Preliminary Findings on the Psychometric Properties of the Chinese Version Verbal and Non-verbal Interaction Scale (C-VNVIS)

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Abstract

Communication between caregivers and care recipients is crucial in providing quality nursing care. However, older persons with cognitive impairment have major difficulties in verbal communication due to deterioration in their ability to express themselves verbally. The Chinese version Verbal and Non-verbal Interaction Scale (C-VNVIS-CR) was developed to assess behavioural responses in an all-round approach that captures both the sociable (such as calm, relaxed) and unsociable (such as argumentative, shouting) versus the verbal and non-verbal behavioural responses that may be observed in cognitively impaired people. The preliminary results show that it has satisfactory levels of inter-rater and test-retest reliability as well as internal consistency, but only modest levels of correlation with another observational scale for assessing cognitively impaired people emotional changes. Thus, further validation studies of the C-VNVIS-CR are necessary. However, the most important point of this study is that it sheds new light on how cognitively impaired residents' responses can be assessed in a reliable and systematic manner. This is an important first step to evaluate and monitor the quality of care provided to them based on their behavioural responses via the consistent use of C-VNVIS-CR - an observation-based instrument.

Keywords: cognitively impaired, Chinese version of C-VNVIS-CR, communication behaviours

Introduction

Effective interaction is a fundamental element of nursing care that is integral to the provision of quality patient care (Ravert, Williams, & Fosbinder, 1997; Wilkinson, Bailey, Aldridge, & Roberts, 1999). A recent study found that there was a strong relationship between patients' perceived satisfaction and nurse-patient interaction (Locke, Stefano, Koster, Taylor, & Greenspan, 2011).

Ageing is associated with causes deterioration in physical, psychosocial and cognitive functions, making older people vulnerable to health problems that require

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unique health care (Chang, Chen, & Su, 2012). These changes are much more pronounced in older people with cognitive impairment, who have problems expressing ideas, interpreting communication and interacting with others (Hammar, Emami, Götell, & Engström, 2011). Research also found that older people with impaired communication due to cognitive impairment are usually excluded from social interaction (Chen & Boore, 2010). This group of older people are likely to experience social and emotional isolation in all healthcare settings. Therefore, proper interaction between cognitively impaired older people and their caregivers is important in the delivery of appropriate nursing care according to individual needs (Chang et al., 2012).

Whilst the importance of communication in the care of older people with cognitive impairment has been recognised, there has been very little study of the ways in which residents with cognitive impairment seek each other and socially interact. One of the major reasons for the lack of quantitative studies is that there is no objective measurement available to assess interactions between caregivers and care recipients with cognitive impairment. The Verbal and Non-verbal Interaction Scale (VNVIS) was developed in view of this (Williams & Parker, 2012). It aims to objectively assess, monitor and evaluate the interaction between caregivers (CG) and care recipients (CR) with cognitive impairment on a regular basis. It can help to enhance quality and efficiency in caring for the instrumental and emotional needs of older people with cognitive impairment, particularly those with communication impairment.

Verbal and Non-verbal Interaction Scale (VNVIS)

The VNVIS is an observation-based instrument and has two versions for two different populations, including caregivers and cognitively impaired care recipients. Both versions have been found to be reliable and valid (Engström, Hammar, Williams, & Götell, 2011; Williams & Parker, 2012). The present study focused solely on administering the care-recipient version (Appendix 1) (Williams & Parker, 2012).

The VNVIS-CR assesses the behavioural responses of cognitively impaired older people by rating the frequency and occurrence of 24 sociable and unsociable communication behavioural items over a 10-minute interval (Williams & Parker, 2012). The sociable total subscale encompasses items such as clamming up, responsive, and coherent behaviours, whereas the unsociable total subscale includes items such as non-responsive, angry, and irrelevant behaviours. The sociable and unsociable total subscales can be further divided into four subscales (i.e. the Non-verbal Sociable subscale X 4 items [e.g. looks at interlocutor], the Verbal Sociable subscale x 7 items [e.g. uses coherent communication], the Non-verbal Unsociable subscale x 7 items [e.g. appears aloof] and the Verbal Unsociable subscale X 5 items [e.g. shouts]) (Williams & Parker, 2012).

