Current Psychology
https://doi.org/10.1007/s12144-025-07663-9

Validation of the Collett-Lester Fear of Death Scale with Portuguese students

Alexandra Neto[1,5] · **Félix Neto**[1,2] · **Patrício Costa**[1,2,3,4] · **Maria José Gomes**[5]

Accepted: 2 March 2025

Abstract

The Collett-Lester Fear of Death Scale (CL-FODS) is a 28-item multidimensional measure assessing fear of death and dying of self and others. This study evaluated the psychometric properties and dimensionality of the Portuguese version in two phases. Phase 1 (P1; December 2018–February 2019) involved 312 students and used Exploratory Structural Equation Modeling (ESEM) to assess validity. Phase 2 (P2; January–March 2024) tested construct reproducibility with 470 students. Participants completed the Portuguese CL-FODS alongside the Social Desirability Scale, Social Anxiety Scale, Loneliness Assessment, and the Depression, Anxiety, and Stress Scales (DASS-21). An abbreviated version (AB-CLFODS) was developed by removing 12 items across subscales: fear of death of self (Items 1, 2, and 4; e.g., "Short life"), dying of self (Items 1, 5, and 7; e.g., "Physical degradation that occurs"), fear of death of others (Items 1, 2, and 3; e.g., "Loss of a loved one"), and dying of others (Items 1, 2, and 7; e.g., "Having to be with someone who is dying"). The AB-CLFODS demonstrated strong reliability, with Cronbach's Alpha and McDonald's ω values of .89 in P1 and .90 in P2. Subscale reliabilities ranged from .75 to .87 in P1 and .79 to .85 in P2. In P1, the scale correlated significantly with social desirability ($p = .003$), stress ($p = .031$), and social anxiety ($p = .017$). P2 confirmed significant correlations with all external measures, including loneliness and DASS-21 scores. Construct validity was further supported in P2 by acceptable fit indices, such as normed chi-square, CFI, and RMSEA values. These findings establish the Portuguese AB-CLFODS as a reliable and valid instrument for assessing fear of death and dying, with consistent psychometric properties and construct validity across time, making it suitable for research and clinical applications.

Keywords Death fear · Death anxiety · CLFODS · Validation · Students · Portugal

Throughout history, it is evident that humans have consistently found death to be an unsettling subject (Kübler-Ross, 2008). Despite its inevitability, death and dying are often neglected in discourse, as naming or reflecting on them is thought to induce physical or psychological distress (Kastenbaum & Ainsenberg, 1983; Zhai & Du, 2020). The fear of death is multidimensional, encompassing a range of fears rather than a single experience, with ongoing debate about the nature of these dimensions. Typically, fear of death involves a conscious fear or apprehension regarding the process of dying or the state of being dead, often including concerns about pain, loss of control, or the unknown. Death anxiety, on the other hand, refers to a broader existential unease related to mortality (Collett & Lester, 1969; Hanna et al., 2024; Kübler-Ross, 2008; Tómas-Sábado et al., 2007).

Numerous studies have examined the fear of death using self-report scales, with the Collett-Lester Fear of Death Scale (CL-FODS) being a widely used multidimensional tool. Since its creation in 1969, it has been referenced and applied in various research contexts and remains a classic instrument for assessing the multidimensional nature of death anxiety (Abdel-Khalek, 2002; Abdel-Khalek &

✉ Alexandra Neto
up199800914@up.pt

1 Faculty of Psychology and Education Sciences, University of Porto, Rua Alfredo Allen, 4200-135 Porto, Portugal

2 Center for Psychology, University of Porto, Porto, Portugal

3 Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, 4710-057 Braga, Portugal

4 ICVS/3B's - PT Associate Laboratory, Braga/Guimarães, Portugal

5 School of Health, Polytechnic Institute of Bragança, Bragança, Portugal

Published online: 22 March 2025

Lester, 2004; Andrade et al., 2023; Collett & Lester, 1969; Dadfar & Lester, 2016; Espinoza et al., 2011; Kübler-Ross, 2008; Naderi & Esmaili, 2009; Quintero & Simkin, 2017; Tómas-Sábado et al., 2007). Collett and Lester (1969) stated that death anxiety is a multidimensional concept that may have various causes and can lead to different reactions depending on the idea of death as a state but also to the process of dying. Attitudes and emotional reactions can vary concerning the need to deal with one´s death and the death of others. This scale assesses four different types of fears: fear of death of self, fear of dying of self, fear of the death of others, and fear of dying of others. The 1969 version contained 36 items; in 1990, Lester proposed a revised scale with subscales containing eight items. In 2003, Lester and Abdel-Khalek proposed a revised scale with 28 items (seven items per subscale). In 2004, Abdel-Khalek and Lester developed an Arabic version of the CL-FODS, obtaining alpha reliabilities for the four subscales and a total score of 0.75 to 0.92. Two factors were congruent with item allocation to two scales (fear of death of self and fear of the death of others). However, the theorized factorial structure of the subscales' fear of the dying process and fear of others' dying was only partially supported by empirical analysis. Neimeyer et al. (2003), in a review of assessment scales for measuring the fear of death and dying, mentioned that the CL-FODS (1969) showed rational support in four inconsistent factors, with fair test-retest correlations and adequate internal consistency results. They cautioned that it would be advisable to disregard its attractive and symmetrical factor structure. Zuccala et al. (2022) reported that the revised CL-FODS was the only measure to receive a positive rating for responsiveness, suggesting that it may be the most appropriate measure for use in clinical trials despite an apparent lack of conceptual unity, as evidenced by the highly variable factor structures of death anxiety measures. The psychometric properties reported in various studies have been acceptable ($\alpha > 0.60$), and the fit indices, although not analyzed in all cases, tend to reach the expected values (see supplementary Table 1S) (Abdel-Khalek et al., 2004; Andrade et al., 2023; Dadfar et al., 2016; Espinoza et al., 2011; Kübler-Ross, 2008; Lester, 2004; Naderi et al., 2009; Quintero, & Simkin, 2017; Tómas-Sábado et al., 2007). Despite being one of the most used and referenced scales in scientific studies and having several adaptations and validations in various countries worldwide, no validation and adaptation study has been conducted in Portugal (see Table 1S). It has been hypothetically suggested by Tomás-Sábado et al. (2007) that this multidimensional fear of death scale might be more suitable for samples of healthcare professionals due to their exposure to different emotions and cognitions, such as reactions to death cases and dying processes. Studies utilizing the CL-FODS have examined its association with variables such as age, gender, and personality. According to findings from several studies, older individuals report lower scores than younger individuals (Lester, 2015; Neimeyer et al., 2004). The scale positively correlates with neuroticism traits but not social desirability (Mooney & O'Gorman, 2001).

Preliminary research has shown positive associations between neuroticism and death anxiety (Pradhan et al., 2020). Similarly, studies have found a positive correlation between depression and death anxiety (Lok et al., 2023). Çakar (2020) identified loneliness and the presence of meaning in life as significant predictors of death anxiety in youth, with a positive relationship between death anxiety and loneliness. Additionally, while research indicates a connection between social anxiety and fear of death, the underlying mechanisms linking these constructs remain unclear (Zuccala et al., 2021).

Fear and anxiety about death and dying and its relationship to empathy, communication, and attitudes toward end-of-life care have been extensively explored with healthcare students. Kaklauskaitė and Antinienė (2016) conducted a study involving 233 medical students from the Lithuanian University of Health Sciences. The study found that students with higher levels of death anxiety, concerning both their own and other´s mortality, also reported increased personal distress, empathic concern, emotional and global empathy, and fantasy. In male participants, the correlation between death anxiety and the empathy subscales was weak. In contrast, female participants showed a very weak correlation specifically between emotional empathy and death anxiety. Findings suggested that medical students with heightened personal distress, empathic concern, and empathy may be more susceptible to experiencing death anxiety, with generally weaker correlations observed in men compared to women.

