

The Distress Thermometer does not predict cancer-related cognitive dysfunctions in cancer patients undergoing curative treatment



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BACKGROUND

Cancer-related cognitive dysfunction is an important side-effect reported among breast and other cancer patients. Initially, these problems were attributed to a chemotherapeutic treatment. However, research has shown that psychological factors such as distress may also play a role in its development.

OBJECTIVES

We aimed to validate the Distress Thermometer, accompanied by the 38-item Problem List, as a screening tool to detect cancer-related cognitive dysfunctions in cancer patients 6 months after treatment start through receiver operating characteristics analysis (ROC).

METHODS

Patients were recruited at the Kortrijk Cancer Center. All cancer patients (≥ 18 years) with a histologically confirmed diagnosis of a solid tumor or hematologic malignancy, who were scheduled to receive an anticancer treatment with curative intent, were invited to participate in this trial. Consenting patients underwent a baseline assessment and one 6 months after treatment start. Patients were screened by the Distress Thermometer (cut-off ≥ 4) and the 38-item Problem List followed by a neuropsychological assessment (Table 1) and self-assessment tools (Table 2).

Table 1: Neuropsychological assessment

Test	Domain
Controlled Oral Word Association Test (COWA): animals	Semantic word fluency
Controlled Oral Word Association Test: 'N'	Phonetic word fluency
Rey's Auditory Verbal Learning Test (AVLT): delayed recall	Verbal learning Verbal episodic memory
Complex Figure Test (CFT): delayed recall	Visual episodic memory
WAIS-III Digit Span	Attention Working memory
WAIS-III Digit Symbol	Executive function
Trail Making Test (TMT): condition 2	Executive function
Trail Making Test: condition 4	Executive function

Table 2. Self-assessment tools

Questionnaire	Domain
Distress Thermometer	Psychological distress
Hospital anxiety and depression scale	Anxiety and depression
FACIT Fatigue-scale	Fatigue
Cognitive Failure Questionnaire	Subjective cognitive functioning
EORTC QLQ C-30	Quality of life

According to the International Cognition and Cancer Task Force (ICCTF), a cognitive impairment was defined as presenting with two or more test scores of $\geq 1,50$ standard deviations (SDs) below published norms or one test score of $\geq 2,00$ SDs below norms.

REFERENCES

Wefel J.S., Vardy J., Ahles T., Schagen S.B. International Cognition and Cancer Task Force recommendations to harmonise studies of cognitive function in patients with cancer. *Lancet Oncol.* 2011;12(7):703-708

RESULTS

A total of 125 patients were included. Of those, 100 patients were evaluated 6 months after treatment start. Patients had a mean age of 61 years (range 30-85). They presented with a histologically confirmed diagnosis of breast cancer (44.0%), digestive cancer (28.8%), genitourinary cancer (11.2%), gynecologic cancer (8.0%), hematologic malignancy (4.8%) or lung cancer (3.2%). The majority of patients (87.2%) had also undergone surgery (Table 3).

Table 3: Demographic and medical data (n=125)

DEMOGRAPHICS	N (%)
Gender	
Male	43 (34.4)
Female	82 (65.6)
Education	
Primary education	0
Lower secondary education	37 (29.6)
Higher secondary education	48 (38.4)
Higher education	35 (28.0)
Other	5 (4.0)
MEDICAL DATA	
Stage	
Early stage (I-II)	78 (62.4)
Late stage (III-IV)	47 (37.6)
Treatment	
Radiotherapy alone	9 (7.2)
Chemotherapy alone	31 (24.8)
Hormonal treatment alone	1 (0.8)
Chemoradiotherapy	31 (24.8)
Radiotherapy + hormonal treatment	50 (40.0)
Chemotherapy + hormonal treatment	1 (0.8)
Chemoradiotherapy + hormonal treatment	2 (1.6)

At baseline, patients presented with a mean distress score of 4.4 (range 0-9.0). 29.6% of patients presented with a cognitive impairment according to the ICCTF definition. Six months after treatment start, the remaining 100 patients had a mean distress score of 3.6 (range 0-9.0). Of those, 29.0% patients presented with a cognitive impairment. Table 4 indicates the z-scores (mean=0;SD=1) per test of these 100 patients.

Table 4: Mean z-scores per test baseline and 6 months after treatment start (n=100)

Test	Baseline (range)	6 months (range)
COWA: animals	0.14 (-2.70 – 2.79)	0.20 (-2.37 – 3.56)
COWA: 'N'	0.13 (-2.47 – 2.87)	0.22 (-2.78 – 4.49)
AVLT: delayed recall	-0.14 (-6.09 – 2.00)	-0.52 (-7.00 – 2.00)
CFT: delayed recall	0.13 (-1.53 – 1.83)	0.50 (-2.54 – 1.98)
WAIS-III Digit Span	0.18 (-2.00 – 3.00)	0.32 (-2.33 – 3.00)
WAIS-III Digit Symbol	0.43 (-2.67 – 3.00)	0.51 (-2.33 – 3.00)
TMT: condition 2	0.36 (-3.00 – 2.00)	0.44 (-3.00 – 1.67)
TMT: condition 4	0.18 (-3.00 – 1.67)	0.41 (-3.00 – 1.33)

ROC-analysis did not indicate that the Distress Thermometer can predict cancer-related cognitive impairment (AUC=0.330; 95%CI(0.205-0.456)).

CONCLUSION

Results indicate that the Distress Thermometer, based on the ROC-analysis, can not predict cancer-related cognitive dysfunctions in cancer patients and that other factors may influence the observed impairments.

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