Brief Methodological Report

Italian Version of Cancer Dyspnea Scale: Cultural-Linguistic and Clinical Validation in Patients With Advanced Cancer Disease in Palliative Care Settings

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Abstract

Context. The Cancer Dyspnea Scale (CDS) is a self-reported multidimensional tool used for the assessment of dyspnea, a subjective experience of breathing discomfort, in patients with cancer. The scale describes dyspnea using three distinct factors: physical, psychological, and discomfort at rest.

Objectives. To crossculturally validate the Italian version of CDS (CDS-IT) and examine its content validity, feasibility, internal consistency, and construct validity in patients with advanced cancer.

Methods. A cross-sectional study was conducted. CDS-IT was forward-backward translated, and its content was validated among a group of experts. Cronbach's α coefficients were used to assess the internal consistency. Construct validity was examined in terms of structural validity through confirmatory factor analysis, and convergent validity was examined with Visual Analogue Scale Dyspnea through the Pearson's correlation coefficient (r). Cancer Quality of life (European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 15 Palliative Care) and Italian Palliative Outcome Scale were also tested.

Results. The CDS-IT was crossculturally validated and showed satisfactory content validity. A total of 101 patients (mean age = 76 [SD = 12]; 53% females) were recruited in palliative care settings. CDS-IT reported a good internal consistency in the total score and its factors ($\alpha = 0.74-0.83$). The factor analysis corresponded acceptably but not completely with the original study. CDS-IT strongly correlated with Visual Analogue Scale Dyspnea ($r = 0.68$) and moderately with Italian Palliative Outcome Scale and European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 15 Palliative Care ($r = 0.33-0.36$, respectively).

Conclusion. The study findings supported the crosscultural validity of the CDS-IT. Its feasibility, internal consistency, and construct validity are satisfactory for clinical practice. The CDS-IT is available to health care professionals as a useful tool to assess dyspnea in patients with cancer. J Pain Symptom Manage 2021;61:571—578. © *2020 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.*

Key Words

Dyspnea, Cancer Dyspnea Scale, palliative care, psychometric properties, advanced disease

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Key Message

The Italian version of Cancer Dyspnea Scale, a multidimensional self-reported outcome to assess dyspnea, was crossvalidated. Its internal consistency and construct validity were demonstrated to be satisfactory for clinical practice in palliative care; the scale is a useful tool to self-report dyspnea-related symptoms in patients with advanced cancer.

Introduction

Dyspnea (or breathlessness) is defined as a subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity.[1] Prevalence is quite high (>60%) among subjects with advanced diseases, particularly of the heart or lungs.[2–6] Dyspnea worsens before death[7] and compromises the quality of life.[8] In patients with advanced cancer, dyspnea is one of the main symptoms and its measurement essential.[9] The Cancer Dyspnea Scale (CDS) is a multidimensional tool for the detection of dyspnea in patients with cancer, developed in Japanese by Dr. Tanaka et al.[10] The scale is a feasible and easy-to-use self-reported outcome measure,[10] designed to evaluate the physiological and psychological discomforts associated with dyspnea. CDS was validated on consecutive outpatients and inpatients admitted to a Japanese hospital.[10] Adequate psychometric properties, including construct validity, intersubscale correlation, convergent validity, internal consistency, and test-retest reliability, were demonstrated.[10] CDS was later crossculturally validated in English,[10,11] Swedish,[12] and Hindi and Marathi.[13] These studies, all recruiting patients with advanced lung cancer, found comparable psychometric properties to the original version.[10–13] The aim of this study was to translate and crossvalidate the CDS into Italian (i.e., CDS-IT) and test its feasibility, content validity, internal consistency, as well as its construct validity on patients with advanced cancer.