The scale is scored by reviewing a 10-minute video record of daily interactions while CRs are receiving nursing care. Each minute of the video record is treated as a discrete interval for recording the occurrence (score = 1) or non-occurrence (score = 0) of the target behavioral item on the VNVIS-CR. Each item score is then obtained by summation of the scores of the target behaviours over the 10-minute intervals. The total score ranges from 0 (the behaviour was not observed during the entire interval) to 10 (the behaviour occurred at least 10 times during the 10-minute interval). All sociable items are summed to obtain the total sociable score, whereas the total unsociable score is obtained by adding up all the scores from the unsociable items. The highest possible score on each of these two subscales is 120. Higher scores on the sociable subscale are more desirable and may indicate supportive communication of the CRs. Higher scores on the unsociable subscale would

indicate problematic communication patterns. The psychometric properties of the VNVIS-CR have been established in a previous study (Engström et al., 2011). Cronbach's alpha was 0.77 for the sociable subscale and 0.80 for the unsociable subscale. Inter-rater reliability was r = 0.61, p < 0.01 for the sociable subscale and r = 0.65, p < 0.01 for the unsociable subscale. Test-retest reliability for the sociable scale was r = 0.75, p < 0.01 and r = 0.493, p =0.08 for the unsociable scale.

Before the VNVIS-CR can be widely adopted in local healthcare settings, its contents must be translated into Chinese. Forward and backward translations were adopted and two bilingual Chinese linguists with master's degrees in linguistics were involved in the translation process. Apart from different languages, the length of the video for rating was reduced to 5 minutes to keep interference in the daily operation of the nursing homes to a minimum. As the duration of the video records was shortened by half in the Chinese version, the maximum scores of its subscales were also decreased by half compared to the original scale (Table 1). The original scale developer was consulted and agreed to this modification in the Chinese version, VNVIS-CR (C-VNVIS-CR). One of the purposes of this study was also to evaluate the feasibility of reducing the duration of the video.

Table 1
Scale Structure of VNVIS-CR* and C-VNVIS-CR*

Major Category	Sub-scale	No. of Items	VNVIS-CR Maximum Score	C-VNVIS-CR Maximum Score
	Nonverbal	7	70	35
	Verbal	5	50	25
		12	120	60
Sociable total				
	Nonverbal	7	70	35
	Verbal	5	50	25
Unsociable total		12	120	60
	Total	24	240	120

*VNVIS-CR: Verbal non-verbal interaction scale — care recipient
* C-VNVIS-CR: Chinese version of verbal non-verbal interaction scale — care recipient

The aim of this study was to evaluate the preliminary psychometric properties of the C-VNIVIS-CR in terms of inter-rater and test-retest reliability and internal consistency, as well as the correlation between C-VNVIS-CR with another observational scale for assessing cognitively impaired people emotional changes (i.e. Observed Emotional Rating Scale [ORES]).

Method

A validation study was used to evaluate the psychometric properties of the C-VNVIS-CR.

Participants

A convenience sample of 15 residents was recruited in a local long-term care home. To

be included in this study, residents had to be 65 years of age or older, and have lived in the home for more than three months to avoid anxiety and distress due to the unfamiliar new environment. Participants' cognitive status was assessed by the Chinese-Abbreviated Mental Test (C-AMT) (Chu, Pei, Ho, & Chan, 1995). A C-AMT score of 5 or less was used to determine cognitive impairment. Only residents with C-AMT scores less than or equal to 5 were recruited into this study. Residents were excluded if they had any conditions known to influence their usual behavioural patterns, such as experiencing any distressing social circumstances, for example, the recent death of a close relative; or if they were suffering from any acute physiological / psychiatric illnesses during the study period.