Similarly Cetintas et al. (2021) investigated the relationship between death anxiety and attitudes toward dying with dignity among 55 nursing students who had completed pediatric oncology clinical practice. Students exhibited moderate death anxiety and high adherence to the principles of dying with dignity. Death anxiety was influenced by witnessing a child's death and the total number of deaths witnessed ($p < 0.05$), while attitudes toward dying with dignity were affected by witnessing the death of a child with cancer ($p < 0.05$). However, no significant relationship was found between death anxiety and attitudes toward dying with dignity ($p > 0.05$). The study highlights the importance of educator support in helping students manage death anxiety and uphold end-of-life care principles. Another study investigated differences in fear of death between sophomore students in an academic nursing program and those in a professional nursing program. Using a quantitative cross-sectional design the authors measured fear of death

with the Indonesian-translated Collett-Lester Fear of Death Scale. Results showed that fear of death levels were moderate to high among academic program students and moderate among professional program students. An independent t-test revealed a significant difference between the groups ($p=0.010$). The study concludes that sophomore students in the academic program experience a significantly higher fear of death ($M=3.42$) than their professional program counterparts ($M=2.97$) (Purimahua et al., 2021).

Sharabati et al. (2024), assessed 1,156 medical interns from Egypt, Jordan, and Palestine were assessed for death anxiety and attitudes toward dealing with dying patients using Templer's Death Anxiety Scale (DAS) and the Approach to Death and Dying Patients Attitude Scale (ADDPAS). The participants had a median age of 24 years, with 74.6% living in urban areas and 53.6% being female. Females reported higher levels of death anxiety ($M=8$) and less positive attitudes toward communication with dying patients. Interns from Egypt scored lower on ADDPAS subscales but higher on DAS compared to those from Jordan and Palestine. The study found that higher death anxiety was significantly associated with greater communication difficulties and a higher tendency to avoid dying patients. The authors concluded that medical interns experience moderate death anxiety, highlighting the need for end-of-life communication training to enhance care for dying patients.

Portugal is predominantly Catholic, where beliefs about the afterlife, salvation, the meaning of death, and hope significantly influence individuals' perceptions and coping mechanisms related to death (Laranjeira et al., 2022). Concepts of heaven and hell influence both acceptance and fear of death, although Portuguese culture is also shaped by broader European identity, which may affect these perceptions (Dresser & Wasserman, 2010; Duque, 2022). Additionally, the cultural emphasis on work-life balance tends to reduce the prominence of death-related concerns (Dresser & Wasserman, 2010). In Portugal, family, friends, work, and leisure/free time are the most valued aspects of life, in that order, while religion, though still significant for 60% of the population, holds a slightly lower priority (Duque, 2022). Gonçalves et al. (2023) and Sousa et al. (2025) found that Portuguese individuals generally report lower levels of death anxiety compared to their Arab counterparts. Duque (2022) further notes that as the socio-cultural fabric of Portugal has evolved, religious values and social attitudes are shifting toward indifference.

In this study, we propose a unique approach to validate and adapt the CL-FODS for use as a multidimensional scale to assess death and dying anxiety in the Portuguese population. This approach is novel and has the potential to contribute to the field of psychology significantly. The primary research question is: "To what extent does the adapted Collett-Lester Fear of Death Scale (CL-FODS) demonstrate validity and reliability as a multidimensional measure of fear of death and dying in Portuguese students?"

Method

Participants

This study was meticulously conducted at two distinct time points with separate samples. In the first phase (P1), 312 students from Portuguese School of Health at the Polytechnic Institute of Bragança participated between December 2018 and February 2019. In the second phase (P2), 470 students from the same institution participated between January and March 2024. This approach ensured a comprehensive and methodologically robust research process.

Instruments

Participants completed a protocol consisting of five selected and validated scales, each of which plays a significant role in assessing death anxiety in the Portuguese population.

The Collett-Lester Fear of Death Scale (CL-FODS) (Lester & Abdel-Khalek, 2003). The CL-FODS comprises 28 items divided into four subscales, each containing seven items: fear of death of self, fear of dying of self, fear of the death of others, and fear of dying of others. The scale employs a five-point response format ranging from 1 (not at all) to 5 (very much). The total score for each subscale ranges from 7 to 35, with a score of 7 indicating low fear of death and dying, scores between 14 and 28 reflecting moderate fear, and a score of 35 indicating extreme fear of the death and dying process. In this sample, the Cronbach's alpha values were as follows: Death of Self ($\alpha=0.91$), Dying of Self ($\alpha=0.92$), Death of Others ($\alpha=0.88$), and Dying of Others ($\alpha=0.92$).

Loneliness (ULS-6). The short Portuguese form of the Revised UCLA Loneliness Scale (Russell et al., 1980) was utilized (ULS-6; Neto, 1992, 2014). This measure consists of six statements (e.g., "People are around me but not with me" and "I feel isolated from others"). Responses are rated on a 4-point scale ranging from 1 ('Never') to 4 ('Often'), with total scores ranging from 6 (indicating low loneliness) to 24 (indicating high loneliness). The measure demonstrated good internal consistency in this sample, with a Cronbach's alpha of 0.82.

Social Desirability. The Portuguese version of this scale has already been used in a broad cross-cultural study (He et al., 2014). Its items were selected based on the absence of ambiguous meaning and appropriateness to different cultural contexts. Comprising fifteen items (e.g., "I think about

my options before I make a choice", and "I gossip", nine are formulated as desirable attributes or behaviors, and six as undesirable attributes or behaviors (all six items should be reverse-scored). The measure utilizes a 5-point Likert response format, ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"), with total scores ranging from 15 (indicating low social desirability) to 75 (indicating high social desirability). In this sample, the internal consistency was acceptable, with a Cronbach's alpha of 0.74.

The Depression Anxiety and Stress Scale-21 (DASS-21) (Lovibond & Lovibond, 1995; Pais-Ribeiro et al., 2004). Is a 21-item measure of negative affect (e.g., "I found it hard to wind down", and "I found it difficult to relax). Each subscale targets common forms of psychological pathology with seven items (depression, anxiety, and stress). The answers are evaluated on a four-point Likert scale from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time"), total scores ranging 0 to 21, with higher scores indicating greater depression, anxiety, and stress. Cronbach's alpha was 0.90, 0.87, and 0.86, respectively.

Social Anxiety was measured with a subscale of the Self-Conscientiousness Scale (Fenigstein et al., 1975). Neto (1989) validated the Portuguese version of this subscale. The social anxiety subscale includes six items (e.g., "I get embarrassed very easily", and "I feel anxious when I speak in front of a group"), scaled from 0 (the statement does not describe you at all) to 4 (it describes you very well). Total scores range 0 to 24, with higher scores indicating greater social anxiety. This subscale´s psychometric characteristics were satisfactory and had a test-retest coefficient of 0.81 (Neto, 1989). In this sample, Cronbach's alpha was 0.72.

Procedure

The cultural adaptation process aims to maintain the content validity of the original instrument, allowing the assumption that the local version can yield measures similar to those of the original instrument, we opted to use the scale in its original language rather than the Brazilian Portuguese version because although both countries share the same native language, they have significant cultural differences. This approach sought to clarify the conceptual and semantic equivalence in terms of general meaning and reference, ensuring that the Portuguese version is more suitable for the Portuguese population (Gjersing et al., 2010; Herdman et al., 1998). It was bearing in mind that cultural, ethnic, and sociodemographic factors related to fear of death can influence the severity of death´s fear (Dadfar et al., 2016). The CL-FODS, consisting of 28 items, was translated from English to Portuguese, and backtranslation was performed by an English-speaking individual.

The translation of the CL-FODS into Portuguese was carried out separately by two English professors with extensive experience teaching English in Portuguese public schools. The translations aimed to consider both linguistic aspects and the meaning attributed to terms in the Portuguese context. After obtaining the translations, the researchers met and analyzed the two translated versions item by item. Among the two translations, they selected the items that best reflected the Portuguese context. Based on this analysis, a new version, referred to as the "First Translated Version of the CL-FODS," was created. This version underwent semantic and idiomatic analysis by three specialists (degree holders in Language and Literature with extensive knowledge of both English and Portuguese), who evaluated its consistency. Subsequently, the version was reviewed by three professionals with doctorates in social and health sciences and expertise in the development and adaptation of psychosocial measurement tools. The scale was then tested with a focus group of 10 participants aged 20 to 36 years, who found it easy to understand. Finally, the scale was retranslated into English by a native English speaker with proficiency in Portuguese. The two versions exhibited high similarity (Brislin, 1980).