Methods

This cross-sectional study was approved by the Ethics Committee (number 491-102018 05/10/2018). The participation was voluntary and anonymity was ensured, and participants gave their informed written consent. The study was conducted in accordance with Italian law and the principles of the Declaration of Helsinki. The study is structured according to the following three phases to develop and test the CDS-IT: Phase 1 (cultural and linguistic validation), Phase 2 (content validation among a group of experts), and Phase 3 (examination of feasibility, internal consistency, and construct validity on patients with advanced cancer).

Phase I. Cultural and Linguistic Validation

The original CDS scale was translated into Italian (CDS-IT) with permission to translate and use the questionnaire obtained from the author of the original version. The forward-backward translation method was adopted.[14] A group of experts in palliative care conducted a formal review of the translated version, improving linguistic and cultural comprehensibility. This version was than backtranslated into English, compared with original English version published by Tanaka et al.[10] and validated by Uronis et al.[11] and finally approved by the original author Tanaka.

Phase II. Content Validity Among a Group of Experts

The CDS-IT was delivered to a group of nine experts in palliative care to assess their agreement regarding how pertinent each item in relation to the objective of its measurement is. The quantitative measure of content validity ratio (CVR) and index (item content validity index [I-CVI] and scale-level content validity index [S-CVI]) was computed.[15,16]

Phase III. Examination of Feasibility, Internal Consistency, and Construct Validity on Patients With Advanced Cancer

The CDS-IT was administered to consecutive patients in three hospice or home palliative care settings by trained nurses. Eligibility criteria were as follows: aged 18 years or older, intact cognition (score at Mini-Mental State Examination higher than 24),[17] and Glasgow Coma Scale with best response, diagnosis of advanced cancer, and the presence of dyspnea at enrollment and/or in the previous days. Patients whose clinical conditions do not allow to self-report the questionnaire were excluded. Patients who did not speak Italian language were excluded. Eligible participant completed the assessment in a single occasion. Sociodemographic and clinical information were collected. Participants were then asked to complete the CDS-IT. The time for the administration and the difficulties in the comprehension of the items were recorded to assess its feasibility. The CDS-IT is a questionnaire composed of 12 items, with a five-point scale ranging from 1 (not at all) to 5 (very much). The scale is subdivided into three factors: Physical Factor 1 (sense of

effort), Psychological Factor 2 (sense of anxiety), and Factor 3 reflecting the uncomfortable feeling at rest (sense of discomfort). The maximum total score is 48, with up to 20 points for effort, 16 for anxiety, and 12 for discomfort. A higher score reflects a higher severity of dyspnea.[10] The following measures have been collected to assess construct validity with the CDS-IT and its three factors. Karnofsky Performance Status (KPS)[18–21] was performed to assess illness severity, and Visual Analogue Scale Dyspnea (VAS-D) was administered to quantify dyspnea distress.[22,23] Furthermore, values of peripheral oxygen saturation (SpO_2) were recorded (Philips SureSigns VS2; Philips Medical Systems, Andover, MA).[24] The quality of life scale developed by the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 15 Palliative Care (EORTC QLQ-C15-PAL) was used to assess the quality of life in cancer research and includes functional, symptoms, and global quality of life domains.[25–27] Finally, we used the Italian Palliative Care Outcome Scale (IPOS)[28–31] to evaluate the physical symptoms, psychological symptoms, and other dimensions typically assessed in palliative care.[32]

Statistical Analysis

Sample size was chosen according to the COnsensus-based Standards for the selection of health Measurements INstruments.[33] A minimum sample size of 100 participants is needed to have a study with a very good quality for the evaluation of reliability and validity.[33] Therefore, 101 participants were enrolled in this study. Descriptive statistics were used to summarize data. Continuous variables were presented as mean (SD), and categorical variables were presented as percentage (absolute value). Cronbach's alpha, Cronbach's alpha if the item was deleted, and the corrected item-total correlation were computed for the CDS-IT total score and its subscale to assess the internal consistency and homogeneity of the questionnaire items. Cronbach's alpha higher than 0.7 and corrected item-total correlations greater than 0.3 were considered adequate. To assess the structural validity, confirmatory factor analysis with Varimax rotation was conducted. Convergent validity was assessed by Pearson's correlations with VAS-D. To examine the multidimensional aspects of dyspnea, correlations between CDS-IT and the other assessment measures (SpO_2, EORTC QLQ-C15-PAL, and IPOS) were established using the Pearson's correlation coefficient (r). The analyses were carried out using a statistical program (SPSS 26®, IBM®, Armonk, NY).

