Validation of the Comprehensive Needs Assessment Tool (CNAT) in patients with advanced cancer

G. Yang[1], G. Pang[1], G.L. Lee[2], P. Neo[1], Y.Y. Wong[1], D. Qu[1], Y.B. Cheung[3].
[1]National Cancer Centre, Department of Supportive and Palliative Care, Singapore, Singapore.
[2]National University of Singapore, Department of Social Work- Faculty of Arts and Social Sciences, Singapore, Singapore.
[3]Duke-NUS Medical School, Centre for Quantitative Medicine, Singapore, Singapore

Introduction:
The 59-item Comprehensive Needs Assessment Tool (CNAT) for cancer patients is an English language survey for needs assessment developed and validated in South Korean cancer patients. The objective of this study was to validate the English version of CNAT in advanced cancer patients in Singapore.

Methods:
This is a cross-sectional survey where advanced cancer patients completed the CNAT in English. Confirmatory factor analysis was used to assess construct validity. For known groups validity, independent samples t-test was used to compare CNAT scores based on Karnofsky performance status and outpatient versus inpatient setting. Cronbach's alpha was used to measure internal consistency.

Results:
A total of 328 advanced cancer patients were recruited. The mean age was 59.6 years and 49.1% were male. Majority (68.0%) were Chinese, 20.4% were Malay, 7.9% were Indian and 3.7% were of other ethnicities. The 7-factor model previously established in Korea showed sufficient construct validity with RMSEA 0.037 and CFI 0.944. All 59 items had a factor loading ≥0.5. Group invariance test showed no difference in pattern of factor loadings between ethnic Chinese and other ethnic groups (P=0.155). For known groups validity, there were significant differences in CNAT scores by performance status and outpatient versus inpatient setting. The CNAT total and factor scores showed good internal consistency with Cronbach's alpha of between 0.80 and 0.937.

Table 1 – Demographic and clinical characteristics

Characteristic	Frequency and percentage (n=328)
Age (years), mean SD	59.6 (10.7)
Ethnicity	
Chinese	223 (68.0%)
Malay	67 (20.4%)
Indian	26 (7.9%)
Others	12 (3.7%)
Gender	
Male	161 (49.1%)
Female	167 (50.9%)
Marital status	
Single	50 (15.2%)
Married and living with spouse	243 (74.1%)
Married and living separately from spouse	5 (1.5%)
Divorced	10 (3.1%)
Widowed	20 (6.1%)
Highest education level	
Primary	29 (8.8%)
Secondary	168 (51.2%)
Post-secondary	130 (39.6%)
Employed	114 (34.8%)
Clinical setting	
Inpatient	131 (39.9%)
Outpatient	197 (60.1%)
Cancer type	
Lung	54 (16.5%)
Breast	57 (17.4%)
Colorectal	62 (18.9%)
Others	155 (47.3%)
Receiving chemotherapy	166 (50.6%)
Receiving radiotherapy	26 (7.9%)
Karnofsky performance status 70 and above (able to care for self)	198 (60.4%)

Table 2: Distribution of CNAT factor and total scores

	Mean (SD)	Floor score, n (%)	Ceiling score, n (%)
Factor 1: Information and education (10 items)	19.5 (22.6)	130 (21.7%)	9 (1.5%)
Factor 2: Psychological problems (10 items)	16.4 (21.5)	200 (33.3%)	3 (0.5%)
Factor 3: Healthcare staff (8 items)	11.0 (18.3)	302 (50.3%)	2 (0.3%)
Factor 4: Physical symptoms (12 items)	13.3 (16.6)	159 (26.5%)	0 (0%)
Factor 5: Hospital facilities and services (6 items)	12.9 (17.5)	238 (39.7%)	2 (0.3%)
Factor 6: Social and religious/ spiritual support (5 items)	7.9 (14.1)	349 (58.2%)	1 (0.2%)
Factor 7: Practical support (8 items)	13.4 (17.4)	217 (36.2%)	2 (0.3%)
Total score (59 items)	14.1 (14.7)	23 (3.8%)	0 (0%)

Table 3: CNAT factor and total scores by Karnofsky performance status (KPS)

	KPS 70 and above (able to care for self) Mean (SD), n=198	KPS 60 or less (needs assistance) Mean (SD), n=130	P value
Factor 1: Information and education (10 items)	20.6 (25.3)	26.8 (25.6)	0.03
Factor 2: Psychological problems (10 items)	14.7 (21.0)	22.5 (25.1)	<0.01
Factor 3: Healthcare staff (8 items)	11.3 (20.5)	15.4 (21.9)	0.08
Factor 4: Physical symptoms (12 items)	11.6 (18.3)	18.4 (18.5)	<0.01
Factor 5: Hospital facilities and services (6 items)	10.5 (17.8)	19.6 (20.7)	<0.01
Factor 6: Social and religious/ spiritual support (5 items)	7.8 (15.8)	10.6 (16.7)	0.13
Factor 7: Practical support (8 items)	10.1 (16.3)	20.8 (22.0)	<0.01
Total score (59 items)	13.0 (16.2)	20.0 (17.5)	<0.01

Table 4: CNAT factor and total scores by setting

	Outpatient setting, Mean (SD), n=197	Inpatient setting, Mean (SD), n=131	P value
Factor 1: Information and education (10 items)	19.4 (24.3)	28.6 (26.5)	<0.01
Factor 2: Psychological problems (10 items)	13.1 (19.8)	25.0 (25.5)	<0.01
Factor 3: Healthcare staff (8 items)	8.6 (17.1)	19.4 (24.7)	<0.01
Factor 4: Physical symptoms (12 items)	9.9 (15.1)	21.0 (21.3)	<0.01
Factor 5: Hospital facilities and services (6 items)	8.9 (15.3)	21.9 (22.4)	<0.01
Factor 6: Social and religious/ spiritual support (5 items)	7.1 (13.5)	11.6 (19.4)	0.01
Factor 7: Practical support (8 items)	9.2 (13.9)	22.2 (23.6)	<0.01
Total score (59 items)	11.4 (13.9)	22.2 (19.3)	<0.01

Conclusions:
The CNAT showed construct and known-group validity and internal consistency in our study sample and can be used to assess the level of unmet needs for advanced cancer patients in the Singapore context.