All participants voluntarily and individually responded to the protocol scales on paper, ensuring anonymity and confidentiality without incentives. They used an individual code that they created with the following instructions: a six-digit alphanumeric code containing special characters that need to be remembered for later use.

This study was conducted at two distinct time points: the calibration and validation phases. In P1, the goal was to validate the scale with students in the healthcare field. The study aimed to adapt the CL-FODS as a multidimensional scale for assessing death and dying anxiety in Portuguese students while determining its psychometric properties, including internal consistency, test-retest reliability, and Exploratory Structural Equation Modeling (ESEM). Additionally, the study analyzed potential statistically significant correlations between the CL-FODS and other scales, such as Social Desirability, Loneliness (ULS-6), and the Anxiety, Depression, and Stress Scale (DASS-21). In P2, the objective was to evaluate whether the construct validation established in the first phase could be reproduced.

Eligibility criteria

Participants comprised all Portuguese health students enrolled at the Polytechnic Institute of Bragança. Students of non-Portuguese nationality were excluded.

Data analysis

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are widely recommended methods for the development and refinement of psychological assessment tools (Marsh et al., 2009; Reise et al., 2000). However, challenges related to measurement invariance and difficulties confirming factor structures have often been linked to overly restrictive cluster models in CFA (Marsh et al., 2014). Exploratory Structural Equation Modeling (ESEM) combines the advantages of Confirmatory Factor Analysis (CFA), Structural Equation Modeling (SEM), and Exploratory Factor Analysis (EFA), which is why its application was chosen in this study. In light of the increasing complexity of theoretical models capable of explaining a given phenomenon, which involves multiple observed and latent variables, as well as group differences and hierarchical, interaction, mediation, and other effects, it is possible to test the global fit of models and the individual significance of parameters within a theoretical framework that encompasses various types of linear models (Nye, 2023; Su et al., 2019). To create a synergy of the two, ESEM was proposed as an alternative solution, incorporating the advantages of EFA and CFA. ESEM is a method that offers the advantage of handling multiple relationships simultaneously, and it is useful for constructs with a poorly defined factorial structure (Nye, 2023). It allows for the specification, estimation, and testing of hypothetical relationships among a group of variables, with the possibility that all existing relationships between variables, whether latent or observed, can be represented by linear structural equations (or transformed into linear ones). This is particularly important since not all variables involved in each phenomenon are manifest (i.e., directly observable or manipulable); some may be latent (i.e., not directly measurable, only observable through their manifestations), and classical analysis methods do not account for "errors-in-variables" (Kline, 2005; Nye, 2023; Su et al., 2019). ESEM translates the relationships between variables into a diagram, offering a clearer representation of the phenomenon under study, which is one of its key advantages. ESEM allows for testing the plausibility of theoretical models by accommodating multiple relationships between both latent and observed variables, regardless of whether they are dependent or independent. This approach overcomes the limitation of traditional methods that permit only a single relationship between dependent and independent variables. Additionally, ESEM facilitates the transition from exploratory to confirmatory analysis, making it a versatile tool for model testing (Kline, 2005; Nye, 2023). In the P1 of the study (see Fig. 1), the Statistical Package for the Social Sciences (IBM SPSS Statistics), version 25, was used for descriptive and correlational data analyses. Jamovi software, version 2.3.28, was used to calculate McDonald´s ω and invariance measures. The remaining analyses in this research were conducted using Mplus 8, with a robust maximum likelihood estimator (MLR). MLR is appropriate for non-normal distributions, estimating standard errors, and chi-square test statistics, and can handle small to medium-sized samples (Muthen, & Asparouhov, 2002). Considering all the above proprieties, the robust MLR was used as an estimator for EFA and CFA. The EFA was executed in the sample (n = 312), and the MLR was used for parameter estimates with Geomin Factor rotation. Given that the sample size of our study exceeds 300, Hair et al. (2009), suggest that satisfactory variables should load on the primary factor above 0.40, on alternative factors below 0.30, and exhibit a difference of at least 0.20 between their primary and alternative factor loadings. Therefore, we defined 0.40 as the cut-off point. If an item cross-loads at 0.50 or higher on two or more factors, it should be excluded from the analysis

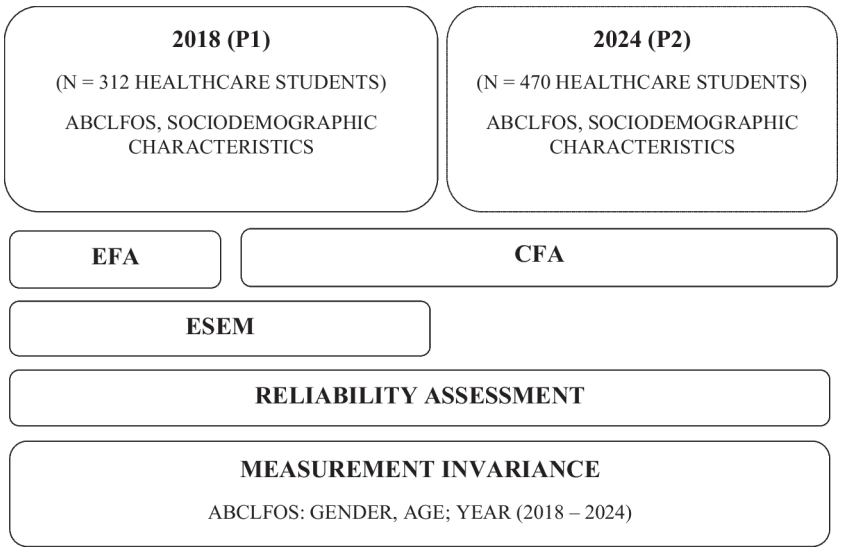

Fig. 1 The procedure for data analysis. *Note:*This figure illustrates the sequential steps used to analyze the data and statistical analysis

(Hair et al., 2009; Howard, 2016). In the CFA model, the variance of the latent factor was fixed at 1.00 (Nye, 2023). T-tests and Pearson's correlations were also used to examine links between CL-FODS and age and gender. Finally, Pearson's correlations were used to evaluate convergent and concurrent validity between the CL-FODS subscales and other scales of Social Desirability, Loneliness, and Anxiety, Depression, and Stress Scales (DASS-21).

In the study's P2 (see Fig. 1) the same statistical software and analyses were applied to the CFA during the first phase. Measurement invariance testing was conducted in P1 and P2 to evaluate whether the construct under study is interpreted equivalently across [specific groups, e.g., age or gender]. The analysis followed a sequential testing approach to examine four levels of invariance: configural, metric, scalar, and strict invariance. Model fit was evaluated using several fit indices, including the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). We also used the change in CFI (ΔCFI) to assess invariance between levels, considering a ΔCFI of≤0.01 as evidence of invariance between models (Chen, 2007).

Table 1 Summary of descriptive statistics sociodemographic characteristics

Variables		P1	P2
Age	*M*	21	21
	SD	3.8	3.9
<19 years	%	36.2	22.3
20–30 years	%	60.6	64.7
>30 years	%	3.2	3
Female	%	84	59.1
Male	%	16	40.9
Unmarried	%	96.2	97.4
Married	%	2.2	.6
Cohabiting	%	1.6	.6
Higher Education: Nursing	%	50.6	50.2
Higher Education: Dietetics and Nutrition	%	17.3	17
Higher Education: Pharmacy Technicians	%	5.8	21.9
Higher Education: Gerontology	%	22.4	10.9
Master´s Nursing	%	3.8	0
Believers	%	83.3	81.1
Religion practitioners	%	46.6	36.6
Regularly visiting cemeteries	%	68.5	59.1
Attended wakes and funerals	%	63.3	53.6
Has not considered their funeral arrangements	%	61	61.3
No arrangements regarding their death	%	95.1	98.3

Study Phase 1 (P1): N (valid)=312, N (omitted)=0, Phase 2 (P2): N (valid)=470, N (omitted)=0

Results

Sociodemographic characteristics

The students from both samples had an average age of 21, with the majority falling within the 20 to 30 age range. The sample of students from the study's first phase was predominantly female, whereas the students from the second phase were almost equally distributed by female and male. Other sociodemographic characteristics of the samples are presented in Table 1.

