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Assessing palliative care education in undergraduate medical students: translation and validation of the Self-efficacy in Palliative Care and Thanatophobia scales to Brazilian Portuguese

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4 **translation and validation of the Self-efficacy in Palliative Care and Thanatophobia**
5 **scales to Brazilian Portuguese**
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Abstract

Background: As the global population ages, Palliative care is ever more essential to provide care for those patients with incurable chronic conditions. However, in many countries, doctors are not prepared to care for dying patients. Palliative care education for undergraduate medical students should be an urgent concern for all medical schools, including Latin America and Brazil. Advances in palliative care education require robust assessment tools for constant evaluation and improvement of the medical schools' educational programmes. Bandura's social cognitive theory proposes that active learning processes are mediated by self-efficacy and associated outcome expectancies, both crucial elements of developing new behaviour. The Self-Efficacy in Palliative Care (SEPC) and Thanatophobia scales were developed using Bandura's theory to assess the outcomes of Palliative Care training.

Objectives: To translate and validate SEPC and Thanatophobia scales into Brazilian Portuguese.

Design: Cross-sectional study.

Setting: One Brazilian medical School.

Participants: Third-year medical students.

Methods: The translation of the scales followed EORTC recommendations, and the authors examined the psychometric properties of the scales using data collected from a cross-sectional sample of 109 medical students in a Brazilian medical school in 2017.

Results: The Brazilian versions of Self-efficacy in Palliative Care and Thanatophobia scales showed good psychometric properties, replicating the original factors (Factor range: 0.51-0.90 and Cronbach's alpha: 0.82-0.97). These factors express the core competencies of palliative care for Brazilian medical students.

Conclusions: The Brazilian version of the scales may be used to assess the impact of current undergraduate training and identify areas for improvement within palliative care educational programmes. Data generated by the scales allow Brazilian researchers to join international conversations on this topic. Medical educators in Brazil could use these scales to tailor

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3 appropriate pedagogical approaches for their medical students and better prepare doctors for
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5 PC.
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9 **Keywords:** self-efficacy; palliative care; thanatophobia; undergraduate medical education;
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13 14 60 **Strengths and Limitations of this Study**

- 15 • The translation and validation of SEPC and thanatophobia scales following rigorous
16 methodology allow Brazilian researchers to join the conversation on palliative care
17 education;
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- 19 • The content validation of those scales in a different population of medical students
20 broaden their usability;
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- 22 • The scales were not tested to investigate the impact of courses or clinical rotations to
23 explore whether the scales can capture changes in students' readiness to provide
24 palliative care.
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33 34 35 70 **Background**

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37 Global changes in the demographic patterns of the population have resulted in recognition of
38 palliative care (PC) as a worldwide need (1). As people live longer and suffer from long-term
39 and life-threatening diseases, the PC approach must be a core competency for doctors (2,3).
40 Accordingly, medical schools are introducing and improving their palliative medicine
41 programmes for undergraduate medical students (4–6). The World Health Organization
42 (WHO) and the Asociación Latinoamericana de Cuidados Paliativos (ALCP) call for mandatory
43 integration of PC into the medical curriculum. In Brazil, medical schools are just beginning to
44 include PC topics in their curricula (7–9). As Brazil and other Latin American countries respond
45 to this call and progressively introduce PC training into undergraduate medical courses,
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56 80 parallel evaluations of the outcomes of these courses need to be implemented to ensure that
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58 the new practice is succeeding on preparing doctors to deal with PC and end-of-life care.
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3 Tremendous efforts are still needed to broaden access to and enhance the quality of
4 PC for Latin America people (1,10). We will consider the Brazilian case. Brazil is the 5th most
5 populous country in the world with 210 million inhabitants and approximately 600.000 people
6 dying every year from conditions that should receive PC (1,11). A recent report identified only
7 177 PC services in the country, mostly in hospitals and few connected to medical schools (12).
8 Therefore, the ratio of PC service per population is 1:1,180,790 habitants, much lower than
9 the Netherlands ratio, for example, which is 1:56,000. At best, up to 10,000 Brazilians have
10 received some PC in the last year, representing about 1,5% of all those who would eventually
11 need PC (1). These data illustrate the urgency and the dimension of the challenge of training
12 new health professionals, especially doctors, to structure a quality PC network in Brazil and
13 all Latin America.
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26 Brazil has 289 medical schools and approximately 19,000 doctors graduated in 2018
27 (13). The number of newly qualified doctors will continue to increase, and the projection is
28 nearly 135,690 new doctors up to 2024. On the other side, the Brazilian health and educational
29 systems do not offer post-graduate training for all the new doctors, and by 2025, Brazil will
30 have an additional amount of 23,500 doctors practising without any post-graduate training,
31 mostly in primary care facilities and emergency departments (8,9,13). Hence, broad PC
32 services in Brazil will rely on teaching core PC competencies for undergraduate medical
33 students, since providing enough specialists and services for PC seems a future, rather than
34 an immediate target. Considering the social relevance of PC training, the effectiveness of the
35 learning strategies to be implemented requires consideration and assessment. Hence, valid
36 and reliable evaluation tools are needed to provide measurements of the strength and
37 weaknesses of PC training.
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51 A comprehensive evaluation of a training programme involves more than just
52 measuring the acquired knowledge. Therefore, a successful training programme should
53 provide enhancement of students' competence in PC, which consists of developing new
54 attitudes and behaviours aligned with patients' needs (14,15). In one approach, Bandura's
55 social cognitive theory explains how individuals learn and what drives behaviour change.
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3 110 According to this theory, 'self-efficacy' and 'outcome expectancy' are central components in
4 behavioural changes, which means that an individual is more likely to perform a specific
5 behaviour successfully when he or she shows higher self-efficacy and the expected outcome
6 is rewarding. Self-efficacy related to one particular subject relies on students' knowledge and
7 skills, their previous experience, and their observation of other's performance. Self-efficacy
8 reflects a bi-directional interaction of internal personal beliefs with students' behaviour and
9 environment. The outcome expectancy is the self-perceived consequence of the student's
10 performance, which can suggest the value this specific performance may have to the student.
11 Appropriate training may strengthen one's confidence in their ability to achieve objectives (self-
12 efficacy), enlighten the importance of desirable actions (outcome expectancies), encouraging
13 the practice of these actions (behaviour/clinical practice). Furthermore, appropriate feedback
14 from the supervisor during the training process may nurture a student's efficacy and modulate
15 their outcome expectancies. Medical educators could use the self-efficacy concept to deliver
16 comprehensive feedback and tailor their teaching approaches to fit students' needs (14,16).
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33 In the context of PC, the Self-efficacy in PC (SEPC) and the Thanatophobia (TS)
34 scales were developed to evaluate student's self-efficacy and their expectations of practice,
35 respectively (14,17,18). The SEPC has three factors related to doctors' expected behaviours
36 in PC: (1) effectively communicating with the patient and family, (2) appropriate assessment
37 and management of patient's symptoms and needs, and (3) work within a multidisciplinary
38 team. Previous studies have used the TS for outcome expectancy evaluation because it is
39 related to healthcare professionals' attitudes towards dying patients. We expected that doctors
40 providing end of life care would present low levels of thanatophobia. (17,19).
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50 Therefore, considering the potential use for PC education in Brazil, it is essential to
51 make available instruments as reliable and valid as the original scales. This study aimed to
52 translate and validate the SEPC and TS to Brazilian Portuguese, following established
53 international procedures, which will contribute to future collaborative studies and meta-
54 analysis in international PC education (20).
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Methods

Setting

140 The validation study was conducted in a Medical School in the Southeast of Brazil. The undergraduate medical course is delivered over six years, with a transversal axis curriculum, aimed to integrate student's learning to healthcare practices and services. Each year 120 new students enrol in the course. In the two first years, students' learning is focused on basic sciences, and they are introduced to patient care with regular activities in primary care facilities and hospital settings. During the next two years, students start clinical studies; first students practice inside the hospital, in Internal Medicine wards, where they learn about history taking, physical examination and clinical reasoning. Later, students start to perform full clinical consultations under expert supervision in primary care settings. In the final two years, students practice under specialist supervision in diverse medical areas, inside and outside the hospital, in different clinical rotations, such as internal medicine, paediatrics, surgery, gynaecology, primary care, medical emergencies and critical care. Despite this breadth of training, there is no formal palliative medicine programme in the curriculum, although some disciplines and clinical placements may include aspects related to fundamental approaches in PC; for example, engaging students in discussions on breaking bad news and end of life ethics.

Participants

For validation analysis, we invited the third-year medical students of class 2017 to answer the translated and pre-tested scales in July 2017 and included all students who agreed to participate.

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Patient and Public Involvement

This study did not involve the participation of patients nor the general public in the design, conduct, reporting or dissemination of the findings.

Instruments

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3 *Self-efficacy in Palliative Care Scale* (SEPC) (17): in this 23-item scale, self-efficacy is
4 recorded as students rate their confidence in performing PC practice on a 100 mm Visual
5 Analogue Scale, ranging from 'very anxious' to 'very confident'. The point assigned on the
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12 170 values indicating higher confidence in that particular skill. The original study identified three
13 factors from a number of items: communication (factor range: 0.70-0.89; Cronbach's alpha:
14 0.93), patient management (factor range: 0.55-0.84; Cronbach's alpha: 0.92) and
15 multidisciplinary team working (factor range: 0.70-0.84; Cronbach's alpha: 0.92) in PC.
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20 *Thanatophobia Scale* (TS) (19): the original scale was designed to assess the different
21 feelings that clinicians may experience in caring for end of life patients, designating these
22 feelings as "thanatophobia". The scale has one factor ranging between 0.61 and 0.79, and a
23 Cronbach's alpha of 0.84. Each item of the scale is a statement related to outcomes of caring
24 for dying patients, such as: "*Dying patients make me feel uneasy*" and "*When patients begin*
25 *to discuss death, I feel uncomfortable*". The participants rate each statement on a 7-point Likert
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32 180 scale, which range from "strongly agree" to "strongly disagree" whether the outcomes. The
33 final score could range from 7 to 49, with higher scores indicating higher thanatophobia levels.
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39 **Procedures**

40 *Phase 1: Translation and Pretesting*

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43 The original SEPC and TS are in English, with no available translation or validation of the
44 scales for the Brazilian Portuguese. Therefore, we proceeded to translate the scales following
45 the *European Organization for Research and Treatment of Cancer* (EORTC)
46 recommendations (20). Firstly, we contacted the researchers who developed the original
47 scales to assure there was not any other translation in progress and to obtain authorisation to
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54 190 develop our version. Then, two translators independently developed two Portuguese versions
55 of the scales, according to EORTC procedure. We then produced an optimal Portuguese
56 version through a reconciliation process of the two translations. This optimal version was sent
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60 to two independent English professional translators who produced two back-translation

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3 versions in English from the optimal Portuguese version. After discussions with the scales'
4 developers on an optimised back-translation, we reached a consensus and produced a final
5 version of both scales (SEPC-Br and TS-Br) in Brazilian Portuguese.
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10 11 *Phase 2: Pretesting*

12 Both final versions were pilot-tested with ten 6th-year medical students. One of the
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16 200 researchers met the students in a group and explained the study. The students completed the
17 scales and after the researcher asked if they had difficulties in comprehending any item. The
18 students did not suggest any changes and assured they had a good comprehension of the
19 aims and expectations of the scale. Once we had a final version, the scales were distributed
20 to the 3rd year medical students from the class of 2017, to generate data to enable the
21 psychometric analysis of the scales.
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30 31 *Phase 3: Statistical analysis for psychometric evaluation*

32 For construct validity, firstly, we checked Bartlett's test of sphericity and Kaiser-Meyer-Olkin
33 (KMO) measure for sampling adequacy. Then, we conducted a Principal Component Analysis
34 (PCA) with varimax rotated, to investigate the internal structure of both scales. Finally, we also
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36 210 calculated the reliability of the scales using Cronbach's alpha.
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43 44 **Ethics**

45 We conducted this research in accord with the Declaration of Helsinki. We assured that any
46 student who was not comfortable with the subject would not feel obliged to participate in the
47 study. As exploring themes related to death could be sensitive to some people, if any students
48 demanded support on this subject, they could contact the research team to receive proper aid.
49 Anonymity was assured during the process of data analysis. All students that agreed in
50 participate signed written informed consent. The Research Ethics Committee (School of
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58 220 Medical Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the
59 study before the data collection.
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Results

From a possible 119 potential participants, two did not answer the survey, and eight did not sign the informed consent. Thus, 109 (response rate = 91.6%) were considered for the validation analysis. The sample had an average age of 20 years-old and 58 females (53%) and 51 males.

Psychometric Properties of SEPC-Br Scale

The necessary assumption of PCA was met with a KMO = 0.884, and Bartlett's Test of Sphericity was significant ($p < 0.001$). The PCA with varimax rotated demonstrated three distinct factors, explaining 71.8% of the variance. The factor coefficients ranged from 0.515 to 0.906 (Table 1).

Table 1 – Self-efficacy in Palliative Care Scale: original and translated items, with principal components with varimax rotation solutions

Item		F1	F2	F3
MT.3	<i>appropriately referring palliative care patients for occupational therapy</i> Encaminhando pacientes em cuidados paliativos para terapia ocupacional no momento certo	0.906		
MT.6	<i>appropriately referring palliative care patients for psychiatric evaluation</i> Encaminhando pacientes em cuidados paliativos para avaliação psiquiátrica no momento certo	0.886		
MT.4	<i>appropriately referring palliative care patients for complementary therapies</i> Encaminhando pacientes em cuidados paliativos para terapias complementares (i.e. acupuntura, massoterapia, etc) no momento certo	0.883		
MT.2	<i>appropriately referring palliative care patients for physiotherapy</i> Encaminhando pacientes em cuidados paliativos para fisioterapia no momento certo	0.882		
MT.5	<i>appropriately referring palliative care patients to a lymphedema service</i> Encaminhando pacientes em cuidados paliativos para tratamento de linfedema no momento certo	0.881		
MT.7	<i>appropriately referring palliative care patients to a spiritual advisor</i> Encaminhando pacientes em cuidados paliativos para um conselheiro espiritual no momento certo	0.841		
MT.1	<i>working in a multi-professional palliative care team</i> Trabalhando com uma equipe multiprofissional de cuidados paliativos	0.787		

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4	CM.5	<i>discussing the patient's death (to occur) with the family</i> Ao conversar com a família do paciente sobre a morte futura do paciente		0.854
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6	CM.1	<i>discussing the likely effects of cancer with the patient</i> Ao conversar os efeitos esperados do câncer com meu paciente		0.848
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8				
9	CM.4	<i>discussing the patient's death (to occur) with the patient</i> Ao conversar com o paciente sobre a morte do próprio paciente		0.842
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11				
12	CM.2	<i>discussing the likely effects of cancer with the patient's family</i> Ao conversar sobre os efeitos esperados do câncer com os familiares do seu paciente		0.810
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16	CM.7	<i>answering the patient's questions "How long have I got to live?"</i> Ao responder à pergunta do paciente: "Quanto tempo de vida eu tenho?"		0.798
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20	CM.6	<i>discussing the patient's death with the family upon bereavement</i> Ao conversar com a família enlutada sobre a morte do paciente		0.789
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24	CM.3	<i>discussing the issues of death and dying</i> Ao conversar assuntos relacionados à morte e ao processo de morrer		0.783
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27	CM.8	<i>answering the patient's questions "Will there be much suffering or pain?"</i> Ao responder à pergunta do paciente: "Eu passarei por muito sofrimento ou dor?"		0.752
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31	PM.1	<i>in my ability to assess the patient's needs</i> Com a minha habilidade de avaliar as necessidades do paciente		0.815
32				
33	PM.3	<i>in my ability to manage common symptoms experienced in palliative care patients</i> Com minha habilidade de manejar sintomas comuns sofridos por pacientes em cuidados paliativos		0.790
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37	PM.2	<i>in my knowledge of the aetiology of common symptoms experienced by palliative care</i> Com meus conhecimentos sobre a causa de sintomas comuns sofridos por pacientes em cuidados paliativos		0.774
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41	PM.4	<i>in my ability to prescribe appropriate and adequate pain control medication</i> Com minha habilidade de prescrever medicação para controle da dor de modo adequado		0.774
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45	PM.5	<i>in my knowledge of the therapeutic and side effects of analgesic agents</i> Com meu conhecimento dos efeitos terapêuticos e colaterais de medicações analgésicas		0.769
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49	PM.6	<i>in my ability to provide psychological care for the palliative care patient and their family</i> Com minha habilidade de fornecer cuidado psicológico para o paciente em cuidado paliativo e sua família		0.710
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54	PM.7	<i>in my ability to provide social care for the palliative care patient and their family</i> Com minha habilidade de fornecer cuidado social para o paciente em cuidado paliativo e sua família		0.684
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58	PM.8	<i>in my ability to provide spiritual care for the palliative care patient and their family</i>		0.515
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	Com minha habilidade de fornecer cuidado espiritual para o paciente em cuidado paliativo e sua família			
<i>MT: Multidisciplinary teamwork; CM: Communication; PM: Patient Management</i>				

Each subsection of the SEPC was analysed independently for reliability on test scores. For the first factor, Multidisciplinary teamwork (MT), Cronbach's alpha was 0.97. For the second factor, Communication (CM), Cronbach's alpha was 0.93. For the third factor, Patient Management (PM), Cronbach's alpha was 0.92.

