Home Resident Satisfaction Scale. *J Appl Gerontol* 1993;12:452-65.