Results

Phase I

The CDS-IT (Appendix Table 1), obtained as the result of the back-forward translation process, has been demonstrated to be closely aligned to the original CDS (Table 1).

Phase II

Characteristics of expert's panel are reported in Appendix Table 2. According to expert opinions, each item had an adequate content validity. Indeed, all items were deemed relevant as all CVRs were above 0.70 (Table 1). The CDS-IT achieved an S-CVI of 94%, whereas each item presented an I-CVI of more than 89% and a minimum CVR value of 0.78 (Table 1).

Phase III

Characteristics of the Participants. A total of 101 patients were enrolled, with a mean age of 76 (SD = 12) years ranging from 45 to 94 years, and 52.5% (53) were females. All patients showed dyspnea in the days before enrollment and had an advanced disease, with 63% (64) of them showing a KPS lower than 40 (64). The 39% (39) patients had lung cancer, and other diagnoses had lower percentages. The 76% (76) of patients received oxygen therapy. Main comorbidities included chronic obstructive pulmonary disease (26%; $n = 26$) and heart failure. The average score of CDS-IT was 20 (SD = 9). Demographic and medical characteristics of included patients were presented in Table 2.

Feasibility. The time for the administration of the CDS-IT scale was 282 (SD = 60) seconds. Patients with poorer performance status needed nurse supervision to fill in the questionnaire. There were no items omitted.

Internal Consistency. Cronbach's alpha of the total score was 0.82 (Table 3). Cronbach's alpha coefficients of the CDS-IT subscales ranged from 0.74 to 0.84 (Table 4). Nine of the corrected item-total correlations were greater than 0.3 and one greater than 0.2.

Construct Validity. In Table 5, the factor-loading pattern is presented together with the results found by Tanaka et al.[10] The factor solutions corresponded acceptably but not completely. Three of the six items that were hypothesized to belong to Factor 1 had a slightly diverse loading pattern in the Italian sample. Items 8, 10, and 12 appeared to belong to Factor 2 rather than Factor 1. In addition, Item 4 was very close to both Factors 1 and 2. Pearson's correlation coefficients between the CDS-IT and its factors with the other assessed measures are shown in Table 6. The

Table 1
Results of the Content Validity Analysis

Content Validity	CVR	I-CVI
Item 1. Can you inhale easily?	1.00[a]	0.89[a]
Item 2. Can you exhale easily?	1.00[a]	0.89[a]
Item 3. Can you breathe slowly?	0.78[a]	0.89[a]
Item 4. Do you feel short of breath?	1.00[a]	1.00[a]
Item 5. Do you feel breathing difficulty accompanied by palpitations and sweating?	0.78[a]	0.89[a]
Item 6. Do you feel as if you are panting?	1.00[a]	1.00[a]
Item 7. Do you feel such breathing difficulty that you do not know what to do about it?	0.78[a]	1.00[a]
Item 8. Do you feel your breath is shallow?	0.78[a]	0.89[a]
Item 9. Do you feel your breathing may stop?	1.00[a]	1.00[a]
Item 10. Do you feel your airway has become narrower?	1.00[a]	1.00[a]
Item 11. Do you feel as if you are drowning?	1.00[a]	1.00[a]
Item 12. Do you feel as if something is stuck in your airway?	1.00[a]	1.00[a]
S-CVI		0.94

CVR = content validity ratio; I-CVI = item content validity index; S-CVI = scale-level content validity index..
[a]Indicates relevant or adequate item.

total CDS-IT score and Factors 1 and 2 showed a moderate-to-strong correlation with VAS-D ($r = 0.68-0.78$). Instead, the correlation between Factor 3 and VAS-D was low ($r = 0.22$). The correlation with SpO_2 follows the same trend: a moderate-to-strong correlation was observed for CDS-IT total score, Factor 1, and Factor 2 ($r = -0.65$ to -0.75) and a low correlation for Factor 3 ($r = -0.17$). The CDS-IT total score, Factor 1, and Factor 2 weakly correlated with EORTC QLQ-C15-PAL and IPOS ($r = 0.33$ to $r = 0.40$). No correlations were found between Factor 3 and EORTC QLQ-C15-PAL and IPOS.