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Psychometric Properties of Thanatophobia-Br Scale

The necessary assumption of PCA was met with a KMO = 0.823, and Bartlett's Test of Sphericity was significant ($p < 0.001$). One item was deleted because it isolated in another dimension on the reliability analysis. After removing one item, the Principal Component Analysis with varimax rotation demonstrated a unidimensional factorial structure with an eigenvalue of 3.22, explaining 53.6% of the variance; factor coefficients ranged from 0.666 to 0.827. Cronbach's alpha was 0.82. The TS-Br and coefficients factors are displayed below (Table 2).

250 **Table 2 – Thanatophobia Scale: original and translated items and principal components with varimax rotation solutions**

Original/Translation	Coefficients
<i>Dying patients make me feel uneasy</i> Pacientes em processo de morrer me deixam desconfortável	0.730
<i>I feel pretty helpless when I have terminal patients on my ward</i> Eu me sinto desamparado quando tenho pacientes terminais sob meus cuidados	0.766
<i>It is frustrating to have to continue talking with relatives of patients who are not going to get better</i> É frustrante ter que continuar conversando com parentes de pacientes que não irão melhorar	0.721
<i>Managing dying patients traumatizes me</i> Lidar com pacientes que estão morrendo me traumatiza	0.827
<i>It makes me uncomfortable when a dying patient wants to say goodbye to me</i> Quando um paciente terminal quer se despedir de mim eu me sinto desconfortável	0.666

<i>I don't look forward to being the personal physician of a dying patient</i> Eu não gostaria de me tornar o médico responsável por um paciente que está morrendo	<i>Excluded item</i>
<i>When patients begin to discuss death, I feel uncomfortable</i> Eu me sinto desconfortável quando os pacientes começam a conversar sobre morte	0.669

In summary, Table 3 shows the factors and Cronbach's alphas of the Brazilian version compared to the original scale.

Table 3 – Comparison between the Original and Brazilian version of the scales

Scales	Original Scale (17)		Brazilian version	
	Factors	Cronbach's alpha	Factors	Cronbach's alpha
SEPC Communication	0.70-0.89	0.93	0.75-0.85	0.93
SEPC Patient Management	0.55-0.84	0.92	0.51-0.81	0.92
SEPC Multidisciplinary teamwork	0.70-0.84	0.92	0.78-0.90	0.97
Thanatophobia Scale	0.61-0.79	0.84	0.66-0.83	0.82

Discussion

This study aimed to explore the reliability and validity of SEPC-Br and TS-Br. We can support their reliability by a high internal consistency, as demonstrated by the Cronbach's alpha coefficient. The PCA replicated the original factors of SEPC-Br and TS-Br, which supports the construct validity of the scales.

In medical education, assessing behaviour change in clinical practice is challenging. Nevertheless, an appropriate theoretical model can provide the means for practical evaluation of the learning process. As previous studies suggest, scales that assess self-efficacy and outcome expectancies may provide valid measurements of the possible impact of an educational programme (14,16,17,21). The SEPC-Br showed good psychometric properties after the translation and validation process, replicating the original factors (17). These factors arguably express common core competencies of PC, and the Brazilian students recognised the same competencies. Although PC education is not well established in Brazilian medical

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3 270 schools, the factors' similarity with the original scale may be explained because of the sample
4 likeness. In both the original and the Brazilian study, medical students were in the midst of
5 their medical studies, probably aware of the vital role of the communication between doctor
6 and patient, the patient's well-being and the required multidisciplinary work to achieve high
7 standards of care (7).
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14 About the TS, we had to exclude one item from the TS-Br to maintain the scales'
15 validity. The excluded item was '*I don't look forward to being the personal physician of a dying*
16 *patient*'. Interestingly, this specific item was discussed during the translation process. We
17 choose the Portuguese translation that appeared to fit better on the original intention of the
18 item. The researchers involved discussed how that specific idea of 'not looking forward' would
19 best communicate in Portuguese. Nevertheless, in the validation process, the TS-Br held its
20 properties after we excluded that item. Therefore, adapted from the original scale, the TS-Br
21 has six items and can be used for future Brazilian studies related to medical education.
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31 Our study was the first to examine the psychological properties of a Brazilian version
32 of these scales. Making available a validated Brazilian version of these scales will allow
33 medical educators to evaluate students' progress in their PC educational programmes.
34 Recently two Brazilian studies have used modified Brazilian versions of SEPC for evaluation
35 of medical students (22,23). Although they have not examined the psychological properties of
36 the SEPC, its use suggests a growing interest in improving PC education for undergraduate
37 students using the self-efficacy concepts. Indeed, PC education in Brazil is increasing, and
38 further efforts for its enhancement are required. Ongoing evaluation and review of PC
39 educational programmes are necessary since there is no gold standard programme in PC
40 education. Clinical simulation, bedside teaching, e-learning, self-directed study, reflexive
41 learning, small group discussions, lectures are examples of these different pedagogical
42 approaches (24–27) and evaluations of educational outcomes using instruments such as
43 SEPC-Br and TS-Br, may help educators in shaping the best methods and curriculum
44 composition for their students' needs (3,28). As a result, future doctors will be better prepared
45 290 for caring for dying patients. Whereas medical schools will use these instruments for improving
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3 their PC programmes, this may show if and how future doctors have been prepared to practice
4 more and better PC. Besides, validated versions of the scales and publishing of the resultant
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7 300 data generated inform Brazilian medical educators and may stimulate other countries in Latin
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10 America to do the same, supporting future research in PC education and providing data for
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12 further improvement in PC training.
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16 **Limitations**

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18 The participants' recruitment was by convenience, and this could result in selection
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20 bias. However, we had a high response rate, and our sample is, therefore, representative of
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22 the students in the mid of the medical course. Also, in our study, we did not evaluate whether
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24 the scales can capture the impact of courses or clinical rotations on PC competencies.
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28 310 **Conclusion**

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30 Brazilian medical schools are gradually incorporating PC in their curricula, indicating a
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32 recognition of the importance of PC education for Brazilian medical doctors. The original scale
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34 developed in English intended to evaluate medical students' self-efficacy in PC and
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36 thanatophobia - as the outcome expectancy. Using these measurements, we can assess
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38 students' self-perceived belief in their performance and measure if and how PC educational
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40 programmes are increasing students' self-efficacy. The Brazilian Portuguese version of the
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42 scales showed good psychometric properties and may be used to assess PC educational
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44 programmes. Medical educators in Brazil and Latin America could use this process and these
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46 scales to tailor appropriate pedagogical approaches for their medical students and better
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49 320 prepare doctors for delivering PC.
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51 **List of abbreviations**

- 52 • PC: Palliative Care
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- 54 • SEPC: Self-Efficacy in Palliative Care
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- 56 • TS: Thanatophobia Scale
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- PCA: Principal Component Analysis
- KMO: Kaiser-Meyer-Olkin
- OSCE: Objective Structured Clinical Examination
- Mini-CEX: Clinical Evaluation Exercise

330 ***Ethics approval and consent to participate***

We conducted this research in accord with the Declaration of Helsinki. We assured that any student who was not comfortable with the subject would not feel obliged to participate in the study. As exploring themes related to death could be sensitive to some people, if any students demanded support on this subject, they could contact the research team to receive proper aid. Anonymity was assured during the process of data analysis. All students that agreed in participate signed written informed consent. The Research Ethics Committee (School of Medical Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the study before the data collection.

340 ***Consent for publication***

Not applicable

Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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10 ***Author contributions***

11 GG, SRM and MACF conceived and designed the study. GG collected the data. GG, DFC
12 and MACF analysed the data. GG and MACF were the major contributors in manuscript
13 writing. DFC and SRM provided meaningful inputs and critical review of the manuscript. All
14 authors read and approved the final manuscript.
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Based on the STROBE cross sectional guidelines.

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Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

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		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	3-5
Objectives	#3	State specific objectives, including any prespecified hypotheses	5-6
Methods			
Study design	#4	Present key elements of study design early in the paper	1 / 7-8
Setting	#5	Describe the setting, locations, and relevant dates, including periods of	6

		recruitment, exposure, follow-up, and data collection	
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3	Eligibility criteria	#6a Give the eligibility criteria, and the sources and methods of selection of participants.	6
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6		#7 Clearly define all outcomes, exposures, predictors, potential	6
7		confounders, and effect modifiers. Give diagnostic criteria, if applicable	
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10	Data sources /	#8 For each variable of interest give sources of data and details of methods	7-8
11	measurement	of assessment (measurement). Describe comparability of assessment	
12		methods if there is more than one group. Give information separately	
13		for for exposed and unexposed groups if applicable.	
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17	Bias	#9 Describe any efforts to address potential sources of bias	7-8
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19	Study size	#10 Explain how the study size was arrived at	7-8
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21	Quantitative	#11 Explain how quantitative variables were handled in the analyses. If	8
22	variables	applicable, describe which groupings were chosen, and why	
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25	Statistical	#12a Describe all statistical methods, including those used to control for	8
26	methods	confounding	
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29	Statistical	#12b Describe any methods used to examine subgroups and interactions	n/a
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33	Statistical	#12c Explain how missing data were addressed	9
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37	Statistical	#12d If applicable, describe analytical methods taking account of sampling	8
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41	Statistical	#12e Describe any sensitivity analyses	n/a
42	methods		
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44	Results		
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46	Participants	#13a Report numbers of individuals at each stage of study—eg numbers	9
47		potentially eligible, examined for eligibility, confirmed eligible,	
48		included in the study, completing follow-up, and analysed. Give	
49		information separately for for exposed and unexposed groups if	
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55	Participants	#13b Give reasons for non-participation at each stage	9
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57	Participants	#13c Consider use of a flow diagram	n/a
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1	Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	9
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6	Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	9
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10	Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	n/a
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14	Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	n/a
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19	Main results	#16b	Report category boundaries when continuous variables were categorized	n/a
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21	Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
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25	Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	n/a
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29	Discussion			
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31	Key results	#18	Summarise key results with reference to study objectives	12-14
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34	Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	14
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39	Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	12-14
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44	Generalisability	#21	Discuss the generalisability (external validity) of the study results	14
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51	Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	16
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BMJ Open

Assessing palliative care education in undergraduate medical students: translation and validation of the Self-efficacy in Palliative Care and Thanatophobia scales to Brazilian Portuguese

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Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	Palliative care
Keywords:	Self-efficacy, PALLIATIVE CARE, Thanatophobia, Undergraduate medical education

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3 **Title: Assessing palliative care education in undergraduate medical students:**
4 **translation and validation of the Self-efficacy in Palliative Care and Thanatophobia**
5 **scales to Brazilian Portuguese**
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Abstract

Background: Palliative care education for undergraduate medical students should be an urgent concern for all medical schools, including in Latin America and Brazil. Advances in palliative care education require robust assessment tools for constant evaluation and improvement of the educational programmes. Bandura's social cognitive theory proposes that active learning processes are mediated by self-efficacy and associated outcome expectancies, both crucial elements of developing new behaviour. The Self-Efficacy in Palliative Care (SEPC) and Thanatophobia scales were developed using Bandura's theory to assess the outcomes of Palliative Care training.

Objectives: To translate and validate SEPC and Thanatophobia scales into Brazilian Portuguese.

Design: Cross-sectional study.

Setting: One Brazilian medical School.

Participants: Third-year medical students.

Methods: the authors translated the SEPC and Thanatophobia scales following the *European Organization for Research and Treatment of Cancer* recommendations and examined the psychometric properties of the scales using data collected from a cross-sectional sample of 119 medical students in a Brazilian medical school in 2017.

Results: Confirmatory factor analyses demonstrated that both the Brazilian versions of SEPC and Thanatophobia scales followed the same structure as the original versions. In addition, there was a negative correlation between both scales, indicating that higher students' fear of death, lower their self-efficacy. Cronbach's alpha and Composite reliability were adequate for both scales, ranging from 0.82 to 0.97.

Conclusions: The Brazilian version of the scales may be used to assess the impact of current undergraduate training and identify areas for improvement within palliative care educational programmes. Data generated by the scales allow Brazilian researchers to join international conversations on this topic. Medical educators in Brazil could use these scales to tailor

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3 appropriate pedagogical approaches for their medical students and better prepare doctors for
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5 PC.

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9 **Keywords:** self-efficacy; palliative care; attitude to death; undergraduate medical education;
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11 psychometrics;

12 13 14 15 16 60 **Strengths and Limitations of this Study**

- 17 • The translation and validation processes were grounded on solid methodological
18 basis;
- 19 • SEPC and Thanatofobia scales showed good psychometric properties and can be
20 used in the Brazilian context of PC education;
- 21 • There was a significant negative correlation between the scales – a new evidence of
22 their validity.
- 23 • Longitudinal studies are needed to explore how the scales could be used to support
24 students' development in PC education.