Collett-Lester Fear of Death Scale Portuguese validation

In the P1 and P2 of the study, the Shapiro-Wilk test on each item of the CL-FODS was statistically significant for all 28 items, and 16 items respectively ($p<0.001$). The data of the sample violated the assumptions of univariate normality. In the first phase, from the examination of the descriptive analysis of the confirmatory factor analysis of the 28-item scale (see Table 2), items 15 "Loss of a loved one" and 17 "Never being able to communicate with the person again" were removed due to presenting skewness values exceeding two (Kline, 2005) and kurtosis values exceeding eight (Bentler & Wu, 2002). In the second phase, descriptive analysis revealed skewness values ranging from -1.09 to 0.07 and kurtosis values between -1.32 and 0.50, suggesting the data are approximately normally distributed (Bentler & Wu, 2002; Kline, 2005).

In the P1 of the study, in the Kaiser-Meyer-Olkin (KMO) test, which assesses the sample adequacy measure, a value of 0.885 was obtained is good, indicating that factor analysis can be conducted (Howard, 2016). Bartlett's sphericity test revealed that the correlation matrix is suitable for principal component analysis, as the test value is below 0.05 ($p=0.001$). In the study's second phase, the KMO was 0.908, and Bartlett's sphericity test was below 0.001, suggesting excellent suitability for factor analysis.

Exploratory structural equation modeling (ESEM) and confirmatory factor analysis (CFA) were subsequently conducted in the initial phase of the study, employing the maximum likelihood robust (MLR) estimator and target rotation, along with modification indices (MIs). Upon analyzing the distribution of the factor loadings for various items (see Table 3), it was observed that items one "The total isolation of death", two "The shortness of life", and eight "The physical degeneration involved" loaded on different factors than that specified in the theoretical construct. Specifically, items one and two, loaded on the fear of dying of self dimension instead of fear of death of self, and item eight on fear of death of self instead of fear of dying of self. It was

Table 2 Summary of descriptive statistics CL-FODS scale

	Mean		Median		Skewness		Kurtosis		Minimum		Maximum	
	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
i1	3.34	-	4.00	-	-0.446	-	-1.079	-	1	-	5	-
i2	3.71	-	4.00	-	-0.778	-	-0.465	-	1	-	5	–
i3	3.19	2.96	3.00	3.00	-0.287	.09	-1.100	-1.21	1	1	5	5
i4	3.99	-	4.00	-	-1.111	-	0.064	-	1	-	5	-
i5	3.03	2.96	3.00	3.00	-0.066	.07	-1.424	-1.29	1	1	5	5
i6	3.18	3.04	3.00	3.00	-0.247	.02	-1.328	-1.32	1	1	5	5
i7	2.59	2.38	2.00	2.00	0.379	.58	-1.189	-.87	1	1	5	5
i8	2.77	-	3.00	-	0.133	-	-1.257	-	1	-	5	-
i9	3.89	3.79	4.00	4.00	-0.872	-.78	-0.001	-.43	1	1	5	5
i10	3.69	3.73	4.00	4.00	-0.705	-.71	-0.309	-.31	1	1	5	5
i11	3.60	3.54	4.00	4.00	-0.625	-.53	-0.360	-.51	1	1	5	5
i12	3.50	-	4.00	-	-0.623	-	-0.275	-	1	-	5	-
i13	3.54	3.44	4.00	4.00	-0.628	-.39	-0.478	-.91	1	1	5	5
i14	3.75	-	4.00	-	-0.843	-	-0.349	-	1	-	5	-
i15	4.71	-	5.00	-	-2.998	-	11.124	-	1	-	5	-
i16	3.82	-	4.00	-	-0.835	-	-0.480	-	1	-	5	-
i17	4.48	-	5.00	-	-2.004	-	4.198	-	1	-	5	-
i18	3.66	3.71	4.00	4.00	-0.634	-.62	-0.658	-.52	1	1	5	5
i19	4.13	4.04	4.00	4.00	-1.267	-1.09	1.224	.51	1	1	5	5
i20	3.15	3.14	3.00	3.00	-0.166	-.11	-1.010	-1.05	1	1	5	5
i21	4.16	4.05	4.00	4.00	-1.068	-1.03	0.456	.36	1	1	5	5
i22	3.44	-	4.00	-	-0.421	-	-0.750	-	1	-	5	–
i23	2.59	-	3.00	-	0.312	-	-0.927	-	1	-	5	
i24	3.92	3.94	4.00	4.00	-0.727	-.64	-0.069	.18	1	1	5	5
i25	3.66	3.70	4.00	4.00	-0.539	-.63	-0.517	-.49	1	1	5	5
i26	3.99	3.95	4.00	4.00	-0.817	-.79	0.077	-.18	1	1	5	5
i27	3.79	3.91	4.00	4.00	-0.663	-.69	-0.060	-.21	1	1	5	5
i28	3.52	-	4.00	-	-0.537	-	-0.576	-	1	–	5	-

Study Phase 1 (P1): N (valid) = 312, N (omitted) = 0, Phase 2 (P2): N (valid) = 470, N (omitted) = 0

Table 3 Exploratory Structural Equation Modeling (ESEM) and Confirmatory Factor Analysis (CFA); Solutions: 4 factors based on responses to 26 items with modification indices (STANDXY values)

Factors	ESEM Factor Loadings				
Items	F1	F2	F3	F4	CFA Factor Loading
MMP					
1. The total isolation of death	0.170	0.467	0.187	-0.121	0.619
2. The shortness of life	0.218	0.418	0.191	-0.129	0.634
3. Missing out on so much after you die	**0.592**	0.052	0.198	-0.101	0.645
4. Dying young	0.314	0.251	0.148	-0.010	0.604
5. How it will feel to be dead	**0.737**	0.042	-0.022	0.004	0.644
6. Never thinking or experiencing	**0.568**	0.125	0.137	0.011	0.715
7. The disintegration of your body after you die	**0.548**	0.151	-0.055	0.160	0.599
MPMP					
8. The physical degeneration involved	0.471	0.270	-0.227	0.238	0.571
9. The pain involved in dying	0.154	**0.585**	-0.093	0.159	0.702
10. The intellectual degeneration of old age	-0.071	**0.804**	-0.003	0.084	0.742
11. That your abilities will be limited as you lay dying	-0.122	**0.881**	0.046	0.014	0.745
12. The uncertainty as to how bravely you will face the process of dying	0.314	0.476	0.028	0.143	0.776
13. Our lack of control over the process of dying	0.272	**0.499**	0.104	0.033	0.757
14. The possibility of dying in a hospital away from friends and family	0.166	0.442	0.115	0.084	0.656
MMO					
16. Having to see the person's dead body	0.151	-0.148	0.338	0.296	0.552
18. Regret over not being nicer to the person when he or she was alive	0.065	-0.068	**0.550**	0.102	0.600
19. Growing old alone without the person	0.051	0.064	**0.639**	0.089	0.753
20. Feeling guilty that you are relieved that the person is dead	0.157	-0.078	**0.431**	0.170	0.579
21. Feeling lonely without the person	-0.023	0.070	**0.623**	0.138	0.718
MPMO					
22. Regret over not being nicer to the person when he or she was alive	0.142	-0.081	0.165	0.465	0.579
23. Growing old alone without the person	0.310	-0.115	0.138	0.249	0.393
24. Feeling guilty that you are relieved that the person is dead	-0.093	0.069	-0.053	**0.841**	0.787
25. Feeling lonely without the person	-0.075	0.042	-0.118	**0.940**	0.803
26. Regret over not being nicer to the person when he or she was alive	-0.102	0.054	0.328	**0.566**	0.773
27. Growing old alone without the person	-0.218	0.205	0.127	**0.710**	0.793
28. Feeling guilty that you are relieved that the person is dead	0.211	0.171	0.233	0.288	0.597