Discussion

The study presented the crossvalidated Italian version of the CDS questionnaire (Phase I) and assessed its content validity among experts in palliative care (Phase II). Finally, its feasibility, internal consistency, and construct validity were tested in a large sample of patients with advanced life-limiting cancer disease (Phase III). The findings of Phase I and Phase II had shown a conceptual equivalence with the original version and a good content validity of all the items. Experts confirmed indeed the absence of ambiguities or items to modify as reflected by high values of CVR (all items were relevant) and CVI (item feasible and semantically well organized) scores. These results demonstrated that CDS-IT was found to be an acceptable and practicable tool to assess the multidimensional symptoms of dyspnea in clinical practice.

In Phase III, the scale was also confirmed to be feasible on a large sample of patients recruited in two different palliative care settings, hospice and home. The average administration time was around five minutes, an acceptable amount of time for elderly patients with advanced cancer disease, that was slightly higher than those found in previous studies (around two minutes).[10,12,13] This difference in time could be due to several factors. At first, our study enrolled a sample of frail older adults (mean [SD] age = 76 [12] years), whereas in the previous studies,[10,12,13] the mean age of the participants ranged from 59 to 69 years. Furthermore, most patients (64%) of the present study presented moderate-to-severe disabilities (KPS = 20−40) that could affect the time to fill in the questionnaire, whereas in the previous studies, enrolled participants with better performance status (Eastern Cooperative Oncology Group Performance status <3).

As the original CDS developed by Tanaka et al.[10] and later crossvalidated in English,[10,11] Swedish,[12] and Hindi and Marathi,[13] the CDS-IT is composed of 12 items and three factors describing the sense of effort (Factor 1), anxiety (Factor 2), and discomfort (Factor 3) that dyspnea causes in patients with advanced cancer disease. Although Items 1 and 2 showed low item-total correlation (<0.20) as described in Table 3, they were not excluded from the CDS-IT because of their high factor loadings (0.91 and 0.75, respectively) in the structural validity results of Factor 3 (Table 5). These findings demonstrated the multidimensionality of the scale by providing the empirical evidence that Items 1 and 2, together with Item 3, did not measure the same construct assessed by the other items of the scale. Finally, looking at the results of the internal consistency of the three stand-alone factors (Table 4), Cronbach's alpha coefficients and item-total correlations of the three factors indicated acceptable internal consistency (>0.70) and good correlations (0.343−0.752) between each item and the factor score, in line with the previous studies.[10−13]

The results of the confirmatory factor analysis loaded some items differently from the previous studies, particularly for Factors 1 and 2.[10−13] The subjective nature of this symptom together with other elements as different cultural and environmental factors and the advanced life-limiting conditions could probably have an important role in the perception of the symptom and could have influenced the factor analysis results.[1,34,35] The CDS-IT Items 8, 10, and 12 were not loaded on Factor 1[10] but seemed to belong to Factor 2. Aspects considered on Factor 1 (shallow breathing, narrowing, and stucking airways) were

Table 2
Demographic and Medical Characteristics of Included Patients (Phase 3) - $N = 101$