25 26 27 28 29 30 31 32 33 34 35 36 37 70 **Background**

38
39 Global changes in the demographic patterns of the population have resulted in
40 recognition of palliative care (PC) as a worldwide need (1). Modern medicine brought new
41 possibilities of sustaining life in circumstances that were unimaginable before (2). However,
42 life under these new circumstances demands for certain sacrifices that not all patients judge
43 feasible or valuable (3). Thus, as people live longer and suffer from long-term and life-threatening
44 diseases, the PC approach has become a core competency for doctors (4,5). The decision-
45 making in palliative care occurs as a process and not as “yes/no” decisions, and patients and
46 health professionals need time to deal with the uncertainties that are present until the best
47 course of action becomes clear. PC education needs to acknowledge this complexity and
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58 80 uncertainty and go beyond the technical possibilities of care to embrace its ethical, moral, and
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3 spiritual dimensions while striving for controlling symptoms and alleviating suffering (4).
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5 Accordingly, medical schools are introducing and improving their palliative medicine
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7 programmes for undergraduate medical students (6–9).
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10 The World Health Organization (WHO) and the Asociación Latinoamericana de
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12 Cuidados Paliativos (ALCP) call for mandatory integration of PC into the medical curriculum.
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14 In Brazil, medical schools are just beginning to include PC topics in their curricula (10–12). As
15
16 Brazil and other Latin American countries respond to this call and progressively introduce PC
17
18 training into undergraduate medical courses (13), parallel evaluations of the outcomes of these
19
20 courses need to be implemented to ensure that the new practice is succeeding on preparing
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22 90 doctors to deal with PC and end-of-life care.
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24
25 Tremendous efforts are still needed to broaden access to and enhance the quality of
26
27 PC for Latin America people (1,14). We will consider the Brazilian case. Brazil is the 5th most
28
29 populous country in the world with 210 million inhabitants and approximately 600.000 people
30
31 dying every year from conditions that should receive PC (1,15). A recent report identified only
32
33 177 PC services in the country, mostly in hospitals and few connected to medical schools (16).
34
35 Therefore, the ratio of PC service per population is 1:1,180,790 habitants, much lower than
36
37 the Netherlands ratio, for example, which is 1:56,000. At best, up to 10,000 Brazilians have
38
39 received some PC in the last year, representing about 1,5% of all those who would eventually
40
41 need PC (1). These data illustrate the urgency and the dimension of the challenge of training
42
43 100 new health professionals, especially doctors, to structure a quality PC network in Brazil and
44
45 all Latin America.
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47
48 Brazil has 289 medical schools and approximately 19,000 doctors graduated in 2018
49
50 (17). The number of newly qualified doctors will continue to increase, and the projection is
51
52 nearly 135,690 new doctors up to 2024. On the other side, the Brazilian health and educational
53
54 systems do not offer post-graduate training for all the new doctors, and by 2025, Brazil will
55
56 have an additional amount of 23,500 doctors practising without any post-graduate training,
57
58 mostly in primary care facilities and emergency departments (11,12,17). Hence, broad PC
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60 services in Brazil will rely on teaching core PC competencies for undergraduate medical

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3 students, since providing enough specialists and services for PC seems a future, rather than
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5 110 an immediate target. Considering the social relevance of PC training, the effectiveness of the
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7 learning strategies to be implemented requires consideration and assessment. Hence, valid
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9 and reliable evaluation tools are needed to provide measurements of the strength and
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11 weaknesses of PC training.
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14 A comprehensive evaluation of a training programme involves more than just
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16 measuring the acquired knowledge. A successful training programme should provide
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18 enhancement of students' competence in PC, which consists of developing new attitudes and
19
20 behaviours aligned with patients' needs (18,19). Bandura's social cognitive theory explains
21
22 that 'self-efficacy' and 'outcome expectancy' are central components in behavioural changes.
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24 Self-efficacy corresponds to one's knowledge and skills, previous experience, and
25
26 120 observation of other's performance. Outcome expectancy is the self-perceived consequence
27
28 of the performance and relates to the value this specific performance has to the person. The
29
30 higher self-efficacy and outcome expectancy, the higher is the chance for behavioural change.
31
32 Thus, appropriate training should strengthen one's confidence in their ability to achieve the
33
34 objectives (self-efficacy) and enlighten the importance of developing the desirable behaviour
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36 (outcome expectancies). Medical educators could use the self-efficacy concept to deliver
37
38 comprehensive feedback and tailor their teaching approaches to fit students' needs (18,20).
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40
41 In the context of PC, the Self-efficacy in PC (SEPC) and the Thanatophobia (TS)
42
43 scales were developed to evaluate student's self-efficacy and their expectations of practice,
44
45 respectively (18,21,22). The SEPC has three factors related to doctors' expected behaviours
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47 130 in PC: (A) effectively communicating with the patient and family, (B) appropriate assessment
48
49 and management of patient's symptoms and needs, and (C) work within a multidisciplinary
50
51 team. Thanatophobia, or 'fear of death', is related to the anxiety experienced by students or
52
53 professionals who deal with dying patients. Previous studies have used the TS for outcome
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55 expectancy evaluation because it is related to healthcare professionals' attitudes towards
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57 dying patients. We expected that doctors providing end of life care would present low levels
58
59 of thanatophobia. (21,23).
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3 Considering the need to foster PC education in Brazil, it is essential to make available
4 instruments as reliable and valid as the original scales. These instruments can be used by
5 Brazilian educators to follow the development of medical students regarding their attitudes
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10 140 towards palliative care. Also, these instruments will allow Brazilian educators to engage in
11 international conversations about this topic. This study aimed to translate and validate the
12 SEPC and TS to Brazilian Portuguese, following established international procedures, which
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14
15 will contribute to future collaborative studies and meta-analysis in international PC education
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18 (24).
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22 **Methods**

23 **Setting**

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26 The validation study was conducted in a Medical School in the Southeast of Brazil.
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28 The undergraduate medical course is delivered over six years, with a transversal axis
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30 150 curriculum, aimed to integrate student's learning to healthcare practices and services. Each
31 year 120 new students enrol in the course. In the two first years, students' learning is focused
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34 on basic sciences, and they are introduced to patient care with regular activities in primary
35 care facilities and hospital settings. During the next two years, students start clinical studies;
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37
38 first students practice inside the hospital, in Internal Medicine wards, where they learn about
39 history taking, physical examination and clinical reasoning. Later, students start to perform full
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42 clinical consultations under expert supervision in primary care settings. In the final two years,
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45 students practice under specialist supervision in diverse medical areas, inside and outside the
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48 hospital, in different clinical rotations, such as internal medicine, paediatrics, surgery,
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51 gynaecology, primary care, medical emergencies and critical care.

52 160 In the medical school where this study was performed, during the last semester of the
53 second year and the entire third year, students have contact with patients inside the hospital,
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55 including the emergency department and the internal medicine ward. Since the Intensive Care
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58 Unit (ICU) in the university hospital does not have enough beds for all the patients in critical
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61 conditions, there are 40 patients in average under mechanical ventilation outside of the ICU

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3 daily. So, students often have contact with critical patients who eventually die since early
4 moments of the undergraduate course. This early contact with dying patients justifies why this
5 sample was chosen to validate the questionnaires. In the future, we are interested in following
6 up their development throughout the course.
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12 Despite this breadth of training, there is no formal palliative medicine programme in
13 the curriculum, although some disciplines and clinical placements may include aspects related
14 170 to fundamental approaches in PC; for example, engaging students in discussions on breaking
15 bad news and end of life ethics.
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22 **Participants**

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24 For validation analysis, we invited the third-year medical students of class 2017 to
25 answer the translated and pre-tested scales in July 2017, during their final exams on clinical
26 semiology. All the students had experienced the same curricular activities. We included all
27 students who agreed to participate (n=111, response rate=93.2%).
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35 180 **Patient and Public Involvement**

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37 This study did not involve the participation of patients nor the general public in the
38 design, conduct, reporting or dissemination of the findings.
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43 **Instruments**

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45 *Self-efficacy in Palliative Care Scale* (SEPC) (21): in this 23-item scale, self-efficacy is
46 recorded as students rate their confidence in performing PC practice on a 100 mm Visual
47 Analogue Scale, ranging from 'very anxious' to 'very confident'. The point assigned on the
48 visual analogue scale is measured, and the score ranges between zero to 100, with higher
49 values indicating higher confidence in that specific task. The original study identified three
50 factors: (A) communication (factor range: 0.70-0.89; Cronbach's alpha: 0.93), (B) patient
51 management (factor range: 0.55-0.84; Cronbach's alpha: 0.92) and (C) multidisciplinary team
52 working (factor range: 0.70-0.84; Cronbach's alpha: 0.92) in PC.
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3 *Thanatophobia Scale (TS) (23)*: the original scale was designed to assess the different
4 feelings that clinicians may experience in caring for end of life patients, designating these
5 feelings as “thanatophobia”. The scale has one factor ranging between 0.61 and 0.79, and a
6 Cronbach’s alpha of 0.84. Each item of the scale is a statement related to outcomes of caring
7 for dying patients, such as: “*Dying patients make me feel uneasy*” and “*When patients begin*
8 *to discuss death, I feel uncomfortable*”. The participants rate each statement on a 7-point Likert
9 scale, which range from "strongly agree" to "strongly disagree" whether the outcomes. The
10 final score could range from 7 to 49, with higher scores indicating higher thanatophobia levels.
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22 **Procedures**

23 *Phase 1: Translation and Pretesting*

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26 The original SEPC and TS are in English, with no available translation or validation of
27 the scales for the Brazilian Portuguese. Therefore, we proceeded to translate the scales
28 following the *European Organization for Research and Treatment of Cancer (EORTC)*
29 recommendations (24). Firstly, we contacted the researchers who developed the original
30 scales to assure there was not any other translation in progress and to obtain authorisation to
31 develop our version. Then, two translators independently developed two Portuguese versions
32 of the scales, according to EORTC procedure. We then produced an optimal Portuguese
33 version through a reconciliation process of the two translations. This optimal version was sent
34 to two independent English professional translators who produced two back-translation
35 versions in English from the optimal Portuguese version. After discussions with the scales’
36 developers on an optimised back-translation, we reached a consensus and produced a final
37 version of both scales (SEPC-Br and TS-Br) in Brazilian Portuguese. The translated version
38 of both scales are in Appendices 1 and 2.
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56 *Phase 2: Pretesting*

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58 Both final versions were pilot-tested with ten 6th-year medical students. One of the
59 researchers met the students in a group and explained the study. The students completed the
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3 scales and after the researcher asked if they had difficulties in comprehending any item. The
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5 students did not suggest any changes and assured they had a good comprehension of the
6
7 aims and expectations of the scale. Once we had a final version, the scales were distributed
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9 to the 3rd year medical students from the class of 2017, to generate data to enable the
10
11 psychometric analysis of the scales.
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16 *Phase 3: Statistical analysis for psychometric evaluation*

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18 For construct validity, firstly, we conducted a confirmatory factor analysis with
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20 Maximum Likelihood estimation to investigate the internal structure of both scales. To assess
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22 230 the confirmatory factor model, we used the following goodness of fit: Chi-square statistics,
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24 Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of
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26 Aproximation (RMSEA). The Chi-square statistics was used to assess the overall fit and
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28 discrepancy between the sample and the model. Both CFI and TLI were considered optimal
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30 with values above 0.90 (25). Optimal RMSEA is lower than 0.80 (26). Finally, we calculated
31
32 the reliability of the scales using Cronbach's alpha and Composite reliability, and, for
33
34 concurrent validity, we calculated the correlation between the SEPC-Br and TS-Br.
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39 **Ethics**

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41 We conducted this research in accord with the Declaration of Helsinki. We assured
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43 240 that any student who was not comfortable with the subject would not feel obliged to participate
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45 in the study. As exploring themes related to death could be sensitive to some people, if any
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47 students demanded support on this subject, they could contact the research team to receive
48
49 proper aid. For analysis purposes, anonymity was preserved.. All students that agreed in
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51 participate signed written informed consent. The Research Ethics Committee (School of
52
53 Medical Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the
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55 study before the data collection.
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60 **Results**

From a possible 119 potential participants, eight did not sign the informed consent. Thus, 111 (response rate = 93.2%) were considered for the SEPC validation analysis and, due to absence of data, 109 were considered for TS validation. Their mean age was 22.02 (SD = 2.11) and the majority were females (53.2%). The proportion of male and female follows the current gender distribution in Brazilian medical schools. Considering participants' previous experience, 47,7% said they had participated in the care of a dying patient during their medical studies.

Psychometric Properties of SEPC-Br Scale

Confirmatory Factor Analysis (CFA) demonstrated that the base model for the SEPC-BR scale (model A) displayed poor fit index values, based on the χ^2/df ratio, the Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA). When the correlation between the items' errors was added (model B), the model achieved a satisfactory level of model fit (Table 1).

Table 1 - Fit index for the SEPC and Thanatophobia scales

		$\chi^2(df)$ Sig.	Ratio χ^2/df	TLI	CFI	RMSEA (HI90)
SEPC	Model A	$\chi^2(227) = 776.018$; $p < 0.001$	3.418	0.782	0.804	0.143 (0.155)
	Model B	$\chi^2(211) = 356.934$; $p < 0.001$	1.691	0.934	0.945	0.079 (0.093)
Thanatophobia	Model A	$\chi^2(14) = 42.058$; $p < 0.001$	3.004	0.824	0.883	0.136 (0.184)
	Model B	$\chi^2(11) = 12.579$; $p > 0.05$	1.143	0.987	0.993	0.036 (0.110)

Abbreviations: SEPC = Self-efficacy in Palliative Care; $\chi^2(df)$ Sig. = Chi-square (degree of freedom) Significance; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA (HI90) = Root Mean Square Error of Approximation (Upper limit of 90% of confidence).

Each subsection of the SEPC was analysed independently for reliability on test scores.

For the first factor, Multidisciplinary Teamwork (MT), Cronbach's alpha and Composite reliability were 0.97 and 0.96, respectively. For the second factor, Communication (CM), Cronbach's alpha and Composite reliability were 0.93 and 0.93, respectively. For the third factor, Patient Management (PM), Cronbach's alpha and Composite reliability were 0.92 and 0.91 respectively.

Psychometric Properties of Thanatophobia-Br Scale

Confirmatory Factor Analysis (CFA) revealed that the base model for the Thanatophobia_BR scale (model A) displayed poor fit index values, based on the χ^2/df ratio, the Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA). When the correlation between the items' errors was added (model B), the model achieved a satisfactory level of model fit (Table 1). Cronbach's alpha and Composite reliability were 0.82 and 0.82, respectively. In summary, Table 2 shows the factors and Cronbach's alphas of the Brazilian version compared to the original scale.

Table 2 – Comparison between the Original and Brazilian version of the scales

Scales	Original Scale (17)		Brazilian version	
	Factors	Cronbach's alpha	Factors	Cronbach's alpha
SEPC Communication	0.70-0.89	0.93	0.75-0.85	0.93
SEPC Patient Management	0.55-0.84	0.92	0.51-0.81	0.92
SEPC Multidisciplinary teamwork	0.70-0.84	0.92	0.78-0.90	0.97
Thanatophobia Scale	0.61-0.79	0.84	0.66-0.83	0.82

Concurrent validity

We found a negative and significant correlation between the SEPC-Br and TS-Br and its dimensions. The magnitude ranged from weak to moderate (Table 3).

Table 3 – Correlation between SEPC and Thanatophobia scales

	Thanatophobia
SEPC Communication	-0.516*
SEPC Patient Management	-0.370*
SEPC Multidisciplinary teamwork	-0.262*
SEPC Total	-0.499*

*p<0.01; Abbreviations: SEPC = Self-efficacy in Palliative Care;

Discussion

290 This study aimed to explore the reliability and validity of SEPC-Br and TS-Br. We can support their reliability by a high internal consistency, as demonstrated by the Cronbach's alpha and Composite reliability coefficient. The Principal Component Analysis replicated the original factors and items of SEPC-Br and TS-Br, which supports the construct validity of the scales. We also found a negative correlation between SEPC-Br and TS-Br, indicating that higher the fear of death, the lower the self-efficacy in PC. This result was expected, since students who are uncomfortable with the idea of death may feel more anxious and less confident to take care of dying patients.