Procedures

The superintendent of the home identified the potential participants. The purpose of the present study was explained to the participants and their family members. As all participants were cognitively impaired, informed consent to join this study was sought from their family members. The participants' demographic data was obtained from their nursing chart. Five-minute videotaping was conducted while they were doing exercises in either physiotherapy (PT) or occupational therapy (OT) sessions. Each participant was videotaped four times within two weeks, once every 3 to 4 days. Eventually, 60 videos were obtained from 15 participants by a research assistant in any of the following locations: the PT room, the OT room, the conference room, the dining room, or participants' bedroom while they were doing exercise under the supervision of the PT or OT therapists or their assistants. The exact videotaping site depended on the availability of PT or OT sessions. All the videos were scored by two raters using the C-VNVIS-CR separately and independently to establish inter-rater reliability. Also, the

individual raters scored the same video twice at a two-week interval to establish the test-retest reliability. To avoid expectation bias, another two raters who were unaware of the C-VNVIS-CR scores used the ORES to score the videos. These two sets of scores were compared to evaluate the correlations. None of the raters were involved in any video-taping.

Instrument

Observed Emotional Rating Scale (ORES). The ORES is an observation-based tool for assessing emotional changes in long-term care home residents with dementia (Lawton, Van Haitsma, Perkinson, & Ruckdeschel, 1999) by observing their facial expressions and body language. It aims to measure five emotions: pleasure, anger, anxiety/fear, sadness and general alertness. Each emotion is rated on a 5-point Likert scale based on the duration of each emotional occurrence. To quantify behavioural responses of cognitively impaired older people while they are receiving care is a relatively new concept. No instrument with a similar measure construct could be identified even after extensive literature review. It is hypothesized behavioural responses of cognitively impaired older people were mostly affected by their mood changes. It is found that some of the assessment items in the ORES did show correlations with the VNVIS-CR. For example, the nonverbal unsociable subscale score of the VNVIS-CR showed a significant correlation with the anger item ($r =0.37$, $P < 0.02$) of the OERS. In this preliminary study, we aim to explore the correlations between the VNVIS-CR and the 5 common mood changes in cognitively impaired older peole while receiving nursing care measured by ORES. It helps to pave the ways to identify more appropriate strategies to establish the validity of VNVIS-CR.

Rater training

To ensure that all raters can use different instruments in a consistent and accurate manner, rater training was conducted prior to data collection by the PI based on the detailed user guides of all the instruments. Inter-rater reliability was established to an acceptable level of ICC above 0.9 after the training.

Ethical consideration

Ethical approval was obtained from the Ethics Review Committee of The Hong Kong Polytechnic University prior to the study. Informed proxy consents were sought from the legal guardians or next of kin of all participants. Information sheets describing and explaining the nature of this study were provided to the participants and their relatives. We assured the participants that there would be no penalties if they were to withdraw from the study at any time. Anonymity and confidentiality were strictly protected.

Data analysis

The data were analysed using the Statistical Package for the Social Sciences 21 (SPSS 21). A value of $p < 0.05$ was considered statistically significant. Descriptive statistics were used to evaluate the demographic nature of the participants. The reliability coefficients (i.e. inter-rater and test-retest reliability) were evaluated by calculating the intraclass correlation coefficient (ICC). The internal consistency was determined by calculating the Cronbach's alpha. The correlations were established by calculating the Spearman's rank correlation coefficients (rs) between the scores of the C-VNVIS-CR and the OERS.

Results

The mean age of the 15 participants was 83.65 (SD = 10.37), with a range from 65 to 102). 9 (60%) were male and 6 (40%) were female. Most of the subjects (87%) were either illiterate or had only primary school level education, which showed their low educational background. All of the participants scored five or below in the C-AMT, which indicated that they were cognitively impaired. Table 2 shows the demographic characteristics of the 15 participants. The C-VNVIS-CR mean score on the sociable subscale was 19.58 ± 8.80 out of 60, while that on the unsociable subscale was 3.70 ± 4.15 out of 60 (Table 3). The descriptive statistics of each item in the C-VNVIS-CR are shown in Table 4. There was no observation of any of the items under the verbal unsociable subscale.