Characteristics	Mean (SD)/Number (%)
Age,[a] yrs	76 (12)
Gender; male/female	48/53
Diagnosis	
Lung cancer[b]	39 (39)
Genitourinary cancer[b]	17 (17)
Breast cancer[b]	11 (11)
Digestive system cancer[b]	15 (15)
Other oncologic diseases[b]	19 (19)
Comorbidity (principal)	
Heart failure[b]	18 (18)
COPD[b]	26 (26)
Asthma[b]	5 (5)
Kidney failure[b]	13 (13)
CDS-IT total[a]	20 (9)
CDS-IT discomfort[a]	7 (3)
CDS-IT effort[a]	9 (5)
CDS-IT anxiety[a]	5 (4)
SpO_2,[a] %	83 (9)
VAS-D[a]	6 (2)
GCS[a]	15 (0)
KPS[a]	41 (14)
20—very ill[b]	9 (9)
30—severely disabled[b]	31 (31)
40—disabled[b]	24 (24)
50—requires help often[b]	18 (19)
60—requiring some help[b]	14 (14)
70—caring for self[b]	3 (3)
80—normal activity with some difficulty[b]	2 (2)
EORTC QLQ-C15-PAL[a]	32 (8)
IPOS[a]	24 (9)
Oxygen therapy[a]	76 (76)

COPD = chronic obstructive pulmonary disease; CDS-IT = Italian version of the Cancer Dyspnea Scale; SpO_2 = peripheral oxygen saturation; VAS-D = Visual Analogue Scale Dyspnea; GCS = Glasgow Coma Scale; KPS = Karnofsky Performance Scale; EORTC QLQ-C15-PAL = European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 15 Palliative Care; IPOS = Italian version of the Palliative care Outcome Scale.
[a]Mean (SD).
[b]Absolute number (percentage).

loaded instead on Factor 2. This could be related to cultural differences; these aspects might evoke, indeed, an emotional reaction. For instance, Item 4 (shortness of breath) is reported both in Factors 1 and 2, suggesting both as a physical and an anxious sensation. This could indicate that our sample attached greater importance to anxiety caused by dyspnea. Patients may perceive the dyspnea condition much more anxiously, and this may be also related to their advanced disease experiences. In the study by Uronis et al.,[11] three items, including 10 and 12, showed similar loads to our study. Also in the study by Damani et al.,[13] Item 10 appeared to belong to Factor 2 rather than Factor 1. As suggested in the study by Tanaka et al.,[10] the different dimensions of dyspnea overlap in such a complex way and are so closely related, and they cannot be clearly distinguished in independent factors. On the contrary, Factor 3 (discomfort) was very well delineated, and our findings are similar to the findings of previous studies.[10–12]

Strong correlation between VAS-D and CDS-IT total score indicated that CDS-IT purposely measures a component of dyspnea. Moderate-to-strong correlations were confirmed particularly for Factor 1 and Factor 2. In other words, patients who had a high dyspnea perception as measured by VAS-D also score high in the physical and psychological domains of CDS-IT. These findings confirmed the construct validity of the CDS-IT, in accordance with the previous studies.[10–13] The weak correlation with Factor 3 revealed that VAS-D is a scale that can partially explain the complexity and multidimensionality of dyspnea, and further studies are needed to analyze the correlation that interplays between Factor 3 and other

Table 3
Internal Consistency Analysis of the CDS-IT

Item	Cronbach's α	Cronbach's α If the Item Was Deleted	Corrected Item-Total Correlation
CDS complete scale	0.818		
Item 1. Can you inhale easily?		0.831	0.128
Item 2. Can you exhale easily?		0.831	0.141
Item 3. Can you breathe slowly?		0.825	0.216
Item 4. Do you feel short of breath?		0.796	0.576
Item 5. Do you feel breathing difficulty accompanied by palpitations and sweating?		0.808	0.431
Item 6. Do you feel as if you are panting?		0.804	0.484
Item 7. Do you feel such breathing difficulty that you do not know what to do about it?		0.792	0.605
Item 8. Do you feel your breath is shallow?		0.793	0.623
Item 9. Do you feel your breathing may stop?		0.798	0.543
Item 10. Do you feel your airway has become narrower?		0.789	0.628
Item 11. Do you feel as if you are drowning?		0.793	0.591
Item 12. Do you feel as if something is stuck in your airway?		0.784	0.693

CDS-IT = Italian version of the Cancer Dyspnea Scale; α = alpha.