(MMP) Fear of death of self; (MPMP) Fear of dying of self; (MMO) Fear of death of others; (MPMO) Fear of dying of others. *Note.* In bold are the factor loadings greater than .40

also noted that items four "Dying young", eight "Physical degradation that occurs", 16 "Having to see your corpse", 23 "Having someone who wants to talk about death with you", and 28 "Being reminded that someday you will also experience this, had factor loadings < 0.40 and were thus removed (see Table 3). The first factor, fear of death of self, consisted of four items with factor loadings ranging from 0.55 to 0.74. This dimension aims to assess the extent to which an individual feels disturbed by sensations related to their experience of death. The second factor, labeled fear of the dying of self, encompassed six items with factor loadings ranging from 0.44 to 0.88. This dimension evaluates the anxiety generated in the individual when contemplating the process undergone until the end of life. The third factor, fear of death of others, grouped four items with factor loadings ranging from 0.43 to 0.64 and pertains to the anxiety experienced when the individual reflects on the death of close individuals. Lastly, the fourth and final factor, fear of dying of others, included five items with factor loadings ranging from 0.47 to 0.94, assessing the distress that arises when the individual considers the process leading up to the death of a close person. No cross-loading on multiple factors was found.

The CL-FODS (Lester & Abdel-Khalek, 2003) has been used by previous researchers to generate a total score for fear of death and dying by summing the scores of the four

subscales. To ensure that each subscale contributes equally to the total score, it is crucial to maintain the same number of items per subscale. To standardize the item distribution across dimensions, items 12 ("Uncertainty about the courage with which one will face the dying process"), 14 ("The possibility of dying in a hospital far from friends and family"), and 22 ("Having to be with someone who is dying") were removed. Each dimension had four items with the highest factor loading > 0.40 (see Table 4). Lester and Abdel-Khalek (2003) made a similar decision in their previous study.

In model one of the confirmatory factor analysis, the results indicate a poor model fit quality: global fit index $X^2(344) = 898$, $p < 0.001$, incremental fit index (CFI) of 0.834, and root mean square error of approximation (RMSEA) of 0.072 (see supplementary Table 2S).

In model two of the ESEM without items 15 and 17, in model three without items 15 and 17 with MI, model four CFA without items 15 and 17, and model five CFA without items 15 and 17 with MI, the results indicate poor model fit (see Table 2S).

Running the Exploratory Structural Equation Modeling with the abbreviated 16-item scale (model six) and Confirmatory Factor Analysis with the abbreviated 16-item scale (model 7), the results indicate good global and incremental model fit in model six with a global fit index $X^2(62) = 106$, $p < 0.001$, incremental fit index (CFI) of 0.974, and root mean square error of approximation (RMSEA) of 0.048, indicating a close fit (see Fig. 2). Model seven demonstrates acceptable fit with a global fit index X^2 (98) = 212, $p < 0.001$, incremental fit index (CFI) of 0.933, and root mean square error of approximation (RMSEA) of 0.06, indicating a reasonable fit (Hu & Bentler, 1999).

In the P2 of the study, when conducting the CFA, the results indicated a poor overall model fit, with a global fit index of $\chi^2(98) = 235$, $p < 0.001$. Given the sensitivity of the chi-squared (χ^2) statistic to sample size, which often leads to significant values even when the model demonstrates adequate fit (Meade et al., 2008; Nye, 2023), we utilized the normed chi-square, also known as the relative chi-square, to mitigate this issue. This approach yielded an acceptable global model fit index of normed 2.4 (Kline, 2005), with CFI of 0.946, and RMSEA of 0.05, indicating a close fit (Hu & Bentler, 1999).

Reliability assessment

To evaluate internal consistency across the four subscales (16 items), Cronbach's alpha values were calculated (Campo-Arias & Oviedo, 2008; Nunnally & Bernstein, 1994). The CL-FODS displayed acceptable internal consistency in both

Table 4 Exploratory Structural Equation Modeling (ESEM) and Confirmatory Factor Analysis (CFA); Solutions: 4 factors based on responses to 16 items (STANDXY values)

Factors	ESEM Factor Loadings				
Items	F1	F2	F3	F4	CFA Factor Loading
MMP					
3 - Missing out on so much after you die	**0.618**	0.037	0.138	-0.092	**0.674**
5 - How it will feel to be dead	**0.795**	0.015	-0.079	0.011	**0.717**
6 - Never thinking or experiencing	**0.666**	0.058	0.087	0.028	**0.777**
7 - The disintegration of your body after you die	**0.438**	0.129	0.088	0.078	**0.595**
MPMP					
9 - The pain involved in dying	0.195	**0.582**	-0.142	0.137	**0.699**
10 - The intellectual degeneration of old age	-0.062	**0.848**	-0.019	0.011	**0.799**
11 - That your abilities will be limited as you lay dying	-0.148	**0.951**	0.040	-0.069	**0.807**
13 - Our lack of control over the process of dying	0.294	**0.498**	0.081	-0.005	**0.731**
MMO					
18 - Regret over not being nicer to the person when he or she was alive	0.052	-0.022	**0.556**	0.050	**0.583**
19 - Growing old alone without the person	0.045	0.078	**0.666**	0.029	**0.752**
20 - Feeling guilty that you are relieved that the person is dead	0.108	-0.072	**0.537**	0.091	**0.590**
21 - Feeling lonely without the person	0.022	0.085	**0.607**	0.092	**0.741**
MPMO					
24 - Watching the person suffer from pain	0.037	-0.028	-0.079	**0.856**	**0.798**
25 - Seeing the physical degeneration of the person's body	0.048	-0.076	-0.129	**0.971**	**0.829**
26 - Not knowing what to do about your grief at losing the person when you are with him/her	-0.038	0.018	0.335	**0.528**	**0.752**
27 - Watching the deterioration of the person's mental abilities	-0.132	0.151	0.111	**0.698**	**0.808**

(MMP) Fear of death of self; (MPMP) Fear of dying of self; (MMO) Fear of death of others; (MPMO) Fear of dying of others. *Note*. In bold are the factor loadings greater than .40.