300 In medical education, assessing behaviour change in clinical practice is challenging. Nevertheless, an appropriate theoretical model can provide the means for practical evaluation of the learning process. As previous studies suggest, scales that assess self-efficacy and outcome expectancies may provide valid measurements of the possible impact of an educational programme (18,20,21,27). The SEPC-Br showed good psychometric properties after the translation and validation process, replicating the original factors (21). These factors arguably express common core competencies of PC, and the Brazilian students recognised the same competencies. Although PC education is not well established in Brazilian medical schools, the factors' similarity with the original scale may be explained because of the sample

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3 likeness. In both the original and the Brazilian study, medical students were in the midst of
4 their medical studies, probably aware of the vital role of the communication between doctor
5 and patient, the patient's well-being and the required multidisciplinary work to achieve high
6 standards of care (10). The TS has also shown good psychometric properties after the
7 translation and validation process, replicating the original structure of the scale (21). This
8 indicates that the scale may be used in the Brazilian context for PC education evaluation
9 based on social cognitive theory.
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18 Our study was the first to examine the psychological properties of a Brazilian version
19 of these scales and the first study to use Confirmatory Factor Analysis for both scales. This is
20 important since confirmatory factor analysis is theory-driven, meaning that it tests the theory
21 behind the scales. In addition, confirmatory factor analysis makes an explicit relation between
22 the latent variable and score. Therefore, our study also adds to the international literature by
23 demonstrating another type of evidence of validity based on confirmatory factor analysis.
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30 Making available a validated Brazilian version of these scales will allow medical
31 educators to evaluate students' progress in their PC educational programmes. Recently two
32 Brazilian studies have used modified Brazilian versions of SEPC for evaluation of medical
33 students (28,29). Although they have not examined the psychological properties of the SEPC,
34 its use suggests a growing interest in improving PC education for undergraduate students
35 using the self-efficacy concepts. Indeed, PC education in Brazil is increasing, and further
36 efforts for its enhancement are required.
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45 Ongoing evaluation and review of PC educational programmes are necessary since
46 there is no gold standard programme in PC education. Clinical simulation, bedside teaching,
47 e-learning, self-directed study, reflexive learning, small group discussions, and lectures are
48 examples of these different pedagogical approaches to teach PC (9,30–34). Evaluations of
49 educational outcomes using instruments such as SEPC-Br and TS-Br, may help educators in
50 shaping the best methods and curriculum composition for their students' needs (5,9,34). As a
51 result, future doctors will be better prepared for caring for dying patients. Whereas medical
52 schools will use these instruments for improving their PC programmes, this may show if and
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3 how future doctors have been prepared to practice more and better PC. Besides, validated
4 versions of the scales and publishing of the resultant data generated inform Brazilian medical
5 educators and may stimulate other countries in Latin America to do the same, supporting
6 future research in PC education and providing data for further improvement in PC training.
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13 340 **Strengths and Limitations**

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15 We choose validated instruments that were based on solid theoretical basis, to assess
16 medical students` attitudes towards palliative care. The translation and validation process
17 were based on a recommended protocol. Those aspects gave to our study a strong
18 methodological grounding.
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24 One limitation that we should acknowledge is that we used a convenience sample,
25 which could result in selection bias, especially considering that we selected third-year
26 students, with few clinical experiences. However, we had a high response rate, and our
27 sample is representative of the students in the mid of the medical course.
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33 The use of self-assessment instruments is not enough by themselves for a final
34 evaluation of learning outcomes and future performance in PC. Therefore, OSCE, mini-CEX
35 or other external evaluation methods should be used in addition to self-efficacy assessment
36 for a thorough evaluation of learning outcomes (20). Regarding the follow-up of students,
37 these scales could be used for understanding the development of palliative care competencies
38 in different Portuguese speaking countries and to compare the development of palliative care
39 competencies in curricula with and without structured palliative care training.
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47 Although this study has mainly focused on the translation and investigation of scales`
48 internal structure and reliability, further studies are necessary to explore and confirm their
49 validity. For example, it is also important to apply these scales in senior medical students and
50 residents to check their validity for these more experienced populations. Additionally, future
51 research in this area should investigate how the improvement measured by the SEPC and TS
52 persists after PC training and how it influences actual doctors` performance when caring for
53 dying patients.
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Conclusion

Brazilian medical schools are gradually incorporating PC in their curricula, indicating a recognition of the importance of PC education for Brazilian medical doctors. The original scale developed in English intended to evaluate medical students' self-efficacy in PC and thanatophobia as the outcome expectancy. Using these measurements, we can assess students' self-perceived belief in their performance and measure if and how PC educational programmes are increasing students' self-efficacy. The Brazilian Portuguese version of the scales showed good psychometric properties and may be used to assess PC educational programmes. Medical educators in Brazil and Latin America could use this process and these scales to tailor appropriate pedagogical approaches for their medical students and better prepare doctors for delivering PC.

List of abbreviations

- CFA: Confirmatory Factor Analysis
- CFI: Comparative Fit Index
- EORTC: European Organization for Research and Treatment of Cancer
- Mini-CEX: Clinical Evaluation Exercise
- OSCE: Objective Structured Clinical Examination
- PC: Palliative Care
- RMSEA: Root Mean Square Error of Aproximation
- SEPC: Self-Efficacy in Palliative Care
- TLI: Tucker Lewis Index
- TS: Thanatophobia Scale

Declarations

Ethics approval and consent to participate

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3 390 We conducted this research in accord with the Declaration of Helsinki. We assured that any
4 student who was not comfortable with the subject would not feel obliged to participate in the
5 study. As exploring themes related to death could be sensitive to some people, if any students
6 demanded support on this subject, they could contact the research team to receive proper aid.
7
8 For analysis purposes, anonymity was preserved. All students that agreed in participate
9 signed written informed consent. The Research Ethics Committee (School of Medical
10 Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the study prior to
11 the data collection.
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Consent for publication

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24 400 Not applicable
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Availability of data and materials

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30 The anonymized data related to this work (students' scores in both scales and their
31 demographics) are available and can be requested for the corresponding author email
32 m.a.de.carvalho.filho@umcg.nl.
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Competing interests

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42 The authors declare that they have no competing interests.
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Author contributions

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56 GG, SRM and MACF conceived and designed the study. GG collected the data. GG, DCF
57 and MACF analysed the data. GG and MACF were the major contributors in manuscript
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3 writing. DCF and SRM provided meaningful inputs and critical review of the manuscript. All
4
5 authors read and approved the final manuscript.
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8 **Data availability statement**

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11 420 The anonymized data related to this work (students' scores in both scales and their
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13 demographics) are available and can be requested for the corresponding author email
14
15 m.a.de.carvalho.filho@umcg.nl. No additional data available.
16
17

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51 Groningen, the Netherlands;
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Appendix 1 – Self-efficacy in Palliative Care Scale: original and Brazilian Portuguese translation (CM: Communication; PM: Patient Management; MT: Multidisciplinary teamwork)

Item	Original	Translation
CM1	<i>discussing the likely effects of cancer with the patient</i>	Ao conversar os efeitos esperados do câncer com meu paciente
CM2	<i>discussing the likely effects of cancer with the patient's family</i>	Ao conversar os efeitos esperados do câncer com os familiares do seu paciente
CM3	<i>discussing the issues of death and dying</i>	Ao conversar assuntos relacionados à morte e ao processo de morrer
CM4	<i>discussing the patient's death (to occur) with the patient</i>	Ao conversar com o paciente sobre a morte do próprio paciente
CM5	<i>discussing the patient's death (to occur) with the family</i>	Ao conversar com a família do paciente a morte futura do paciente
CM6	<i>discussing the patient's death with the family upon bereavement</i>	Ao conversar com a família enlutada a morte do paciente
CM7	<i>answering the patient's questions "How long have I got to live?"</i>	Ao responder à pergunta do paciente: "Quanto tempo de vida eu tenho?"
CM8	<i>answering the patient's questions "Will there be much suffering or pain?"</i>	Ao responder à pergunta do paciente: "Eu passarei por muito sofrimento ou dor?"
PM1	<i>in my ability to assess the patient's needs</i>	Com a minha habilidade de avaliar as necessidades do paciente
PM2	<i>in my knowledge of the aetiology of common symptoms experienced by palliative care</i>	Com meus conhecimentos sobre a causa de sintomas comuns sofridos por pacientes em cuidados paliativos
PM3	<i>in my ability to manage common symptoms experienced in palliative care patients</i>	Com minha habilidade de manejar sintomas comuns sofridos por pacientes em cuidados paliativos
PM4	<i>in my ability to prescribe appropriate and adequate pain control medication</i>	Com minha habilidade de prescrever medicação para controle da dor de modo adequado
PM5	<i>in my knowledge of the therapeutic and side effects of analgesic agents</i>	Com meu conhecimento dos efeitos terapêuticos e colaterais de medicações analgésicas
PM6	<i>in my ability to provide psychological care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado psicológico para o paciente em cuidado paliativo e sua família
PM7	<i>in my ability to provide social care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado social para o paciente em cuidado paliativo e sua família
PM8	<i>in my ability to provide spiritual care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado espiritual para o paciente em cuidado paliativo e sua família
MT1	<i>working in a multi-professional palliative care team</i>	Trabalhando com uma equipe multiprofissional de cuidados paliativos
MT2	<i>appropriately referring palliative care patients for physiotherapy</i>	Encaminhando pacientes em cuidados paliativos para fisioterapia no momento certo
MT3	<i>appropriately referring palliative care patients for occupational therapy</i>	Encaminhando pacientes em cuidados paliativos para terapia ocupacional no momento certo

MT4	<i>appropriately referring palliative care patients for complementary therapies</i>	Encaminhando pacientes em cuidados paliativos para terapias complementares (i.e. acupuntura, massoterapia, etc) no momento certo
MT5	<i>appropriately referring palliative care patients to a lymphedema service</i>	Encaminhando pacientes em cuidados paliativos para tratamento de linfedema no momento certo
MT6	<i>appropriately referring palliative care patients for psychiatric evaluation</i>	Encaminhando pacientes em cuidados paliativos para avaliação psiquiátrica no momento certo
MT7	<i>appropriately referring palliative care patients to a spiritual advisor</i>	Encaminhando pacientes em cuidados paliativos para um conselheiro espiritual no momento certo

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2 **Appendix 2 – Thanatophobia Scale: original and Brazilian Portuguese translation**
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Original/Translation
<p>5 <i>Dying patients make me feel uneasy</i> 6 Pacientes em processo de morrer me deixam desconfortável</p>
<p>7 <i>I feel pretty helpless when I have terminal patients on my ward</i> 8 Eu me sinto desamparado quando tenho pacientes terminais sob meus cuidados</p>
<p>9 <i>It is frustrating to have to continue talking with relatives of patients who are not going to get better</i> 10 É frustrante ter que continuar conversando com parentes de pacientes que não irão melhorar</p>
<p>11 <i>Managing dying patients traumatises me</i> 12 Lidar com pacientes que estão morrendo me traumatiza</p>
<p>13 <i>It makes me uncomfortable when a dying patient wants to say goodbye to me</i> 14 Quando um paciente terminal quer se despedir de mim eu me sinto desconfortável</p>
<p>15 <i>I don't look forward to being the personal physician of a dying patient</i> 16 Eu não gostaria de me tornar o médico responsável por um paciente que está morrendo</p>
<p>17 <i>When patients begin to discuss death, I feel uncomfortable</i> 18 Eu me sinto desconfortável quando os pacientes começam a conversar sobre morte</p>

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Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the STROBE cross sectional reporting guidelines, and cite them as:

von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies.

	Reporting Item	Page Number
Title and abstract		
Title	#1a Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction		
Background / rationale	#2 Explain the scientific background and rationale for the investigation being reported	3-5
Objectives	#3 State specific objectives, including any prespecified hypotheses	5-6
Methods		
Study design	#4 Present key elements of study design early in the paper	1 / 7-8
Setting	#5 Describe the setting, locations, and relevant dates, including periods of	6

		recruitment, exposure, follow-up, and data collection	
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3	Eligibility criteria	#6a Give the eligibility criteria, and the sources and methods of selection of participants.	6
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6		#7 Clearly define all outcomes, exposures, predictors, potential	6
7		confounders, and effect modifiers. Give diagnostic criteria, if applicable	
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10	Data sources /	#8 For each variable of interest give sources of data and details of methods	7-8
11	measurement	of assessment (measurement). Describe comparability of assessment	
12		methods if there is more than one group. Give information separately	
13		for for exposed and unexposed groups if applicable.	
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17	Bias	#9 Describe any efforts to address potential sources of bias	7-8
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19	Study size	#10 Explain how the study size was arrived at	7-8
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21	Quantitative	#11 Explain how quantitative variables were handled in the analyses. If	8
22	variables	applicable, describe which groupings were chosen, and why	
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25	Statistical	#12a Describe all statistical methods, including those used to control for	8
26	methods	confounding	
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29	Statistical	#12b Describe any methods used to examine subgroups and interactions	n/a
30	methods		
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33	Statistical	#12c Explain how missing data were addressed	9
34	methods		
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37	Statistical	#12d If applicable, describe analytical methods taking account of sampling	8
38	methods	strategy	
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41	Statistical	#12e Describe any sensitivity analyses	n/a
42	methods		
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44	Results		
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46	Participants	#13a Report numbers of individuals at each stage of study—eg numbers	9
47		potentially eligible, examined for eligibility, confirmed eligible,	
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55	Participants	#13b Give reasons for non-participation at each stage	9
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57	Participants	#13c Consider use of a flow diagram	n/a
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1	Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	9
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6	Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	9
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10	Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	n/a
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14	Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	n/a
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19	Main results	#16b	Report category boundaries when continuous variables were categorized	n/a
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21	Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
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25	Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	n/a
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29	Discussion			
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31	Key results	#18	Summarise key results with reference to study objectives	12-14
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34	Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	14
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39	Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	12-14
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44	Generalisability	#21	Discuss the generalisability (external validity) of the study results	14
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51	Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	16
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BMJ Open

Assessing palliative care education in undergraduate medical students: translation and validation of the Self-efficacy in Palliative Care and Thanatophobia scales to Brazilian Portuguese

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Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	Palliative care
Keywords:	Self-efficacy, PALLIATIVE CARE, Thanatophobia, Undergraduate medical education

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3 **Title: Assessing palliative care education in undergraduate medical students:**
4 **translation and validation of the Self-efficacy in Palliative Care and Thanatophobia**
5 **scales to Brazilian Portuguese**
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56 **Abstract**
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3 **Background:** As the global population ages, Palliative care is ever more essential to provide
4 care for patients with incurable chronic conditions. However, in many countries, doctors are
5 not prepared to care for dying patients. Palliative care education should be an urgent concern
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10 30 for all medical schools all around the world, including Latin America and Brazil. Advances in
11 palliative care education require robust assessment tools for constant evaluation and
12 improvement of educational programmes. Bandura's social cognitive theory proposes that
13 active learning processes are mediated by self-efficacy and associated outcome
14 expectancies, both crucial elements of developing new behaviour. The Self-Efficacy in
15 Palliative Care (SEPC) and Thanatophobia scales were developed using Bandura's theory to
16 assess the outcomes of Palliative Care training.
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24 **Objectives:** we aimed to translate and validate these scales for Brazilian Portuguese to
25 generate data on how well doctors are being prepared to meet the needs of their patients.
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28 **Design:** Cross-sectional study.
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30 40 **Setting:** One Brazilian medical School.
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32 **Participants:** Third-year medical students.
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34 **Methods:** the authors translated the scales following the *European Organization for Research*
35 *and Treatment of Cancer* recommendations and examined their psychometric properties using
36 data collected from a sample of 111 students in a Brazilian medical school in 2017.
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40 **Results:** The Brazilian versions of Self-efficacy in Palliative Care and Thanatophobia scales
41 showed good psychometric properties, including confirmatory factor analysis, replicating the
42 original factors (Factor range: .51-.90), and acceptable values of reliability (Cronbach's alpha:
43 .82-.97 and Composite reliability .82-.96). Additionally, the Brazilian versions of the scales
44 showed concurrent validity, demonstrated through a significant negative correlation.
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50 50 **Conclusions:** The Brazilian version of the scales may be used to assess the impact of current
51 undergraduate training and identify areas for improvement within palliative care educational
52 programmes. The data generated allow Brazilian researchers to join international
53 conversations on this topic and educators to develop tailored pedagogical approaches.
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3 **Keywords:** self-efficacy; palliative care; attitude to death; undergraduate medical education;
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5 psychometrics;
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10 **Article Summary: Strengths and Limitations of this Study**

- 11
- 12 • Translation and validation process were guided through solid methodological basis;
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 - 14 60 • We choose validated instruments for access medical student's self-efficacy in palliative
15 care;
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 - 18 • Clarify how students' performance regarding their palliative care training is key to
19 enhance palliative care education of undergraduate medical students;
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24 **Background**

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26 Global changes in the demographic patterns of the population have resulted in recognition of
27 palliative care (PC) as a worldwide need (1). Modern medicine deals with possibilities of
28 sustaining life in circumstances unimaginable before (2). However, life under these new
29 circumstances demands for certain sacrifices that not all patients judge feasible or valuable
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31 (3). As people live longer and suffer from long-term and life-threatening diseases, the PC
32 approach must be a core competency for doctors (4,5). Moreover, the decision-making in
33 palliative care occurs as a process and not as "yes or no" decisions, and patients and health
34 professionals need time to deal with the uncertainties that are present until the best decision
35 70 (3). As people live longer and suffer from long-term and life-threatening diseases, the PC
36 approach must be a core competency for doctors (4,5). Moreover, the decision-making in
37 palliative care occurs as a process and not as "yes or no" decisions, and patients and health
38 professionals need time to deal with the uncertainties that are present until the best decision
39 finally becomes clear. In this sense, PC education needs to acknowledge this complexity and
40 uncertainty and go beyond the technical possibilities of care to embrace ethics, symptom
41 control, communication, and spirituality (4). Accordingly, medical schools are introducing and
42 improving their palliative medicine programmes for undergraduate medical students (6–9).