Reliability

Test-retest and inter-rater reliability

Thirty-four out of 60 videos were randomly selected in order to assess the test-retest reliability. The C-VNVIS-CR demonstrated good test-retest reliability, with values of 0.88 and 0.92 for Raters 1 and 2, respectively. In general, excellent inter-rater reliability were obtained when using the C-VNVIS-CR to assess participants' responses while they were doing exercises under the supervision of physical or occupational therapists (PT or OT), with average ICC values of 0.96 for all 60 videos rated between Raters 1 and 2.

Internal consistency reliability

The Cronbach's α of each subscale (i.e. sociable and unsociable) was calculated to examine the homogeneity of the tool items. The Cronbach's alpha was 0.91 for the sociable subscale and 0.77 for the unsociable subscale, indicating that the two sub-scales of the C-VNVIS-CR had an adequate level of internal consistency. In other words, all items within the same subscale measured with similar characteristics.

Table 2
Characteristics of the participants (n = 15)

Characteristics	M	SD
Age (years)	83.65	10.34
Duration in Residence (months)	65.53	61.43
AMT Scores	3.13	1.51

	Frequency (n)	Percentage (%)
Gender		
Male	9	60.0
Female	6	40.0
Marital Status		
Single	1	5.9
Married	7	41.2
Widowed	9	52.9
Falls within 12 Months (times)		
0	13	86.7
1	1	6.7
3	1	6.7
Education Level		
No formal education	6	40.0
Primary school	**7**	**46.7**
Secondary school	2	13.3
Religion		
None	8	53.3
Traditional Chinese	3	20.0
Taoism	1	6.7
Christianity	3	20.0

Table 3
Descriptive statistics of the C-VNVIS-C* subscales

Subscales	Min.	Max.	M	SD
Sociable-verbal	0	20	4.98	5.53
Sociable-nonverbal	4	21	14.74	4.34
Sociable Total Score	0	41	19.58	8.80
Unsociable-verbal	0	6	0.10	0.77
Unsociable-nonverbal	0	14	3.68	4.17
Unsociable Total Score	0	14	3.70	4.15

* C-VNVIS-CR: Chinese version of verbal non-verbal interaction scale — care recipient

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Table 4
Descriptive Statistics of the C-VNVIS-CR*

Communication behavioural items	Min.	Max.	M	SD
Nonverbal sociable items				
1. Looks at interlocutor	2.00	5.00	3.93	1.12
2. Appears interested	1.13	5.00	4.03	1.22
3. Affectionate	0.00	0.25	0.04	0.08
4. Positive affect (e.g. smiling, reaching)	0.38	3.63	1.78	1.20
5.Calm, relaxed	4.88	5.00	4.98	0.04
Nonverbal unsociable items				
6. Appears aloof	0.38	4.88	1.84	1.17
7. Stares into space, mute	0.25	4.75	1.49	1.22
8. Smiles or laughs inappropriately	0.00	0.00	0.00	0.00
9. Does not respond to questions	0.00	0.88	0.13	0.27
10.Argumentative	0.00	0.00	0.00	0.00
11.Rejecting	0.00	0.25	0.02	0.07
12. Verbalises negative affect	0.00	0.25	0.02	0.07
Verbal sociable items				
13.Uses coherent communication	0.25	3.38	1.65	1.07
14.Uses relevant communication	0.25	3.38	1.67	1.10
15.Uses interlocutors name	0.00	0.50	0.07	0.15
16.Asks appropriate questions	0.00	0.75	0.15	0.25
17.Asks for reassurance	0.00	0.38	0.07	0.14
18.Responds to questions	0.13	3.13	1.51	0.94
19.Reports positive affect	0.00	0.38	0.03	0.10
Verbal unsociable items				
20.Doesn't make sense	0.00	0.00	0.00	0.00
21.Shouting	0.00	0.00	0.00	0.00
22.Cursing	0.00	0.00	0.00	0.00
23.Incoherent	0.00	0.00	0.00	0.00
24.Irrelevant	0.00	0.00	0.00	0.00