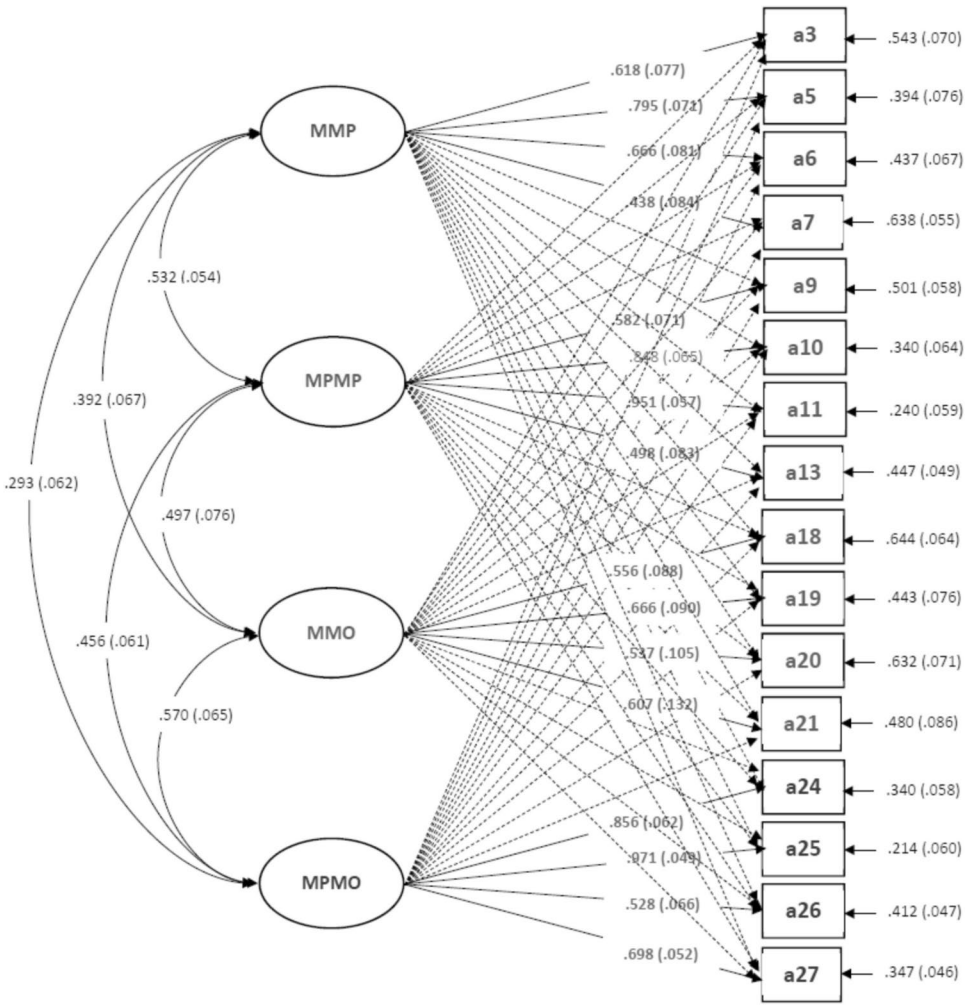

Fig. 2 Model 6 ESEM with Abbreviated 16-Item Scale with factor loadings and, within parentheses, standardized coefficients. *Note:* (MMP) Fear of death of self; (MPMP) Fear of dying of self; (MMO) Fear of death of others; (MPMO) Fear of dying of others

study phases, with Cronbach's alpha values of 0.89 in P1 and 0.90 in P2, alongside McDonald's Omega values of 0.89 and 0.90, respectively (see Table 3S).

In correlating the CL-FODS with measures of loneliness, social desirability, their attributes, and desirable and undesirable behaviors, as well as the DASS-21 and social anxiety, the initial phase of the study revealed a significant but weak positive correlation between fear of others' death and both loneliness and social desirability (see Table 4S). In the P2, a similarly weak positive correlation emerged between loneliness, social desirability, and the fear of death and dying process, both for oneself and others. Analysis of the correlation between the CL-FODS and DASS-21 indicated that, in the P1, only a weak yet statistically significant positive correlation was found between the total DASS-21 score and subscales for fear of death of oneself and others. By the second phase, significant yet weak positive correlations were observed between the overall CL-FODS, its subscales, and DASS-21. Additionally, a weak but significant positive correlation was found between the fear of death and the dying process for oneself and others, and social anxiety (see Table 4S).

Invariance measures

The data collected in P1 of the study indicate that female students display significantly higher levels of fear related to death and the dying process.

To evaluate measurement invariance across gender, we examined configural, metric, scalar, and strict invariance models. The results demonstrate configural, metric, and predominantly scalar invariance (see Table 5S), suggesting that the construct can be measured across genders with consistent factor structures, loadings, and intercepts. However, the observed decrease in fit at the means level implies that latent means may differ, necessitating caution when comparing means across genders. In P2, the results indicate robust measurement invariance across groups. The CFI remains near 0.95, while the RMSEA and SRMR fall within acceptable ranges at all levels, supporting configural, metric, scalar, and strict invariance (see Table 5S). This strong

fit allows meaningful comparisons across groups for the latent constructs, indicating that observed group differences are unlikely to arise from measurement issues. A *t*-test conducted to assess statistically significant differences between genders found no significant differences in fear of death and the dying process among the students (see Table 3S).

To examine measurement invariance across age groups in P1, a series of models configural, metric, scalar, and strict were evaluated. The results supported configural, metric, and scalar invariance, facilitating reliable comparisons of factor structure, factor loadings, and latent means across groups (see Table 5S). Although strict invariance was less supported due to an increase in the SRMR, the overall findings suggest that group comparisons of factor structure and means are valid; however, some differences in measurement precision may still exist. Pearson's *r* analyses indicated no statistically significant correlation between age and the overall fear of death and the dying process. However, within the subscale assessing fear of one's dying process, a significant, albeit weak, association between age and fear was observed. In P2 of the study, the measures of invariance demonstrated slight decreases in CFI, alongside consistent values for RMSEA and SRMR across the models. These findings suggest strong measurement invariance across age groups at all tested levels, indicating that the construct is likely perceived similarly across these groups, thus allowing for meaningful comparisons of latent means. Furthermore, Pearson's *r* results indicated a weak yet statistically significant association between age and total scores on the abbreviated CLFOD scale, as well as the subscales measuring fear of others' death and fear of others' dying process (see Table 4S) (Cohen et al., 2003).

The configural model confirmed that the underlying structure was stable over time (see Table 5S). The metric model indicated that factor loadings were equivalent, allowing for comparisons of relationships between items and latent variables. The scalar model further established that item intercepts were consistent, enabling comparisons of latent means. Finally, the means invariance model confirmed that the latent means were comparable across the two time points, affirming the measurement stability over time. Overall, these findings support the conclusion that the measurement model retains its integrity and comparability between 2018 and 2024.

Measurement invariance was assessed across the years 2018 and 2024 through four successive models: configural, metric, scalar, and means invariance. The results indicate that the measurement model demonstrated good fit across all models, with CFI values consistently above 0.94, RMSEA values below 0.065, and SRMR values under 0.055 (see Table 5S).

Discussion and conclusions

Death, as a primary loss, is often accompanied by secondary, sometimes less visible losses, such as the loss of companionship, sexual intimacy, and family roles. These losses frequently contribute to significant associated challenges, including anxiety, fear, and depression, among other issues (Zhai & Du, 2020). Portugal is predominantly Catholic, where family, friends, work, and leisure are highly valued. Beliefs about the afterlife, salvation, and the meaning of death and hope play a significant role in shaping individuals' perceptions and coping mechanisms related to death, reducing anxiety and fear associated with death and dying (Laranjeira et al., 2022; Gonçalves et al., 2023; Sousa et al., 2025). However, Duque (2022) highlighted that, despite the significance of religion for many Portuguese individuals, societal values and attitudes are shifting toward indifference, with ethical relativism gaining prominence. This shift, characterized by perspectives such as "everything is negotiable," "nothing is sacred," and "truth is a construct," may alter coping mechanisms related to death and the dying process over time.

Health students exhibit a moderate to high fear of death and the dying process, with higher scores on the subscales for fear of death of others and dying of others, these findings are consistent with previous studies (Bermejo et al., 2018; Dadfar et al., 2016; Thiemann et al., 2015). Other studies highlight the lack of preparation and difficulties faced by professionals when confronted with death and the dying process (Kumar et al., 2013). In the P1 of the study, female students demonstrated higher levels of fear regarding death and the dying process, consistent with earlier findings (He & Li, 2022). However, the invariance measure results suggested that the construct can be measured across genders with consistent factor structure, loadings, and (mostly) intercepts, the lack of strict invariance indicates potential differences in latent means between genders. Therefore, caution should be exercised when making comparisons of means across gender groups. In the P2, no gender differences were detected, which corroborates the results reported by Thiemann et al. (2015). These discrepancies may be partially due to the predominance of female participants in the P1, while the P2 included an equal distribution of male and female participants. When analyzing the scale results for fear of death and the dying process concerning age, no statistically significant differences were found in P1. The fit indices support configural, metric, scalar, and strict invariance across age groups. Statistically significant differences were observed in P2, consistent with findings from Bermejo et al. (2018). Similar to other studies, the scores for fear of dying and fear of others' death were higher than those for

fear of one's death (Bužgová & Janíková, 2019; Dadfar & Lester, 2016).