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44 The World Health Organization (WHO) and the Asociación Latinoamericana de Cuidados
45 Paliativos (ALCP) call for mandatory integration of PC into the medical curriculum. In Brazil,
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47 80 medical schools are just beginning to include PC topics in their curricula (10–12). As Brazil
48 and other Latin American countries respond to this call and progressively introduce PC training
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3 into undergraduate medical courses (13), parallel evaluations of the outcomes of these
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5 courses need to be implemented to ensure that the new practice is succeeding on preparing
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7 doctors to deal with PC and end-of-life care.
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10 Tremendous efforts are still needed to broaden access to and enhance the quality of
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12 PC for Latin America people (1,14). We will consider the Brazilian case. Brazil is the 5th most
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14 populous country in the world with 210 million inhabitants and approximately 600.000 people
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16 dying every year from conditions that should receive PC (1,15). A recent report identified only
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18 177 PC services in the country, mostly in hospitals and few connected to medical schools (16).
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20 90 Therefore, the ratio of PC service per population is 1:1,180,790 habitants, much lower than
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22 the Netherlands ratio, for example, which is 1:56,000. At best, up to 10,000 Brazilians have
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24 received some PC in the last year, representing about 1,5% of all those who would eventually
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26 need PC (1). These data illustrate the urgency and the dimension of the challenge of training
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28 new health professionals, especially doctors, to structure a quality PC network in Brazil and
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30 all Latin America.
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33 Brazil has 289 medical schools and approximately 19,000 doctors graduated in 2018
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35 (17). The number of newly qualified doctors will continue to increase, and the projection is
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37 nearly 135,690 new doctors up to 2024. On the other side, the Brazilian health and educational
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39 systems do not offer post-graduate training for all the new doctors, and by 2025, Brazil will
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41 100 have an additional amount of 23,500 doctors practising without any post-graduate training,
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43 mostly in primary care facilities and emergency departments (11,12,17). Hence, broad PC
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45 services in Brazil will rely on teaching core PC competencies for undergraduate medical
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47 students, since providing enough specialists and services for PC seems a future, rather than
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49 an immediate target. Considering the social relevance of PC training, the effectiveness of the
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51 learning strategies to be implemented requires consideration and assessment. Hence, valid
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53 and reliable evaluation tools are needed to provide measurements of the strength and
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55 weaknesses of PC training.
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58 A comprehensive evaluation of a training programme involves more than just
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60 measuring the acquired knowledge. Therefore, a successful training programme should

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3 110 provide enhancement of students' competence in PC, which consists of developing new
4 attitudes and behaviours aligned with patients' needs (18,19). Bandura's social cognitive
5 theory explains that 'self-efficacy' and 'outcome expectancy' are central components in
6 behavioural changes. Self-efficacy corresponds to one's knowledge and skills, previous
7 experience, and observation of other's performance. Outcome expectancy is the self-
8 perceived consequence of the performance and relates to the value this specific performance
9 has to the person. The higher self-efficacy and outcome expectancy, the higher is the chance
10 for behavioural change. Thus, appropriate training should strengthen one's confidence in their
11 ability to achieve the objectives (self-efficacy) and enlighten the importance of developing the
12 desirable behaviour (outcome expectancies). Medical educators could use the self-efficacy
13 concept to deliver comprehensive feedback and tailor their teaching approaches to fit students'
14 needs (18,20).
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28 In the context of PC, the Self-efficacy in PC (SEPC) and the Thanatophobia (TS)
29 scales were developed to evaluate student's self-efficacy and their expectations of practice,
30 respectively (18,21,22). The SEPC has three factors related to doctors' expected behaviours
31 in PC: (A) effectively communicating with the patient and family, (B) appropriate assessment
32 and management of patient's symptoms and needs, and (C) work within a multidisciplinary
33 team. Thanatophobia, or 'fear of death', is related to the anxiety experienced by students or
34 professionals who deal with dying patients. Previous studies have used the TS for outcome
35 expectancy evaluation because it is related to healthcare professionals' attitudes towards
36 dying patients. We expected that doctors providing end of life care would present low levels
37 of thanatophobia. (21,23).
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49 Considering the need to foster PC education in Brazil, it is essential to make available
50 instruments as reliable and valid as the original scales. These instruments can be used by
51 Brazilian educators to follow the development of medical students regarding their attitudes
52 towards palliative care. Also, these instruments will allow Brazilian educators to engage in
53 international conversations about this topic. This study aimed to translate and validate the
54 SEPC and TS to Brazilian Portuguese, following established international procedures, which
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3 will contribute to future collaborative studies and meta-analysis in international PC education
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9 **Methods**

10 **Setting**

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13 The validation study was conducted in a Medical School in the Southeast of Brazil. The
14 undergraduate medical course is delivered over six years, with a transversal axis curriculum,
15 aimed to integrate student's learning to healthcare practices and services. Each year 120 new
16 students enrol in the course. In the two first years, students' learning is focused on basic
17 sciences, and they are introduced to patient care with regular activities in primary care facilities
18 and hospital settings. During the next two years, students start clinical studies; first students
19 practice inside the hospital, in Internal Medicine wards, where they learn about history taking,
20 physical examination and clinical reasoning. Later, students start to perform full clinical
21 consultations under expert supervision in primary care settings. In the final two years, students
22 practice under specialist supervision in diverse medical areas, inside and outside the hospital,
23 in different clinical rotations, such as internal medicine, paediatrics, surgery, gynaecology,
24 primary care, medical emergencies and critical care. Nevertheless, in our context, during the
25 last semester of the second year and the entire third year, students have contact with patients
26 inside the hospital, including the emergency department and the internal medicine ward. Since
27 the Intensive Care Unit (ICU) in our university hospital does not have enough beds for all the
28 patients in critical conditions, we end up with around 40 patients under mechanical ventilation
29 outside of the ICU. So, even when our students had not cared directly for someone who died,
30 they have contact with critical patients who eventually die since early moments of the
31 undergraduate course. This early contact with dying patients justifies why we choose this
32 sample to validate our questionnaires. In the future, we are interested in following up their
33 development throughout the course.
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57 Despite this breadth of training, there is no formal palliative medicine programme in the
58 curriculum, although some disciplines and clinical placements may include aspects related to
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3 fundamental approaches in PC. For example, students have an obligatory longitudinal course,
4 along the six years of medical school, on bio- and clinical ethics, in which they discuss, among
5 other topics, the concepts of euthanasia, dysthanasia, orthothanasia, and end-of-life care. In
6 the first three years, the course is mainly theoretical, and, in the last three years, students
7 engage in the ethical decision making of challenging patients. Also, students have contact with
8 real patients since the first year, and several aspects of clinical communication are discussed,
9 such as how to brake bad news, the importance of being empathetic, and offering rapport.
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20 **Participants**

21 For validation analysis, we invited the third-year medical students of class 2017 to answer the
22 translated and pre-tested scales in July 2017, during their final exams on clinical semiology.
23 All the students had experienced the same curricular activities. We included all students who
24 agreed to participate.
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30 **Patient and Public Involvement**

31 This study did not involve the participation of patients nor the general public in the design,
32 conduct, reporting or dissemination of the findings.
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39 **Instruments**

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41 *Self-efficacy in Palliative Care Scale* (SEPC) (21): in this 23-item scale, self-efficacy is
42 recorded as students rate their confidence in performing PC practice on a 100 mm Visual
43 Analogue Scale, ranging from 'very anxious' to 'very confident'. The point assigned on the
44 visual analogue scale is measured, and the score ranges between zero to 100, with higher
45 values indicating higher confidence in that specific task. The original study identified three
46 factors: (A) communication (factor range: .70 - .89; Cronbach's alpha: .93), (B) patient
47 management (factor range: .55 - .84; Cronbach's alpha: .92) and (C) multidisciplinary team
48 working (factor range: .70- .84; Cronbach's alpha: .92) in PC.
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58 *Thanatophobia Scale* (TS) (23): the original scale was designed to assess the different
59 feelings that clinicians may experience in caring for end of life patients, designating these
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3 feelings as "thanatophobia". The scale has one factor ranging between .61 and .79, and a
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5 Cronbach's alpha of .84. Each item of the scale is a statement related to outcomes of caring
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7 for dying patients, such as: "*Dying patients make me feel uneasy*" and "*When patients begin*
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9 *to discuss death, I feel uncomfortable*". The participants rate each statement on a 7-point Likert
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11 scale, which range from "strongly agree" to "strongly disagree" whether the outcomes. The
12
13 final score could range from 7 to 49, with higher scores indicating higher thanatophobia levels.
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16 17 **Procedures**

18 *Phase 1: Translation and Pretesting*

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20 The original SEPC and TS are in English, with no available translation or validation of the
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22 scales for the Brazilian Portuguese. Therefore, we proceeded to translate the scales following
23
24 the *European Organization for Research and Treatment of Cancer* (EORTC)
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26 recommendations (24). Firstly, we contacted the researchers who developed the original
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28 scales to assure there was not any other translation in progress and to obtain authorisation to
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30 develop our version. Then, two translators independently developed two Portuguese versions
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32 of the scales, according to EORTC procedure. We then produced an optimal Portuguese
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34 version through a reconciliation process of the two translations. This optimal version was sent
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37 210 to two independent English professional translators who produced two back-translation
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39 versions in English from the optimal Portuguese version. After discussions with the scales'
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41 developers on an optimised back-translation, we reached a consensus and produced a final
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43 version of both scales (SEPC-Br and TS-Br) in Brazilian Portuguese.
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50 *Phase 2: Pretesting*

51 Both final versions were pilot-tested in a focus group with ten 6th-year medical students. One
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53 of the researchers met the students and explained the study. The students completed the
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55 scales and, after, the researcher asked if they had difficulties in comprehending any item.
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58 220 Small grammar corrections were proposed but the students did not suggest any major
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60 changes and assured that they had a good comprehension of the items, aims and

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3 expectations of the scale. Students did not engage in a content analysis of the scales. Once
4 we had a final version (appendices 1 and 2), the scales were distributed to the 3rd year medical
5 students from the class of 2017, to generate data to enable the psychometric analysis of the
6 scales.
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11 12 13 *Phase 3: Statistical analysis for psychometric evaluation*

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15 For construct validity, firstly, we conducted a confirmatory factor analysis with Maximum
16 Likelihood estimation to investigate the internal structure of both scales. To assess the
17 confirmatory factor model, we used the following goodness of fit: Chi-square statistics,
18 Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of
19 Approximation (RMSEA). The Chi-square statistics was used to assess the overall fit and
20 discrepancy between the sample and the model. Both CFI and TLI were considered optimal
21 with values above .90 (25). Optimal RMSEA is lower than .80 (26). The missing data were
22 deleted for the analysis. Finally, we calculated the reliability of the scales using Cronbach's
23 alpha and Composite reliability, and, for concurrent validity, we calculated the correlation
24 between the SEPC-Br and TS-Br.
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36 Data were analyzed using IBM-SPSS 21.0 and R (lavaan and dplyr packages). The latter
37 was used for the confirmatory factor analysis and calculating the Composite reliability,
38 respectively.
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46 **Ethics**

47 We conducted this research in accord with the Declaration of Helsinki. We assured that any
48 student who was not comfortable with the subject would not feel obliged to participate in the
49 study. As exploring themes related to death could be sensitive to some people, if any students
50 demanded support on this subject, they could contact the research team to receive proper aid.
51 For analysis purposes, anonymity was preserved. All students that agreed in participate
52 signed written informed consent. The Research Ethics Committee (School of Medical
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3 Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the study before
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5 250 the data collection.
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10 **Results**

11 From a possible 119 potential participants, eight did not sign the informed consent. Thus, 111
12 (response rate = 93.2%) were considered for the SEPC validation analysis and, due to
13 absence of data, 109 (response rate = 91.6%) were considered for TS validation. Their mean
14 age was 22.02 (SD = 2.11) and the majority were females (53.2%). The proportion of male
15 and female follows the current ratio of gender in Brazilian medical school. Asking about
16 students' previous experience, 47.7% said they had participated in the care of a dying patient
17 during their medical studies. This finding is coherent with educational experience they have in
18 their medical school.
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26 260 their medical school.
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28 ***Psychometric Properties of SEPC-Br Scale***

29 Confirmatory Factor Analysis (CFA) demonstrated that the base model for the SEPC-BR scale
30 (model A) displayed poor fit index values, based on the Comparative Fit Index (CFI), Tucker
31 Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA). When the
32 correlation between the items' errors was added (model B), the model achieved a satisfactory
33 level of model fit (Table 1).
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42 ***Table 1 - Fit index for the SEPC and Thanatophobia scales***

		χ^2 (df) Sig.	CFI	TLI	RMSEA (LO90; HI90)
SEPC	Model A	$\chi^2(227) = 776.018$; $p < 0.001$	.804	.782	.143 (.132; .155)

	Model B	$\chi^2(211) = 356.934$; $p < 0.001$	.945	.934	.079 (.065; .093)
Thanatophobia	Model A	$\chi^2(14) = 42.058$; $p < 0.001$	.883	.824	.136 (.090; 0.184)
	Model B	$\chi^2(11) = 12.579$; $p > 0.05$	.993	.987	.036 (.000; .110)

Abbreviations: SEPC = Self-efficacy in Palliative Care; $\chi^2(df)$ Sig. = Chi-square (degree of freedom) Significance; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA (HI90) = Root Mean Square Error of Approximation (Lower and Upper limit of 90% of confidence).

Each subsection of the SEPC was analyzed independently for reliability on test scores. For the first factor, Multidisciplinary teamwork (MT), Cronbach's alpha and Composite reliability were .97 and .96, respectively. For the second factor, Communication (CM), Cronbach's alpha and Composite reliability were .93 and .93, respectively. For the third factor, Patient Management (PM), Cronbach's alpha and Composite reliability were .92 and .91 respectively.

Psychometric Properties of Thanatophobia-Br Scale

Confirmatory Factor Analysis (CFA) revealed that the base model for the Thanatophobia_BR scale (model A) displayed poor fit index values, based on the Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA). When the correlation between the items' errors was added (model B), the model achieved a satisfactory level of model fit (Table 1). Cronbach's alpha and Composite reliability were .82 and .82, respectively. In summary, Table 2 shows the factors and Cronbach's alphas of the Brazilian version compared to the original scale.