Table 4
Internal Consistency Analysis of the Italian CDS-IT for Factor 1—Sense of Effort, Factor 2—Sense of Anxiety, and Factor 3—Sense of Discomfort Subscales

Item	Cronbach's α	Cronbach's α If the Item Was Deleted	Corrected Item-Total Correlation
CDS effort	0.834		
Item 4. Do you feel short of breath?		0.813	0.589
Item 6. Do you feel as if you are panting?		0.817	0.572
Item 8. Do you feel your breath is shallow?		0.808	0.610
Item 10. Do you feel your airway has become narrower?		0.795	0.660
Item 12. Do you feel as if something is stuck in your airway?		0.765	0.752
CDS anxiety	0.736		
Item 5. Do you feel breathing difficulty accompanied by palpitations and sweating?		0.772	0.343
Item 7. Do you feel such breathing difficulty that you do not know what to do about it?		0.657	0.563
Item 9. Do you feel your breathing may stop?		0.653	0.566
Item 11. Do you feel as if you are drowning?		0.597	0.653
CDS discomfort	0.787		
Item 1. Can you inhale easily?		0.600	0.732
Item 2. Can you exhale easily?		0.698	0.639
Item 3. Can you breathe slowly?		0.823	0.523

CDS-IT = Italian version of the Cancer Dyspnea Scale; α = alpha.

dyspnea-related scales to determine its convergence. In our study, as in the studies by Tanaka et al. and Uronis et al., we tested the correlation with SpO_2, an objective measure of the degree of blood oxygen saturation linked to the patients' respiratory status. In previous studies, Factors 1 and 2 did not correlate with the SpO_2,[10] and all subscales were weakly correlated with SpO_2 except for anxiety,[11] our findings instead showed that the correlations between CDS-IT and SpO_2 mirrored those observed with VAS-D.

Because dyspnea is a relevant symptom that impacts on the patient's essential needs and quality of life of patients in palliative care, EORTC QLQ-C15-PAL and IPOS assessments were included. In accordance with previous studies,[11,12] weak but significant correlations between CDS-IT (total score, Factors 1 and 2) and EORTC QLQ-C15-PAL and IPOS, revealing a slight but significant link between the impact of the dyspnea symptoms and the quality of life as well as the main concerns, were reported by patients in palliative care.

The study conducted had some limitations. The test-retest reliability together with the responsiveness to change the minimally clinically important change was not examined in the present study because of the assessment in a single occasion and the lack of longitudinal data. Further studies should investigate these aspects. Despite this, our study is the first to assess the content validity of this scale; moreover, a good number of subjects were recruited despite the frailty condition of the recruited patients in palliative care. In conclusion, our study enriches the literature available, with CDS-IT psychometric properties close to the original and the other cross-cultural validated versions. Its feasibility, internal

Table 5
Exploratory Factor Analysis

Item Number and Content	Factor 1[a]	Factor 2[b]	Factor 3[c]
Item 1. Can you inhale easily?	−0.03 (−0.29)	0.09 (−0.01)	**0.91 (0.91)**
Item 2. Can you exhale easily?	−0.06 (−0.16)	0.06 (−0.11)	**0.75 (0.94)**
Item 3. Can you breathe slowly?	0.00 (−0.18)	−0.06 (−0.17)	**0.60 (0.88)**
Item 4. Do you feel short of breath?	**0.42 (0.69)**	0.48 (0.16)	−0.10 (−0.27)
Item 5. Do you feel breathing difficulty accompanied by palpitations and sweating?	0.21 (0.38)	**0.33 (0.67)**	−0.21 (0.01)
Item 6. Do you feel as if you are panting?	**0.96 (0.61)**	0.27 (0.35)	−0.02 (−0.25)
Item 7. Do you feel such breathing difficulty that you do not know what to do about it?	0.18 (0.11)	**0.66 (0.85)**	−0.04 (−0.19)
Item 8. Do you feel your breath is shallow?	**0.25 (0.63)**	0.61 (0.29)	−0.07 (−0.26)
Item 9. Do you feel your breathing may stop?	−0.01 (0.25)	**0.70 (0.81)**	0.02 (−0.15)
Item 10. Do you feel your airway has become narrower?	**0.16 (0.82)**	0.82 (0.16)	0.11 (−0.25)
Item 11. Do you feel as if you are drowning?	0.08 (0.45)	**0.85 (0.65)**	0.16 (−0.08)
Item 12. Do you feel as if something is stuck in your airway?	**0.33 (0.74)**	0.78 (0.31)	0.02 (0.01)