The CL-FODS was selected based on its accessibility and ease of administration. This instrument has been widely utilized across various Asian and Western cultures. Although numerous validation studies of the CL-FODS scale have been conducted in the United States (Collett & Lester, 1969), Australia (Mooney & O'Gorman, 2001), Egypt (Abdel-Khalek, 2002), Arab countries (Abdel-Khalek & Lester, 2004), Spain (Tomás-Sábado et al., 2007), Nigeria and Turkey (Kolawole & Olusegun, 2008; Zeyrek & Lester, 2008), Iran (Naderi & Esmaili, 2009), Venezuela (Buccella Sifontes et al., 2012), Argentina (Quintero & Simkin, 2017), the Czech Republic (Bužgová & Janíková, 2019), France (Cuniah et al., 2021), and Brazil (Andrade et al., 2023), none have conducted a psychometric analysis of its properties using exploratory structural equation modeling (ESEM). Instead, all previous studies performed independent exploratory and confirmatory factor analyses. In P1, we aimed to evaluate the structural relationships among the latent variables underlying the observed data to assess model fit. Additionally, we examined the psychometric properties and dimensionality of the Portuguese version of the CL-FODS using exploratory structural equation modeling (ESEM), and we compared the factorial solutions derived from ESEM and independent confirmatory factor analysis (ICM-CFA) approaches. In P2, we investigated whether the construct validity established in the first phase would be replicable over time. The pattern and size of factor loadings are similar for the two approaches. The ESEM solution fits the data better than the traditional CFA solution. Similar to previous studies, the results found, demonstrated a positive and high inter-item correlation above 0.40 and a Cronbach's Alpha of the scale of 0.89 (P2) and 0.90 (P2), and in the dimensions fear of death of self 0.78 (P1) and 0.79 (P2); fear of dying of self 0.84 (P1) and 0.85 (P2); fear of death of others 0.75 (P1) and 0.79 (P2); and fear of dying of others 0.87 (P1) and 0.85 (P2). All these Cronbach´s Alpha values reinforce the internal consistency of this scale like in different countries where has already been validated (Abdel-Khalek, 2002; Abdel-Khalek & Lester, 2004; Andrade et al., 2023; Buccella Sifontes et al., 2012; Bužgová & Janíková, 2019; Collett & Lester, 1969; Cuniah et al., 2021; Kolawole & Olusegun, 2008; Mondragon-Sanchez et al., 2020; Mooney and O'Gorman, 2001; Mosaku & Olusegun, 2008; Naderi & Esmaili, 2009; Quintero & Simkin, 2017; Tomás-Sábado et al., 2007; Zeyrek & Lester, 2008). In this study, most items of the CL-FODS had higher factor loadings on the dimensions consistent with the theoretical construct, except items one "The total isolation of death", two "The shortness of life", and eight, "The physical degeneration involved" loaded on different factors than that specified in the theoretical construct. Specifically, items one and two, loaded on the fear of dying of self dimension instead of fear of death of self, and item eight on fear of death of self instead of fear of dying of self, as observed in other studies (Venegas et al., 2011; Abdel-Khalek & Lester, 2004; Venegas et al., 2011). In the validation study of the scale in Brazil (Andrade et al., 2023), item two was translated similarly to this study and had a higher factor loading on the fear of death of self factor, consistent with the theoretical model. This situation may be associated with the perception of death and the dying process as part of a single, more global dimension, fear of one's death, reflecting a lack of distinction between the different conceptualizations of one's death and the process of dying. All variables related to the evidence of validity concerning external factors, the DASS-21, and its subscales for depression, anxiety, and stress were positively and significantly correlated with CL-FODS. Additionally, a weak but significant positive correlation was found between CL-FODS and the Loneliness Scale, the Social Desirability Scale, as well as its subscales for Desirable and Undesirable Attributes and Behaviors. This positive association between CL-FODS and anxiety scales has been similarly reported in prior studies (Abdel-Khalek, 2002; Cuniah et al., 2021; Tomás-Sábado et al., 2007). Unlike other findings, the factor structure in the present study was supported by 16 items grouped into four factors, differing partially from the original scale. Furthermore, the construct validity established in the initial phase was replicated after a five-year interval, with acceptable global model fit indices, including normed chi-square, CFI, and RMSEA values, indicating a close fit. The internal consistency of the resulting abbreviated scale also demonstrated robustness and precision. Over the years and across various international validation studies, the CL-FODS has consistently demonstrated acceptable reliability, validity, and precision in assessing fear of death and the dying process for both oneself and others. Further validation studies using ESEM are recommended to refine the structure and improve the model fit. Overall, the Portuguese version of the CL-FODS exhibited good psychometric properties when administered to healthcare students, making it suitable for use with this population, particularly for assessing fears related to the self or others.

The study has several limitations, including a homogeneous sample consisting primarily of young adults (mean age = 21) and a focus solely on healthcare students, which may restrict the generalizability of the findings. Additionally, personality differences were not accounted for in the analysis. Future research should examine responses from professionals and students across different specialties to explore various dimensions of death-related anxiety. Furthermore, as no fear-of-death assessment scale previously existed for the Portuguese population, this newly validated version (see

Supplementary Table 6S) is expected to have two significant impacts. First, it will strengthen the scientific community's ability to support both research and the provision of care. Second, it will contribute to the expansion and deepening of knowledge regarding the phenomena of death and dying.

The Portuguese validation of the CL-FODS carries important clinical implications. It offers a culturally and linguistically appropriate tool for assessing fear of death, enabling more accurate evaluations and enhancing patient-centered care. The scale can aid mental health interventions by addressing fear of death, often associated with anxiety and existential distress, while also improving the quality of palliative care by identifying and addressing end-of-life concerns. Additionally, it can support professional training, fostering the development of skills to manage death-related fears, and encourage further research and policy development in end-of-life care. Overall, this validated instrument represents a significant advancement in both clinical practice and research on death-related phenomena.

Further validation and reliability studies of this scale are recommended to enhance its structural soundness and reliability. As with any psychometric instrument validation process, additional research is essential to provide further evidence of the AB—CLFODS's validity, whether through larger samples or alternative methodologies. Each application of the instrument, regardless of the context, represents a step forward in advancing the theoretical understanding of the concept under study fear of death and dying.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12144-025-07663-9.

Acknowledgements This study was made possible through the collective efforts and cooperation of various individuals and organizations, and their contributions are sincerely acknowledged. Special thanks are extended to the School of Health, Polytechnic Institute of Bragança.

Author contributions The principal investigator (AN [1]) played a central role in all aspects of the project, encompassing planning, data collection, data analysis, and manuscript drafting. FN and PC were project research supervisors, contributing to the initial project planning, data analysis, and manuscript composition. All authors critically reviewed the manuscript and provided their approval for submission.

Funding Open access funding provided by FCT|FCCN (b-on).
This study was conducted without any external funding.

Data availability Data will be available upon reasonable request from the corresponding author.

Declarations

Ethical approval The study received approval from the Ethics Committee of the Faculty of Psychology and Education Sciences, University of Porto, Ref. No. 2018/11-02b.

Informed consent All participants provided written informed consent before enrollment in the study.

Conflict of interests The authors declare no conflicting interests.

References

Abdel-Khalek, A. (2002). Convergent validity of the Collett-Lester fear of death and templer death anxiety scales in Egyptian male college students. *Psychological Reports, 90*, 849–850. https://doi.org/10.2466/pr0.2002.90.3.849

Abdel-Khalek, A. M., & Lester, D. (2004). The factorial structure of the Arabic version of the revised Collett-Lester fear of death scale. *Death Studies, 28*, 787–793. https://doi.org/10.1080/07481180490483445

Andrade, A., Silva, J., & Baptista, M. (2023). Brazilian psychometrics of the Collett-Lester fear of death scale. *Revista Bioética, 31*, 1–12. https://doi.org/10.1590/1983-803420233283en

Bentler, P., & Wu, E. (2002). *EQS for windows user's guide*. Multivariate Software, Inc.

Bermejo, J. C., Villacieros, M., & Hassoun, H. (2018). Attitudes towards end-of life patient care and fear of death in healthcare student sample. *Medicina Paliativa, 25*(3), 168–174. https://doi.org/10.1016/j.medipa.2017.02.004

Brislin, R. W. (1980). Translation and content analysis of oral and written materials. In H. C. Triandis & J. W. Berry (Eds.), *Handbook of cross-cultural psychology* (Vol. 2, pp. 389–444). Allyn & Bacon.