Table 2 – Comparison between the Original and Brazilian version of the scales

Scales	Original Scale (17)	Brazilian version
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<i>Psychometrics properties</i>	<i>Factors</i>	<i>Cronbach's alpha</i>	<i>Factors</i>	<i>Cronbach's alpha</i>
SEPC Communication	.70 - .89	.93	.75 - .85	.93
SEPC Patient Management	.55 - .84	.92	.51- .81	.92
SEPC Multidisciplinary teamwork	.70 - .84	.92	.78 - .90	.97
Thanatophobia Scale	.61 - .79	.84	.66 - .83	.82

Concurrent validity

We found a negative and significant correlation between the SEPC-Br and TS-Br and its dimensions. The magnitude ranged from weak to moderate (Table 3).

Table 3 – Correlation between SEPC and Thanatophobia scales

	Thanatophobia
SEPC Communication	-.516*
SEPC Patient Management	-.370*
SEPC Multidisciplinary teamwork	-.262**
SEPC Total	-.499*

*p=0.000; **p=0.006 Abbreviations: SEPC = Self-efficacy in Palliative Care;

Discussion

This study aimed to explore the reliability and validity of SEPC-Br and TS-Br. Both scales had a high reliability coefficient measured by Cronbach's alfa and Composite reliability. The Principal Component Analysis replicated the original factors and items of SEPC-Br and TS-Br, which supports the construct validity of the scales. We also found a negative correlation between SEPC-Br and TS-Br, indicating that higher the fear of death, the lower the self-efficacy in PC. This result was expected, since students who are uncomfortable with the idea of death may feel more anxious and less confident to take care of dying patients.

In medical education, assessing behaviour change in clinical practice is challenging. Nevertheless, an appropriate theoretical model can provide the means for practical evaluation of the learning process. As previous studies suggest, scales that assess self-efficacy and

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3 outcome expectancies may provide valid measurements of the possible impact of an
4 educational programme (18,20,21,27). The SEPC-Br showed good psychometric properties
5 after the translation and validation process, replicating the original factors (21). These factors
6 arguably express common core competencies of PC, and the Brazilian students recognised
7 the same competencies. Although PC education is not well established in Brazilian medical
8 schools, the factors' similarity with the original scale may be explained because of the sample
9 likeness. In both the original and the Brazilian study, medical students were in the midst of
10 their medical studies, probably aware of the vital role of the communication between doctor
11 and patient, the patient's well-being and the required multidisciplinary work to achieve high
12 standards of care (10). The TS has also showed good psychometric properties after the
13 translation and validation process, replicating the original structure of the scale (21). This
14 indicates that the scale may be used in the Brazilian context for PC education evaluation
15 based on social cognitive theory.

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31 Our study was the first to examine the psychological properties of a Brazilian version
32 of these scales and the first study to use Confirmatory Factor Analysis for both scales. This is
33 important since confirmatory factor analysis is theory-driven analysis, meaning that it tests the
34 theory behind the scales. In addition, confirmatory factor analysis makes an explicit relation
35 between the latent variable and score. Therefore, our study also adds to the international
36 literature by presenting another type of evidence of validity based on confirmatory factor
37 analysis and concurrent validity between the SEPC and Thanatophobia.

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33 Making available a validated Brazilian version of these scales will allow medical
34 educators to evaluate students' progress in their PC educational programmes. Recently two
35 Brazilian studies have used modified Brazilian versions of SEPC for evaluation of medical
36 students (28,29). Although they have not examined the psychological properties of the SEPC,
37 its use suggests a growing interest in improving PC education for undergraduate students
38 using the self-efficacy concepts. Indeed, PC education in Brazil is increasing, and further
39 efforts for its enhancement are required.

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3 Ongoing evaluation and review of PC educational programmes are necessary since
4 there is no gold standard programme in PC education. Clinical simulation, bedside teaching,
5 e-learning, self-directed study, reflexive learning, small group discussions, lectures are
6 examples of these different pedagogical approaches to teach PC (9,30–34). Evaluations of
7 educational outcomes using instruments such as SEPC-Br and TS-Br, may help educators in
8 shaping the best methods and curriculum composition for their students' needs (5,9,34). As a
9 result, future doctors will be better prepared for caring for dying patients. Whereas medical
10 schools will use these instruments for improving their PC programmes, this may show if and
11 how future doctors have been prepared to practice more and better PC. Besides, validated
12 versions of the scales and publishing of the resultant data generated inform Brazilian medical
13 educators and may stimulate other countries in Latin America to do the same, supporting
14 future research in PC education and providing data for further improvement in PC training.
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31 **Strengths and Limitations**

32 We choose validated instruments that were based on a solid theoretical basis, to access
33 medical students' attitudes towards palliative care. The translation and validation processes
34 were based on a recommended guideline protocol and we worked close to the original authors.
35 Those aspects gave to our study a strong methodological grounding.
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41 One limitation that we should acknowledge is that we used a convenience sample,
42 which could result in selection bias, especially considering that we selected third-year
43 students, with few clinical experiences. However, we had a high response rate, and our
44 sample is, therefore, representative of the students in the mid of the medical course with initial
45 clinical learning and experience, and exposure to critical and dying patients.
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51 The use of self-assessment instruments is not enough by themselves for a final
52 evaluation of learning outcomes and future performance in PC. Therefore, OSCE, mini-CEX
53 or other external evaluation methods should be used in addition to self-efficacy assessment
54 for a thorough evaluation of learning outcomes (20). Regarding the follow-up of students,
55 these scales could be used for understanding the development of palliative care competencies
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3 360 in different Portuguese speaking countries and to compare the development of palliative care
4 competencies in curricula with and without structured palliative care training.
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7 Although this study has mainly focused on the translation and investigation of scales`
8 internal structure and reliability, further studies are necessary to explore and confirm their
9 validity. For example, it is also important to apply these scales in senior medical students and
10 residents to check their validity for these more experienced populations. Additionally, future
11 research in this area should investigate how the improvement measured by the SEPC and TS
12 persists after PC training and how it influences actual doctors' performance when caring for
13 dying patients.
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23 24 370 **Conclusion**

25 Brazilian medical schools are gradually incorporating PC in their curricula, indicating a
26 recognition of the importance of PC education for Brazilian medical doctors. The original scale
27 developed in English intended to evaluate medical students' self-efficacy in PC and
28 thanatophobia as the outcome expectancy. Using these measurements, we can assess
29 students' self-perceived belief in their performance and measure if and how PC educational
30 programmes are increasing students' self-efficacy. The Brazilian Portuguese version of the
31 scales showed good psychometric properties and may be used to assess PC educational
32 programmes. Medical educators in Brazil and Latin America could use this process and these
33 scales to tailor appropriate pedagogical approaches for their medical students and better
34 prepare doctors for delivering PC.
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50 **List of abbreviations**

- 51 • CFA: Confirmatory Factor Analysis
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- 53 • CFI: Comparative Fit Index
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- 55 • EORTC: European Organization for Research and Treatment of Cancer
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- 57 • Mini-CEX: Clinical Evaluation Exercise
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- OSCE: Objective Structured Clinical Examination
- PC: Palliative Care
- RMSEA: Root Mean Square Error of Approximation
- 390 • SEPC: Self-Efficacy in Palliative Care
- TLI: Tucker Lewis Index
- TS: Thanatophobia Scale

Declarations

Ethics approval and consent to participate

We conducted this research in accord with the Declaration of Helsinki. We assured that any student who was not comfortable with the subject would not feel obliged to participate in the study. As exploring themes related to death could be sensitive to some people, if any students demanded support on this subject, they could contact the research team to receive proper aid.

400 For analysis purposes, anonymity was preserved. All students that agreed in participate signed written informed consent. The Research Ethics Committee (School of Medical Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the study prior to the data collection.

Consent for publication

Not applicable

Availability of data and materials

410 The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author contributions

420 GG, SRM and MACF conceived and designed the study. GG collected the data. GG, DCF
17 and MACF analysed the data. GG and MACF were the major contributors in manuscript
18 writing. DCF and SRM provided meaningful inputs and critical review of the manuscript. All
19 authors read and approved the final manuscript.

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430

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4 Groningen, the Netherlands;
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Appendix 1 – Self-efficacy in Palliative Care Scale: original and Brazilian Portuguese translation (CM: Communication; PM: Patient Management; MT: Multidisciplinary teamwork)

Item	Original	Translation
CM1	<i>discussing the likely effects of cancer with the patient</i>	Ao conversar os efeitos esperados do câncer com meu paciente
CM2	<i>discussing the likely effects of cancer with the patient's family</i>	Ao conversar os efeitos esperados do câncer com os familiares do seu paciente
CM3	<i>discussing the issues of death and dying</i>	Ao conversar assuntos relacionados à morte e ao processo de morrer
CM4	<i>discussing the patient's death (to occur) with the patient</i>	Ao conversar com o paciente sobre a morte do próprio paciente
CM5	<i>discussing the patient's death (to occur) with the family</i>	Ao conversar com a família do paciente a morte futura do paciente
CM6	<i>discussing the patient's death with the family upon bereavement</i>	Ao conversar com a família enlutada a morte do paciente
CM7	<i>answering the patient's questions "How long have I got to live?"</i>	Ao responder à pergunta do paciente: "Quanto tempo de vida eu tenho?"
CM8	<i>answering the patient's questions "Will there be much suffering or pain?"</i>	Ao responder à pergunta do paciente: "Eu passarei por muito sofrimento ou dor?"
PM1	<i>in my ability to assess the patient's needs</i>	Com a minha habilidade de avaliar as necessidades do paciente
PM2	<i>in my knowledge of the aetiology of common symptoms experienced by palliative care</i>	Com meus conhecimentos sobre a causa de sintomas comuns sofridos por pacientes em cuidados paliativos
PM3	<i>in my ability to manage common symptoms experienced in palliative care patients</i>	Com minha habilidade de manejar sintomas comuns sofridos por pacientes em cuidados paliativos
PM4	<i>in my ability to prescribe appropriate and adequate pain control medication</i>	Com minha habilidade de prescrever medicação para controle da dor de modo adequado
PM5	<i>in my knowledge of the therapeutic and side effects of analgesic agents</i>	Com meu conhecimento dos efeitos terapêuticos e colaterais de medicações analgésicas
PM6	<i>in my ability to provide psychological care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado psicológico para o paciente em cuidado paliativo e sua família

PM7	<i>in my ability to provide social care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado social para o paciente em cuidado paliativo e sua família
PM8	<i>in my ability to provide spiritual care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado espiritual para o paciente em cuidado paliativo e sua família
MT1	<i>working in a multi-professional palliative care team</i>	Trabalhando com uma equipe multiprofissional de cuidados paliativos
MT2	<i>appropriately referring palliative care patients for physiotherapy</i>	Encaminhando pacientes em cuidados paliativos para fisioterapia no momento certo
MT3	<i>appropriately referring palliative care patients for occupational therapy</i>	Encaminhando pacientes em cuidados paliativos para terapia ocupacional no momento certo
MT4	<i>appropriately referring palliative care patients for complementary therapies</i>	Encaminhando pacientes em cuidados paliativos para terapias complementares (i.e. acupuntura, massoterapia, etc) no momento certo
MT5	<i>appropriately referring palliative care patients to a lymphedema service</i>	Encaminhando pacientes em cuidados paliativos para tratamento de linfedema no momento certo
MT6	<i>appropriately referring palliative care patients for psychiatric evaluation</i>	Encaminhando pacientes em cuidados paliativos para avaliação psiquiátrica no momento certo
MT7	<i>appropriately referring palliative care patients to a spiritual advisor</i>	Encaminhando pacientes em cuidados paliativos para um conselheiro espiritual no momento certo

Appendix 2 – Thanatophobia Scale: original and Brazilian Portuguese translation

<i>Original/Translation</i>
<i>Dying patients make me feel uneasy</i> Pacientes em processo de morrer me deixam desconfortável
<i>I feel pretty helpless when I have terminal patients on my ward</i> Eu me sinto desamparado quando tenho pacientes terminais sob meus cuidados
<i>It is frustrating to have to continue talking with relatives of patients who are not going to get better</i> É frustrante ter que continuar conversando com parentes de pacientes que não irão melhorar
<i>Managing dying patients traumatises me</i> Lidar com pacientes que estão morrendo me traumatiza
<i>It makes me uncomfortable when a dying patient wants to say goodbye to me</i> Quando um paciente terminal quer se despedir de mim eu me sinto desconfortável
<i>I don't look forward to being the personal physician of a dying patient</i> Eu não gostaria de me tornar o médico responsável por um paciente que está morrendo
<i>When patients begin to discuss death, I feel uncomfortable</i> Eu me sinto desconfortável quando os pacientes começam a conversar sobre morte

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

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		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	3-5
Objectives	#3	State specific objectives, including any prespecified hypotheses	5-6
Methods			
Study design	#4	Present key elements of study design early in the paper	1 / 7-8
Setting	#5	Describe the setting, locations, and relevant dates, including periods of	6

		recruitment, exposure, follow-up, and data collection	
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3	Eligibility criteria	#6a Give the eligibility criteria, and the sources and methods of selection of participants.	6
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6		#7 Clearly define all outcomes, exposures, predictors, potential	6
7		confounders, and effect modifiers. Give diagnostic criteria, if applicable	
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9			
10	Data sources /	#8 For each variable of interest give sources of data and details of methods	7-8
11	measurement	of assessment (measurement). Describe comparability of assessment	
12		methods if there is more than one group. Give information separately	
13		for for exposed and unexposed groups if applicable.	
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17	Bias	#9 Describe any efforts to address potential sources of bias	7-8
18			
19	Study size	#10 Explain how the study size was arrived at	7-8
20			
21	Quantitative	#11 Explain how quantitative variables were handled in the analyses. If	8
22	variables	applicable, describe which groupings were chosen, and why	
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24			
25	Statistical	#12a Describe all statistical methods, including those used to control for	8
26	methods	confounding	
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29	Statistical	#12b Describe any methods used to examine subgroups and interactions	n/a
30	methods		
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33	Statistical	#12c Explain how missing data were addressed	9
34	methods		
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37	Statistical	#12d If applicable, describe analytical methods taking account of sampling	8
38	methods	strategy	
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41	Statistical	#12e Describe any sensitivity analyses	n/a
42	methods		
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44	Results		
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46	Participants	#13a Report numbers of individuals at each stage of study—eg numbers	9
47		potentially eligible, examined for eligibility, confirmed eligible,	
48		included in the study, completing follow-up, and analysed. Give	
49		information separately for for exposed and unexposed groups if	
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55	Participants	#13b Give reasons for non-participation at each stage	9
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57	Participants	#13c Consider use of a flow diagram	n/a
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1	Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	9
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6	Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	9
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10	Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	n/a
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14	Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	n/a
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19	Main results	#16b	Report category boundaries when continuous variables were categorized	n/a
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21	Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
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25	Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	n/a
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29	Discussion			
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31	Key results	#18	Summarise key results with reference to study objectives	12-14
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34	Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	14
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39	Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	12-14
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44	Generalisability	#21	Discuss the generalisability (external validity) of the study results	14
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51	Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	16
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BMJ Open

Assessing palliative care education in undergraduate medical students: translation and validation of the Self-efficacy in Palliative Care and Thanatophobia scales to Brazilian Portuguese

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3 **Title: Assessing palliative care education in undergraduate medical students:**
4 **translation and validation of the Self-efficacy in Palliative Care and Thanatophobia**
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Abstract

Background: As the global population ages, Palliative care is ever more essential to provide care for patients with incurable chronic conditions. However, in many countries, doctors are not prepared to care for dying patients. Palliative care education should be an urgent concern for all medical schools all around the world, including Latin America and Brazil. Advances in palliative care education require robust assessment tools for constant evaluation and improvement of educational programmes. Bandura's social cognitive theory proposes that active learning processes are mediated by self-efficacy and associated outcome expectancies, both crucial elements of developing new behaviour. The Self-Efficacy in Palliative Care (SEPC) and Thanatophobia scales were developed using Bandura's theory to assess the outcomes of Palliative Care training.

Objectives: we aimed to translate and validate these scales for Brazilian Portuguese to generate data on how well doctors are being prepared to meet the needs of their patients.