Numbers in bold are the items loading on the specific factors.
[a]Factor 1—sense of effort.
[b]Factor 2—sense of anxiety.
[c]Factor 3—sense of discomfort.

Table 6
Correlations (Pearson's Coefficients) Between the CDS-IT Total/Subscales and VAS-D, SpO_2, EORTC QLQ-C15-PAL, and IPOS

Measures	CDS Factor 1[a]	CDS Factor 2[b]	CDS Factor 3[c]	CDS Total
VAS-D	0.678	0.734	0.217	0.780
SpO_2	−0.654	−0.723	−0.170	−0.745
EORTC QLQ-C15-PAL	0.395	0.381	—	0.362
IPOS	0.392	0.388	—	0.326

CDS-IT = Italian version of the Cancer Dyspnea Scale; VAS-D = Visual Analogue Scale Dyspnea; SpO_2 = peripheral oxygen saturation; EORTC QLQ-C15-PAL = European Organization for Research and Treatment of quality of life for cancer in palliative care; IPOS = Italian version of the Palliative care Outcome Scale. Only significant Pearson correlation.
[a]Factor 1—sense of effort.
[b]Factor 2—sense of anxiety.
[c]Factor 3—sense of discomfort.

consistency, and validity are satisfactory for clinical practice. The CDS-IT is available to health care professionals as a useful tool to assess dyspnea in patients with cancer. The validated CDS-IT can be used in a larger sample to determine the prevalence and intensity of dyspnea in patients with advanced disease and its impact on quality of life.

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Appendix

Appendix Table 1
Translated CDS-IT

CDS-IT
Item 1. Ti senti in grado di inspirare facilmente?
Item 2. Ti senti in grado di espirare facilmente?
Item 3. Sei in grado di respirare lentamente?
Item 4. Senti di avere il fiato corto?
Item 5. Senti che le tue difficoltà respiratorie sono accompagnate da palpitazioni e sudorazione?
Item 6. Hai la sensazione di ansimare?
Item 7. Senti una tale difficoltà respiratoria da non sapere cosa fare?
Item 8. Senti il tuo respiro poco profondo e leggero?
Item 9. Pensi che il suo respiro possa fermarsi?
Item 10. Senti le tue vie aeree ristrette e che si stanno chiudendo?
Item 11. Ti senti come se stessi per annegare?
Item 12. Senti come se ci fosse qualcosa che blocca le tue vie respiratorie?

CDS-IT = Italian version of the Cancer Dyspnea Scale.

Appendix Table 2
Characteristics of the Group of Experts, Involved in the Assessment of Content Validity (Phase II)

Experts ($N = 9$)	Characteristics	Mean (SD)/Number (%)
Gender[a]	Male	1 (11)
	Female	8 (89)
Age (yrs)[b]		48 (6)
Profession[a]	Nurse	9 (100)
Education[a]	Bachelor School of Nursing	7 (78)
	Master of Science in Nursing	2 (22)
Work setting[a]	Hospice	3 (33.3)
	Home palliative care	3 (33.3)
	University	3 (33.3)
Work experience (yrs)[b]		13 (9.5)

[a]Absolute number (percentage).
[b]Mean (SD).