* C-VNVIS-CR: Chinese version of verbal non-verbal interaction scale — care recipient

Correlations between C-VNVIS-CR and OERS

The Spearman correlations between the subscales of the C-VNVIS-CR and the five emotional items of the OERS were circulated (Table 5). The unsociable subscales showed no correlation with any of the emotional items of the OERS. The sociable non-verbal subscale and the sociable total subscale showed a mild correlation with the "Pleasure" item in the OERS (i.e. $\rho = 0.39$, $p < 0.01$ and $\rho = 0.35$, $p < 0.01$, respectively). Interestingly, the sociable verbal subscale and the sociable total subscale were significantly and positively correlated with the "sadness" item in the OERS (i.e. $\rho = 0.35$ and $\rho = 0.23$, $p < 0.05$, respectively). The "general alertness" item in the OERS was found to have a significant negative correlation with the sociable non-verbal subscale (i.e. $\rho = -0.22$, $p < 0.05$).

Table 5
Correlation coefficients of the C-VNVIS-CR[#] subscales to the OERS[#] emotion items

	Spearmans rank correlation coefficients (ρ)					
Emotional item of the OERS	Sociable verbal	Sociable non-verbal	**Total sociable subscale**	Unsociable verbal	Unsociable non-verbal	**Total unsociable subscale**
Pleasure	.179	.390**	.346**	^NA	-.012	-.012
Anger	.210	.152	.203	^NA	.016	.016
Anxiety/fear	.144	.152	.154	^NA	-.124	-.124
Sadness	.260*	.100	.230*	^NA	-.180	-.180
General alertness	.140	-.221*	-.064	^NA	.124	.124

Note. * $p < .05$; **$p < .01$

[#] C-VNVIS-CR: Chinese version of verbal non-verbal interaction scale — care recipient

[#] OERS: Observed Emotional Rating Scale

^NA : Not applicable, as all scores for the verbal unsociable items are zero, no correlation can be calculated.

Discussion

Based on our results, the C-VNVIS-CR demonstrated a satisfactory level of reliability in terms of inter-rater reliability, test-retest reliability and internal consistency. However the internal consistency of the unsociable subscale was relatively less satisfactory when compared with other reliability indexes. It may be due to the unsociable items covered a diverse range of behavioral responses from mute to shouting as well as from unresponsive to argumentative. Although all these behaviours were classified as unsociable responses in C-VNVIS-CR, they represent disparate behaviours which may contribute to the relatively less satisfied internal consistency of the unsociable items. Additionally, all the items for unsociable subscale were zero, meaning that these behaviors are very uncommon or non-existent in this sample. The reliability indexes established from this study cannot reflect the degree of agreement of this scale when assessing care-recipients with diverse unsociable behavioural responses.

On the other hand, the C-VNVIS-CR only demonstrated a modest level of correlations in its sociable subscale compared with the ORES. Only the "pleasure" and "sadness" items in the

OERS showed significant correlation with the sociable total subscale of the C-VNVIS-CR. It is understandable that people with cognitive impairment might still be able to exhibit sociable non-verbal behaviour (e.g. smiling, touching, calm and relaxed) when they feel pleasant or sociable verbal behaviour (e.g. using relevant and coherent communications) when they feel sad.

Conversely, no significant correlation was found between the unsociable total subscale of the C-VNVIS-CR and the OERS. One of the possible explanations is that unsociable verbal behaviors were displayed relatively less frequently by the Chinese participants in this study. The appropriateness of social interaction is considered an important social norm in Chinese culture, with the Chinese tending to inhibit their negative moods or behaviours so as to maintain a polite social image (Chang, Lin & Chou, 2009).

In addition, the videotaped scenarios were limited to OT and PT sessions in the present study, which were likely to be perceived by the participants as a relatively pleasant and enjoyable moment and therefore probably reduced the chances of the participants exhibiting unsociable communication behaviours. Therefore, the findings may only reflect a part of the picture concerning the behavioural responses of cognitively impaired residents while exercising.