Design: Cross-sectional study.

Setting: One Brazilian medical School.

Participants: Third-year medical students.

Methods: the authors translated the scales following the *European Organization for Research and Treatment of Cancer* recommendations and examined their psychometric properties using data collected from a sample of 111 students in a Brazilian medical school in 2017.

Results: The Brazilian versions of Self-efficacy in Palliative Care and Thanatophobia scales showed good psychometric properties, including confirmatory factor analysis, replicating the original factors (Factor range: .51-.90), and acceptable values of reliability (Cronbach's alpha: .82-.97 and Composite reliability .82-.96). Additionally, the Brazilian versions of the scales showed concurrent validity, demonstrated through a significant negative correlation.

Conclusions: The Brazilian version of the scales may be used to assess the impact of current undergraduate training and identify areas for improvement within palliative care educational programmes. The data generated allow Brazilian researchers to join international conversations on this topic and educators to develop tailored pedagogical approaches.

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5 **Keywords:** self-efficacy; palliative care; attitude to death; undergraduate medical education;
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7 psychometrics;
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12 **60 Article Summary: Strengths and Limitations of this Study**

- 13 • Translation and validation process were guided through solid methodological basis;
- 14 • We choose validated instruments for access medical student's self-efficacy in palliative
15 care;
- 16 • Clarify how students' performance regarding their palliative care training is key to
17 enhance palliative care education of undergraduate medical students;
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27 **Background**

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29 Global changes in the demographic patterns of the population have resulted in recognition of
30 palliative care (PC) as a worldwide need (1). Modern medicine deals with possibilities of
31 sustaining life in circumstances unimaginable before (2). However, life under these new
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33 **70** circumstances demands for certain sacrifices that not all patients judge feasible or valuable
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35 (3). As people live longer and suffer from long-term and life-threatening diseases, the PC
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37 approach must be a core competency for doctors (4,5). Moreover, the decision-making in
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39 palliative care occurs as a process and not as "yes or no" decisions, and patients and health
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41 professionals need time to deal with the uncertainties that are present until the best decision
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43 finally becomes clear. In this sense, PC education needs to acknowledge this complexity and
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45 uncertainty and go beyond the technical possibilities of care to embrace ethics, symptom
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47 control, communication, and spirituality (4). Accordingly, medical schools are introducing and
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49 improving their palliative medicine programmes for undergraduate medical students (6–9).
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54 **80** The World Health Organization (WHO) and the Asociación Latinoamericana de Cuidados
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56 Paliativos (ALCP) call for mandatory integration of PC into the medical curriculum. In Brazil,
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58 medical schools are just beginning to include PC topics in their curricula (10–12). As Brazil
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3 and other Latin American countries respond to this call and progressively introduce PC training
4 into undergraduate medical courses (13), parallel evaluations of the outcomes of these
5 courses need to be implemented to ensure that the new practice is succeeding on preparing
6 doctors to deal with PC and end-of-life care.
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11 Tremendous efforts are still needed to broaden access to and enhance the quality of
12 PC for Latin America people (1,14). We will consider the Brazilian case. Brazil is the 5th most
13 populous country in the world with 210 million inhabitants and approximately 600.000 people
14 dying every year from conditions that should receive PC (1,15). A recent report identified only
15 177 PC services in the country, mostly in hospitals and few connected to medical schools (16).
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18 90 Therefore, the ratio of PC service per population is 1:1,180,790 habitants, much lower than
19 the Netherlands ratio, for example, which is 1:56,000. At best, up to 10,000 Brazilians have
20 received some PC in the last year, representing about 1,5% of all those who would eventually
21 need PC (1). These data illustrate the urgency and the dimension of the challenge of training
22 new health professionals, especially doctors, to structure a quality PC network in Brazil and
23 all Latin America.
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34 Brazil has 289 medical schools and approximately 19,000 doctors graduated in 2018
35 (17). The number of newly qualified doctors will continue to increase, and the projection is
36 nearly 135,690 new doctors up to 2024. On the other side, the Brazilian health and educational
37 100 systems do not offer post-graduate training for all the new doctors, and by 2025, Brazil will
38 have an additional amount of 23,500 doctors practising without any post-graduate training,
39 mostly in primary care facilities and emergency departments (11,12,17). Hence, broad PC
40 services in Brazil will rely on teaching core PC competencies for undergraduate medical
41 students, since providing enough specialists and services for PC seems a future, rather than
42 an immediate target. Considering the social relevance of PC training, the effectiveness of the
43 learning strategies to be implemented requires consideration and assessment. Hence, valid
44 and reliable evaluation tools are needed to provide measurements of the strength and
45 weaknesses of PC training.
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3 110 A comprehensive evaluation of a training programme involves more than just
4 measuring the acquired knowledge. Therefore, a successful training programme should
5 provide enhancement of students' competence in PC, which consists of developing new
6 attitudes and behaviours aligned with patients' needs (18,19). Bandura's social cognitive
7 theory explains that 'self-efficacy' and 'outcome expectancy' are central components in
8 behavioural changes. Self-efficacy corresponds to one's knowledge and skills, previous
9 experience, and observation of other's performance. Outcome expectancy is the self-
10 perceived consequence of the performance and relates to the value this specific performance
11 has to the person. The higher self-efficacy and outcome expectancy, the higher is the chance
12 for behavioural change. Thus, appropriate training should strengthen one's confidence in their
13 ability to achieve the objectives (self-efficacy) and enlighten the importance of developing the
14 desirable behaviour (outcome expectancies). Medical educators could use the self-efficacy
15 concept to deliver comprehensive feedback and tailor their teaching approaches to fit students'
16 needs (18,20).
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33 In the context of PC, the Self-efficacy in PC (SEPC) and the Thanatophobia (TS)
34 scales were developed to evaluate student's self-efficacy and their expectations of practice,
35 respectively (18,21,22). The SEPC has three factors related to doctors' expected behaviours
36 in PC: (A) effectively communicating with the patient and family, (B) appropriate assessment
37 and management of patient's symptoms and needs, and (C) work within a multidisciplinary
38 team. Thanatophobia, or 'fear of death', is related to the anxiety experienced by students or
39 professionals who deal with dying patients. Previous studies have used the TS for outcome
40 expectancy evaluation because it is related to healthcare professionals' attitudes towards
41 dying patients. We expected that doctors providing end of life care would present low levels
42 of thanatophobia. (21,23).
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54 Considering the need to foster PC education in Brazil, it is essential to make available
55 instruments as reliable and valid as the original scales. These instruments can be used by
56 Brazilian educators to follow the development of medical students regarding their attitudes
57 towards palliative care. Also, these instruments will allow Brazilian educators to engage in
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3 international conversations about this topic. This study aimed to translate and validate the
4 SEPC and TS to Brazilian Portuguese, following established international procedures, which
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7 140 will contribute to future collaborative studies and meta-analysis in international PC education
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13 **Methods**

14 **Setting**

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17 The validation study was conducted in a Medical School in the Southeast of Brazil. The
18 undergraduate medical course is delivered over six years, with a transversal axis curriculum,
19 aimed to integrate student's learning to healthcare practices and services. Each year 120 new
20 students enrol in the course. In the two first years, students' learning is focused on basic
21 sciences, and they are introduced to patient care with regular activities in primary care facilities
22 and hospital settings. During the next two years, students start clinical studies; first students
23 practice inside the hospital, in Internal Medicine wards, where they learn about history taking,
24 physical examination and clinical reasoning. Later, students start to perform full clinical
25 consultations under expert supervision in primary care settings. In the final two years, students
26 practice under specialist supervision in diverse medical areas, inside and outside the hospital,
27 in different clinical rotations, such as internal medicine, paediatrics, surgery, gynaecology,
28 primary care, medical emergencies and critical care. Nevertheless, in our context, during the
29 last semester of the second year and the entire third year, students have contact with patients
30 inside the hospital, including the emergency department and the internal medicine ward. Since
31 the Intensive Care Unit (ICU) in our university hospital does not have enough beds for all the
32 patients in critical conditions, we end up with around 40 patients under mechanical ventilation
33 outside of the ICU. So, even when our students had not cared directly for someone who died,
34 they have contact with critical patients who eventually die since early moments of the
35 undergraduate course. This early contact with dying patients justifies why we choose this
36 sample to validate our questionnaires. In the future, we are interested in following up their
37 development throughout the course.
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3 Despite this breadth of training, there is no formal palliative medicine programme in the
4 curriculum, although some disciplines and clinical placements may include aspects related to
5 fundamental approaches in PC. For example, students have an obligatory longitudinal course,
6 along the six years of medical school, on bio- and clinical ethics, in which they discuss, among
7 other topics, the concepts of euthanasia, dysthanasia, orthothanasia, and end-of-life care. In
8 the first three years, the course is mainly theoretical, and, in the last three years, students
9 engage in the ethical decision making of challenging patients. Also, students have contact with
10 real patients since the first year, and several aspects of clinical communication are discussed,
11 such as how to brake bad news, the importance of being empathetic, and offering rapport.
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24 **Participants**

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26 For validation analysis, we invited the third-year medical students of class 2017 to answer the
27 translated and pre-tested scales in July 2017, during their final exams on clinical semiology.
28 All the students had experienced the same curricular activities. We included all students who
29 agreed to participate.
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35 **Patient and Public Involvement**

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37 This study did not involve the participation of patients nor the general public in the design,
38 conduct, reporting or dissemination of the findings.
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43 **Instruments**

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45 *Self-efficacy in Palliative Care Scale* (SEPC) (21): in this 23-item scale, self-efficacy is
46 recorded as students rate their confidence in performing PC practice on a 100 mm Visual
47 Analogue Scale, ranging from 'very anxious' to 'very confident'. The point assigned on the
48 visual analogue scale is measured, and the score ranges between zero to 100, with higher
49 values indicating higher confidence in that specific task. The original study identified three
50 factors: (A) communication (factor range: .70 - .89; Cronbach's alpha: .93), (B) patient
51 management (factor range: .55 - .84; Cronbach's alpha: .92) and (C) multidisciplinary team
52 working (factor range: .70- .84; Cronbach's alpha: .92) in PC.
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3 *Thanatophobia Scale* (TS) (23): the original scale was designed to assess the different
4 feelings that clinicians may experience in caring for end of life patients, designating these
5 feelings as “thanatophobia”. The scale has one factor ranging between .61 and .79, and a
6 Cronbach’s alpha of .84. Each item of the scale is a statement related to outcomes of caring
7 for dying patients, such as: “*Dying patients make me feel uneasy*” and “*When patients begin*
8 *to discuss death, I feel uncomfortable*”. The participants rate each statement on a 7-point Likert
9 scale, which range from "strongly agree" to "strongly disagree" whether the outcomes. The
10 final score could range from 7 to 49, with higher scores indicating higher thanatophobia levels.
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22 **Procedures**

23 *Phase 1: Translation and Pretesting*

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25 The original SEPC and TS are in English, with no available translation or validation of the
26 scales for the Brazilian Portuguese. Therefore, we proceeded to translate the scales following
27 the *European Organization for Research and Treatment of Cancer* (EORTC)
28 recommendations (24). Firstly, we contacted the researchers who developed the original
29 scales to assure there was not any other translation in progress and to obtain authorisation to
30 develop our version. Then, two translators independently developed two Portuguese versions
31 of the scales, according to EORTC procedure. We then produced an optimal Portuguese
32 version through a reconciliation process of the two translations. This optimal version was sent
33 to two independent English professional translators who produced two back-translation
34 versions in English from the optimal Portuguese version. After discussions with the scales’
35 developers on an optimised back-translation, we reached a consensus and produced a final
36 version of both scales (SEPC-Br and TS-Br – Appendices 1 and 2)) in Brazilian Portuguese.
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54 *Phase 2: Pretesting*

55 Both final versions were pilot-tested in a focus group with ten 6th-year medical students. One
56 of the researchers met the students and explained the study. The students completed the
57 scales and, after, the researcher asked if they had difficulties in comprehending any item.
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3 Small grammar corrections were proposed but the students did not suggest any major
4 changes and assured that they had a good comprehension of the items, aims and
5 expectations of the scale. Students did not engage in a content analysis of the scales. Once
6 we had a final version, the scales were distributed to the 3rd year medical students from the
7 class of 2017, to generate data to enable the psychometric analysis of the scales.
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16 *Phase 3: Statistical analysis for psychometric evaluation*

17 For construct validity, firstly, we conducted a confirmatory factor analysis with Maximum
18 Likelihood estimation to investigate the internal structure of both scales. To assess the
19 confirmatory factor model, we used the following goodness of fit: Chi-square statistics,
20 Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of
21 Approximation (RMSEA). The Chi-square statistics was used to assess the overall fit and
22 discrepancy between the sample and the model. Both CFI and TLI were considered optimal
23 with values above .90 (25). Optimal RMSEA is lower than .80 (26). The missing data were
24 deleted for the analysis. Finally, we calculated the reliability of the scales using Cronbach's
25 alpha and Composite reliability, and, for concurrent validity, we calculated the correlation
26 between the SEPC-Br and TS-Br.
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39 Data were analyzed using IBM-SPSS 21.0 and R (lavaan and dplyr packages). The latter was
40 used for the confirmatory factor analysis and calculating the Composite reliability, respectively.
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45 **Ethics**

46 We conducted this research in accord with the Declaration of Helsinki. We assured that any
47 student who was not comfortable with the subject would not feel obliged to participate in the
48 study. As exploring themes related to death could be sensitive to some people, if any students
49 demanded support on this subject, they could contact the research team to receive proper aid.
50 For analysis purposes, anonymity was preserved. All students that agreed in participate
51 signed written informed consent. The Research Ethics Committee (School of Medical
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Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the study before the data collection.

Results

From a possible 119 potential participants, eight did not sign the informed consent. Thus, 111 (response rate = 93.2%) were considered for the SEPC validation analysis and, due to absence of data, 109 (response rate = 91.6%) were considered for TS validation. Their mean age was 22.02 (SD = 2.11) and the majority were females (53.2%). The proportion of male and female follows the current ratio of gender in Brazilian medical school. Asking about students' previous experience, 47.7% said they had participated in the care of a dying patient during their medical studies. This finding is coherent with educational experience they have in their medical school.

Psychometric Properties of SEPC-Br Scale

Confirmatory Factor Analysis (CFA) demonstrated that the base model for the SEPC-BR scale (model A) displayed poor fit index values, based on the Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA). When the correlation between the items' errors was added (model B), the model achieved a satisfactory level of model fit (Table 1).

Table 1 - Fit index for the SEPC and Thanatophobia scales

		χ^2 (df) Sig.	CFI	TLI	RMSEA (LO90; HI90)
SEPC	Model A	$\chi^2(227) = 776.018$; p<0.001	.804	.782	.143 (.132; .155)
	Model B	$\chi^2(211) = 356.934$; p<0.001	.945	.934	.079 (.065; .093)

Thanato phobia	Model A	$\chi^2(14) = 42.058;$ $p < 0.001$	.883	.824	.136 (.090; .184)
	Model B	$\chi^2(11) = 12.579;$ $p > 0.05$	.993	.987	.036 (.000; .110)

Abbreviations: SEPC = Self-efficacy in Palliative Care; $\chi^2(df)$ Sig. = Chi-square (degree of freedom) Significance; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA (HI90) = Root Mean Square Error of Approximation (Lower and Upper limit of 90% of confidence).

Each subsection of the SEPC was analyzed independently for reliability on test scores. For the first factor, Multidisciplinary teamwork (MT), Cronbach's alpha and Composite reliability were .97 and .96, respectively. For the second factor, Communication (CM), Cronbach's alpha and Composite reliability were .93 and .93, respectively. For the third factor, Patient Management (PM), Cronbach's alpha and Composite reliability were .92 and .91 respectively.

Psychometric Properties of Thanatophobia-Br Scale

Confirmatory Factor Analysis (CFA) revealed that the base model for the Thanatophobia_Br scale (model A) displayed poor fit index values, based on the Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA). When the correlation between the items' errors was added (model B), the model achieved a satisfactory level of model fit (Table 1). Cronbach's alpha and Composite reliability were .82 and .82, respectively. In summary, Table 2 shows the factors and Cronbach's alphas of the Brazilian version compared to the original scale.

Table 2 – Comparison between the Original and Brazilian version of the scales

Scales	Original Scale (17)		Brazilian version	
<i>Psychometrics properties</i>	<i>Factors</i>	<i>Cronbach's alpha</i>	<i>Factors</i>	<i>Cronbach's alpha</i>
SEPC Communication	.70 - .89	.93	.75 - .85	.93
SEPC Management	<i>Patient</i> .55 - .84	.92	.51- .81	.92

SEPC Multidisciplinary teamwork	.70 - .84	.92	.78 - .90	.97
Thanatophobia Scale	.61 - .79	.84	.66 - .83	.82

Concurrent validity

We found a negative and significant correlation between the SEPC-Br and TS-Br and its dimensions. The magnitude ranged from weak to moderate (Table 3).

290 **Table 3 – Correlation between SEPC and Thanatophobia scales**

	Thanatophobia
SEPC Communication	-.516*
SEPC Patient Management	-.370*
SEPC Multidisciplinary teamwork	-.262**
SEPC Total	-.499*

*p=0.000; **p=0.006 Abbreviations: SEPC = Self-efficacy in Palliative Care;

Discussion

This study aimed to explore the reliability and validity of SEPC-Br and TS-Br. Both scales had a high reliability coefficient measured by Cronbach's alfa and Composite reliability. The Principal Component Analysis replicated the original factors and items of SEPC-Br and TS-Br, which supports the construct validity of the scales. We also found a negative correlation between SEPC-Br and TS-Br, indicating that higher the fear of death, the lower the self-efficacy in PC. This result was expected, since students who are uncomfortable with the idea of death may feel more anxious and less confident to take care of dying patients.

In medical education, assessing behaviour change in clinical practice is challenging. Nevertheless, an appropriate theoretical model can provide the means for practical evaluation of the learning process. As previous studies suggest, scales that assess self-efficacy and outcome expectancies may provide valid measurements of the possible impact of an educational programme (18,20,21,27). The SEPC-Br showed good psychometric properties after the translation and validation process, replicating the original factors (21). These factors

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3 arguably express common core competencies of PC, and the Brazilian students recognised
4 the same competencies. Although PC education is not well established in Brazilian medical
5 schools, the factors' similarity with the original scale may be explained because of the sample
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10 310 likeness. In both the original and the Brazilian study, medical students were in the midst of
11 their medical studies, probably aware of the vital role of the communication between doctor
12 and patient, the patient's well-being and the required multidisciplinary work to achieve high
13 standards of care (10). The TS has also showed good psychometric properties after the
14 translation and validation process, replicating the original structure of the scale (21). This
15 indicates that the scale may be used in the Brazilian context for PC education evaluation
16 based on social cognitive theory.
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24 Our study was the first to examine the psychological properties of a Brazilian version
25 of these scales and the first study to use Confirmatory Factor Analysis for both scales. This is
26 important since confirmatory factor analysis is theory-driven analysis, meaning that it tests the
27 theory behind the scales. In addition, confirmatory factor analysis makes an explicit relation
28 between the latent variable and score. Therefore, our study also adds to the international
29 literature by presenting another type of evidence of validity based on confirmatory factor
30 320 analysis and concurrent validity between the SEPC and Thanatophobia.
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39 Making available a validated Brazilian version of these scales will allow medical
40 educators to evaluate students' progress in their PC educational programmes. Recently two
41 Brazilian studies have used modified Brazilian versions of SEPC for evaluation of medical
42 students (28,29). Although they have not examined the psychological properties of the SEPC,
43 its use suggests a growing interest in improving PC education for undergraduate students
44 using the self-efficacy concepts. Indeed, PC education in Brazil is increasing, and further
45 efforts for its enhancement are required.
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54 Ongoing evaluation and review of PC educational programmes are necessary since
55 there is no gold standard programme in PC education. Clinical simulation, bedside teaching,
56 e-learning, self-directed study, reflexive learning, small group discussions, lectures are
57 examples of these different pedagogical approaches to teach PC (9,30–34). Evaluations of
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3 educational outcomes using instruments such as SEPC-Br and TS-Br, may help educators in
4 shaping the best methods and curriculum composition for their students' needs (5,9,34). As a
5 result, future doctors will be better prepared for caring for dying patients. Whereas medical
6 schools will use these instruments for improving their PC programmes, this may show if and
7 how future doctors have been prepared to practice more and better PC. Besides, validated
8 versions of the scales and publishing of the resultant data generated inform Brazilian medical
9 educators and may stimulate other countries in Latin America to do the same, supporting
10 future research in PC education and providing data for further improvement in PC training.
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22 **Strengths and Limitations**

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24 We choose validated instruments that were based on a solid theoretical basis, to access
25 medical students' attitudes towards palliative care. The translation and validation processes
26 were based on a recommended guideline protocol and we worked close to the original authors.
27 Those aspects gave to our study a strong methodological grounding.
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33 One limitation that we should acknowledge is that we used a convenience sample,
34 which could result in selection bias, especially considering that we selected third-year
35 350 students, with few clinical experiences. However, we had a high response rate, and our
36 sample is, therefore, representative of the students in the mid of the medical course with initial
37 clinical learning and experience, and exposure to critical and dying patients.
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44 The use of self-assessment instruments is not enough by themselves for a final
45 evaluation of learning outcomes and future performance in PC. Therefore, OSCE, mini-CEX
46 or other external evaluation methods should be used in addition to self-efficacy assessment
47 for a thorough evaluation of learning outcomes (20). Regarding the follow-up of students,
48 these scales could be used for understanding the development of palliative care competencies
49 in different Portuguese speaking countries and to compare the development of palliative care
50 competencies in curricula with and without structured palliative care training.
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59 Although this study has mainly focused on the translation and investigation of scales'
60 internal structure and reliability, further studies are necessary to explore and confirm their

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3 validity. For example, it is also important to apply these scales in senior medical students and
4 residents to check their validity for these more experienced populations. Also, using strong
5 words at the beginning of each sentence may produce variance beyond the measured
6 construct, the so-called Method Effects, and future research is needed to clarify this issue
7 (35). Additionally, future research in this area should investigate how the improvement
8 measured by the SEPC and TS persists after PC training and how it influences actual doctors'
9 performance when caring for dying patients.
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Conclusion

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22 Brazilian medical schools are gradually incorporating PC in their curricula, indicating a
23 recognition of the importance of PC education for Brazilian medical doctors. The original scale
24 developed in English intended to evaluate medical students' self-efficacy in PC and
25 thanatophobia as the outcome expectancy. Using these measurements, we can assess
26 students' self-perceived belief in their performance and measure if and how PC educational
27 programmes are increasing students' self-efficacy. The Brazilian Portuguese version of the
28 scales showed good psychometric properties and may be used to assess PC educational
29 programmes. Medical educators in Brazil and Latin America could use this process and these
30 scales to tailor appropriate pedagogical approaches for their medical students and better
31 prepare doctors for delivering PC.
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List of abbreviations

- 46 • CFA: Confirmatory Factor Analysis
 - 47 • CFI: Comparative Fit Index
 - 48 • EORTC: European Organization for Research and Treatment of Cancer
 - 49 • Mini-CEX: Clinical Evaluation Exercise
 - 50 • OSCE: Objective Structured Clinical Examination
 - 51 • PC: Palliative Care
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- RMSEA: Root Mean Square Error of Approximation
 - SEPC: Self-Efficacy in Palliative Care
 - TLI: Tucker Lewis Index
 - TS: Thanatophobia Scale
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14 **Declarations**

15 ***Ethics approval and consent to participate***

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18 We conducted this research in accord with the Declaration of Helsinki. We assured that any
19 student who was not comfortable with the subject would not feel obliged to participate in the
20 study. As exploring themes related to death could be sensitive to some people, if any students
21 demanded support on this subject, they could contact the research team to receive proper aid.
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24 400 For analysis purposes, anonymity was preserved. All students that agreed in participate
25 signed written informed consent. The Research Ethics Committee (School of Medical
26 Sciences/UNICAMP - 58198016.4.0000.5404/2016) analysed and approved the study prior to
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37 ***Consent for publication***

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39 Not applicable
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44 ***Availability of data and materials***

45 410 The datasets used and analysed during the current study are available from the corresponding
46 author on reasonable request.
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52 ***Competing interests***

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54 The authors declare that they have no competing interests.
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58 ***Funding***

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Appendix 1 – Self-efficacy in Palliative Care Scale: original and Brazilian Portuguese translation (CM: Communication; PM: Patient Management; MT: Multidisciplinary teamwork)

Item	Original	Translation
CM1	<i>discussing the likely effects of cancer with the patient</i>	Ao conversar os efeitos esperados do câncer com meu paciente
CM2	<i>discussing the likely effects of cancer with the patient's family</i>	Ao conversar os efeitos esperados do câncer com os familiares do seu paciente
CM3	<i>discussing the issues of death and dying</i>	Ao conversar assuntos relacionados à morte e ao processo de morrer
CM4	<i>discussing the patient's death (to occur) with the patient</i>	Ao conversar com o paciente sobre a morte do próprio paciente
CM5	<i>discussing the patient's death (to occur) with the family</i>	Ao conversar com a família do paciente a morte futura do paciente
CM6	<i>discussing the patient's death with the family upon bereavement</i>	Ao conversar com a família enlutada a morte do paciente
CM7	<i>answering the patient's questions "How long have I got to live?"</i>	Ao responder à pergunta do paciente: "Quanto tempo de vida eu tenho?"
CM8	<i>answering the patient's questions "Will there be much suffering or pain?"</i>	Ao responder à pergunta do paciente: "Eu passarei por muito sofrimento ou dor?"
PM1	<i>in my ability to assess the patient's needs</i>	Com a minha habilidade de avaliar as necessidades do paciente
PM2	<i>in my knowledge of the aetiology of common symptoms experienced by palliative care</i>	Com meus conhecimentos sobre a causa de sintomas comuns sofridos por pacientes em cuidados paliativos
PM3	<i>in my ability to manage common symptoms experienced in palliative care patients</i>	Com minha habilidade de manejar sintomas comuns sofridos por pacientes em cuidados paliativos
PM4	<i>in my ability to prescribe appropriate and adequate pain control medication</i>	Com minha habilidade de prescrever medicação para controle da dor de modo adequado
PM5	<i>in my knowledge of the therapeutic and side effects of analgesic agents</i>	Com meu conhecimento dos efeitos terapêuticos e colaterais de medicações analgésicas
PM6	<i>in my ability to provide psychological care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado psicológico para o paciente em cuidado paliativo e sua família

PM7	<i>in my ability to provide social care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado social para o paciente em cuidado paliativo e sua família
PM8	<i>in my ability to provide spiritual care for the palliative care patient and their family</i>	Com minha habilidade de fornecer cuidado espiritual para o paciente em cuidado paliativo e sua família
MT1	<i>working in a multi-professional palliative care team</i>	Trabalhando com uma equipe multiprofissional de cuidados paliativos
MT2	<i>appropriately referring palliative care patients for physiotherapy</i>	Encaminhando pacientes em cuidados paliativos para fisioterapia no momento certo
MT3	<i>appropriately referring palliative care patients for occupational therapy</i>	Encaminhando pacientes em cuidados paliativos para terapia ocupacional no momento certo
MT4	<i>appropriately referring palliative care patients for complementary therapies</i>	Encaminhando pacientes em cuidados paliativos para terapias complementares (i.e. acupuntura, massoterapia, etc) no momento certo
MT5	<i>appropriately referring palliative care patients to a lymphedema service</i>	Encaminhando pacientes em cuidados paliativos para tratamento de linfedema no momento certo
MT6	<i>appropriately referring palliative care patients for psychiatric evaluation</i>	Encaminhando pacientes em cuidados paliativos para avaliação psiquiátrica no momento certo
MT7	<i>appropriately referring palliative care patients to a spiritual advisor</i>	Encaminhando pacientes em cuidados paliativos para um conselheiro espiritual no momento certo

Appendix 2 – Thanatophobia Scale: original and Brazilian Portuguese translation

<i>Original/Translation</i>
<i>Dying patients make me feel uneasy</i> Pacientes em processo de morrer me deixam desconfortável
<i>I feel pretty helpless when I have terminal patients on my ward</i> Eu me sinto desamparado quando tenho pacientes terminais sob meus cuidados
<i>It is frustrating to have to continue talking with relatives of patients who are not going to get better</i> É frustrante ter que continuar conversando com parentes de pacientes que não irão melhorar
<i>Managing dying patients traumatises me</i> Lidar com pacientes que estão morrendo me traumatiza
<i>It makes me uncomfortable when a dying patient wants to say goodbye to me</i> Quando um paciente terminal quer se despedir de mim eu me sinto desconfortável
<i>I don't look forward to being the personal physician of a dying patient</i> Eu não gostaria de me tornar o médico responsável por um paciente que está morrendo
<i>When patients begin to discuss death, I feel uncomfortable</i> Eu me sinto desconfortável quando os pacientes começam a conversar sobre morte

Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the STROBE cross sectional reporting guidelines, and cite them as:

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		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	3-5
Objectives	#3	State specific objectives, including any prespecified hypotheses	5-6
Methods			
Study design	#4	Present key elements of study design early in the paper	1 / 7-8
Setting	#5	Describe the setting, locations, and relevant dates, including periods of	6

		recruitment, exposure, follow-up, and data collection	
1			
2	Eligibility criteria	#6a Give the eligibility criteria, and the sources and methods of selection of	6
3		participants.	
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6		#7 Clearly define all outcomes, exposures, predictors, potential	6
7		confounders, and effect modifiers. Give diagnostic criteria, if applicable	
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10	Data sources /	#8 For each variable of interest give sources of data and details of methods	7-8
11	measurement	of assessment (measurement). Describe comparability of assessment	
12		methods if there is more than one group. Give information separately	
13		for for exposed and unexposed groups if applicable.	
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17	Bias	#9 Describe any efforts to address potential sources of bias	7-8
18			
19	Study size	#10 Explain how the study size was arrived at	7-8
20			
21	Quantitative	#11 Explain how quantitative variables were handled in the analyses. If	8
22	variables	applicable, describe which groupings were chosen, and why	
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25	Statistical	#12a Describe all statistical methods, including those used to control for	8
26	methods	confounding	
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29	Statistical	#12b Describe any methods used to examine subgroups and interactions	n/a
30	methods		
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32			
33	Statistical	#12c Explain how missing data were addressed	9
34	methods		
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36			
37	Statistical	#12d If applicable, describe analytical methods taking account of sampling	8
38	methods	strategy	
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41	Statistical	#12e Describe any sensitivity analyses	n/a
42	methods		
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44	Results		
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46	Participants	#13a Report numbers of individuals at each stage of study—eg numbers	9
47		potentially eligible, examined for eligibility, confirmed eligible,	
48		included in the study, completing follow-up, and analysed. Give	
49		information separately for for exposed and unexposed groups if	
50		applicable.	
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55	Participants	#13b Give reasons for non-participation at each stage	9
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57	Participants	#13c Consider use of a flow diagram	n/a
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1	Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	9
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6	Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	9
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10	Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	n/a
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14	Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	n/a
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19	Main results	#16b	Report category boundaries when continuous variables were categorized	n/a
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21	Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a
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25	Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	n/a
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29	Discussion			
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31	Key results	#18	Summarise key results with reference to study objectives	12-14
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34	Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	14
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39	Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	12-14
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44	Generalisability	#21	Discuss the generalisability (external validity) of the study results	14
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51	Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	16
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