Limitations and suggestions for further study

This study has several limitations because the participant sample was small and recruited from one long-term care home. However, these limitations may also be viewed as suggestions for future study in order to establish more evidence that the C-VNVIS-CR can be used to qualify cognitively impaired residents' behavioural responses. Research observations were limited to PT and OT sessions. Future

validation studies should include more common scenarios for videotaping in order to better capture the daily interactions between caregivers and cognitively impaired residents in long-term care homes. Additionally, it is also worth administering both the CG and the CR versions of C-VNVIS in a future study in order to assess the social interactions between these two parties in a more holistic manner. Finally, in the future, the C-VNVIS could be used for real-time assessments. These assessments could be compared with the assessments based on videos. If the findings are similar, this would support the use of the C-VNVIS in routine clinical care.

Conclusion

The use of the objective tool, C-VNVIS-CR, in this study sheds new light on how cognitively impaired residents' responses, emotions and moods can be assessed in a reliable and systematic manner. In order to provide better care for residents with cognitive impairment, it is imperative that more effort and time be invested in identifying and fulfilling their needs. By using the C-VNVIS-CR, cognitively impaired residents' behavioural responses while receiving different care can be systematically recorded. This record can be used to evaluate the quality of care as well as being used for future comparison of individual cognitively impaired residents' behavioural response changes over time. This helps to identify their true emotional responses to various care or interactions with their caregivers. Hence, it is an important first step to evaluating and monitoring the quality of interactions between them while consistently using an observation-based instrument - C-VNVIS-CR, during their daily interactions. However, all scores for the verbal unsociable items were zero. Thus, the findings, particularly the reliability of the unsociable subscale should be interpreted with cautions. Additionally, the generalizability of the findings in this

study is limited by its small sample size as well as only included relatively pleasant and enjoyable conditions.

摘要

語言和非語言的互動量表(被照顧者)心理測量特性的初步確立

照顧者和被照顧者之間的溝通是提供優質護理服務的關鍵。但是，由於患有認知障礙的長者的言語表達能力已衰退，因此他們未必能夠進行言語溝通互動。發展C-VNVIS-CR就是用以全方位評估認知障礙者的行為反應，捕捉有可能在他們身上觀察到的社交(例如鎮靜和輕鬆)和非社交(例如爭吵和呼喝)及言語和非言語的行為反應。 初步結果顯示雖然C-VNVIS-CR的觀察者評分信度、再測信度和內部一致性信度都處於滿意水平，但與另一份用以量度認知障礙人士情緒轉變的觀察量表的相關係數只有中度水平。 因此， 這需要進一步的驗證研究以收集更多證據支持C-VNVIS-CR的效度。然而，這項研究最重要的一點是能夠進一步了解如何對有認知障礙的長者的反應進行可靠和有系統的評估。另外，這亦為使用觀測量表(即 C-VNVIS-CR) 量度認知障礙長者的行為表現，並持續地評估和監測給予他們的護理的品質踏出重要的一步。

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Appendix 1- Chinese version C-VNVIS-CR

分鐘	1	2	3	4	5	總分
非言語, 適當社交行為						
1. 看著對方						
2. 表現出感興趣						
3. 溫柔親切						
4. 正面情緒 (例如：微笑、容易親近)						
5. 平靜、放鬆						
非言語, 不適當社交行為						
6. 無動於衷						
7. 凝視空氣、無言						
8. 不適當地微笑或大笑						
9. 不回應問題						
10. 爭辯						
11. 拒絕						
12. 發出負面的聲音（例如：嘆氣）						
言語, 適當社交行為						
13. 連貫的溝通						
14. 切題的交流						
15. 稱呼對方的名字						
16. 提出適當的問題						
17. 尋求保證/安慰						
18. 回應問題						
19. 口頭表達正面情緒						
言語, 不適當社交行為						
20. 不合常理						
21. 大叫						
22. 咒罵						
23. 不連貫						
24. 離題						