Buccella Sifontes, S., Moreira, R. B., & Fernández Urrea, D. (2012). Validación de la versión española de la escala de miedo a la muerte de Collett-Lester en estudiantes de medicina de la Universidad de Carabobo [Validation of the Spanish Version of the Collett-Lester Fear of Death Scale in Medical Students at the University of Carabobo]. *Informe Médico*, *14*(1), 47–54. https://bit.ly/3KfRudq

Bužgová, R., & Janíková, E. (2019). Czech adaption of the Collett-Lester fear of death scale in a sample of nursing students. *OMEGA Journal of Death and Dying, 80*(1), 20–34. https://doi.org/10.1177/0030222817725183

Çakar, F. S. (2020). The levels predicting the death anxiety of loneliness and meaning in life in youth. *European Journal of Education Studies, 6*(11), 97–121. https://doi.org/10.5281/zenodo.3626703

Campo-Arias, A., & Oviedo, H. (2008). Propiedades psicométricas de una escala: La consistencia interna [Psychometric properties of a scale: Internal consistency]. *Revista de Salud Pública, 10*(5), 831–839. https://doi.org/10.1590/S0124-00642008000500015

Cetintas, I., Kostak, M. A., Semerci, R., & Kocaaslan, E. N. (2021). Relationship between nursing students' death anxiety and attitudes toward dying with dignity. *International Journal of Caring*

Sciences, 14(2), 1089–1097.https://www.internationaljournalofcaringsciences.org/docs/31_cetintas_original_14_2.pdf

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple correlation/regression analysis for the behavioral sciences*. Lawrence Erlbaum Associates.

Collett, L. J., & Lester, D. (1969). The fear of death and the fear of dying. *The Journal of Psychology: Interdisciplinary and Applied, 72*(2), 179–181. https://doi.org/10.1080/00223980.1969.10543496

Cuniah, M., Bréchon, G., & Bailly, N. (2021). Validation of the revised Collett-Lester fear of death scale in a French population. *Frontiers Psychology, 12*, 736171. https://doi.org/10.3389/fpsyg.2021.736171

Dadfar, M., & Lester, D. (2016). The reliability, validity, and factorial structure of the Collett-Lester fear of death scale in a sample of Iranian nurses. *International Journal of Medical Research & Health Sciences, 5*, 306–317. https://doi.org/10.1155/2016/2906857

Dresser, N., & Wasserman, F. (2010). *Saying goodbye to someone you love*. Demos Medical Publishing.

Duque, E. (2022). *Valores e religiosidade em Portugal. Comportamentos e atitudes geracionais*. Edições Afrontamento.

Espinoza, V. M., Sanhueza, A. O., & Barriga, O. (2011). Validation of Collett-Lester's fear of death scale in a sample of nursing students. *Revista Latinoamericana Enfermagem, 19*(5), 1171–1180. https://doi.org/10.1590/S0104-11692011000500015

Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology, 43*(4), 522–527. https://doi.org/10.1037/h0076760

Gjersing, L., Caplehorn, J. R., Clausen, T. (2010). Cross-cultural adaptation of research instruments: Language, setting, time and statistical considerations. *BMC Medical Research Methodology*, *10*(13). https://doi.org/10.1186/1471-2288-10-13

Gonçalves, G., AL-Dossary, S. A., & Sousa, C. (2023). Measurement invariance and country difference in death anxiety: Evidence from Portuguese and Arab samples. *Current Psychology, 43*, 4255–4265. https://doi.org/10.1007/s12144-023-04659-1

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). Pearson Prentice Hall.

Hanna, R., Jolanta, B., Katarzyna, B., Kornelia, K., & Mariusz, J. (2024). The impact of patient death on the risk of developing occupational burnout in midwives a preliminary cross-sectional study. *Scientific Reports, 14*, 25634. https://doi.org/10.1038/s41598-024-77607-z

He, Y., & Li, T. (2022). Death attitudes and death anxiety among medical interns after the 2020 outbreak of the novel coronavirus. *Frontiers in Psychology, 13*, 698546. https://doi.org/10.3389/fpsyg.2022.698546

He, J., de Vijver, F., Espinoza, A., Abubakar, A., Dimitrova, R., Adams, B., Aydini, A., Atitsogbe, K., Alonso-Arbiol, I., Bobowik, M., Fisher, R., Jordanov, V., Mastrotheodoros, S., Neto, F., Ponizovsky, Y., Reb, J., Sim, S., Sovet, L., Stefenel, D.,… Villieux, A. (2014). Socially desirable responding: Enhancement and denial in 20 countries. *Cross-Cultural Research, 49*, 227–249. https://doi.org/10.1177/1069397114552781

Herdman, M., Fox-Rushby, J., Badia, X. (1998). A model of equivalence in the cultural adaptation of HRQoL instruments: The universalist approach. *Quality of Life Research*, *7*(4), 323–335. https://pubmed.ncbi.nlm.nih.gov/9610216/

Howard, M. C. (2016). A review of exploratory factor analysis decisions and overview of current practices: What we are doing and how can we improve? *International Journal of Human-Computer Interaction, 32*, 51–62. https://doi.org/10.1080/10447318.2015.1087664

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Kaklauskaitė, Ž., & Antinienė, D. (2016). Death anxiety and empathy among male and female medical students. *Baltic Journal of Sport and Health Sciences*, *4*(103). https://doi.org/10.33607/bjshs.v4i103.67

Kastenbaum, R., & Ainsenberg, R. (1983). *Psicologia da Morte [Psychology of Death]*. Livraria Pioneira Editora da Universidade de São Paulo.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (3rd ed.). Guilford Press.

Kolawole, M. S., & Olusegun, A. K. (2008). The reliability and validity of revised Collett-Lester fear of death scale (version 3) in a Nigerian population. *Omega Journal of Death and Dying, 57*(2), 195–205. https://doi.org/10.2190/OM.57.2.e

Kübler-Ross, E. (2008). *On death and dyng: What the dying have to teach doctors, nurses, clergy and their own families*. Taylor & Francis Ltd.

Kumar, S. P., D'Souza, M., & Sisodia, V. (2013). Healthcare professionals' fear of death and dying: Implications for palliative care. *Indian Journal of Science and Technology, 19*(3), 196–198. https://doi.org/10.4103/0973-1075.121544

Laranjeira, C., Dixe, M. A., Semeão, I., Rijo, S., Faria, C., & Querido, A. (2022). "Keeping the light on": A qualitative study on hope perceptions at the end of life in Portuguese family dyads. *International Journal Environmental Research Public Health, 19*(3), 1561. https://doi.org/10.3390/ijerph19031561

Lester, D. (2004). The factorial structure of the revised Collett-Lester fear of death scale. *Death Studies, 28*(8), 795–798. https://doi.org/10.1080/07481180490483472

Lester, D. (2015). Self-construal and the fear of death. *Psychological Reports, 117*, 376–379. https://doi.org/10.2466/16.PR0.117c23z0

Lester, D., & Abdel-Khalek, A. (2003). The Collett-Lester fear of death scale. *Death Studies, 27*, 81–85. https://doi.org/10.1080/07481180390136946

Lok, N., Aydın, Z., Uzun, G., Kayaaslan, B., & Selçuk, T. A. (2023). Relationship of depression, hopelessness and life satisfaction with death anxiety in individuals who have had COVID-19. *Omega (Westport),10*, 1–20. https://doi.org/10.1177/00302228231174602

Lovibond, S. H., & Lovibond, P. F. (1995). Depression anxiety stress scales (DASS--21, DASS--42) [Database record]. *APA PsycTests*. https://doi.org/10.1037/t01004-000

Marsh, H. W., Muthén, B., Asparouhov, T., Lüdtke, O., Robitzsch, A., Morin, A. J. S., & Trautwein, U. (2009). Exploratory structural equation modeling, integrating CFA and EFA: Application to students´evaluations of university teaching. *Structural Equation Modeling: A Multidisciplinary Journal, 16*(3), 439–476. https://doi.org/10.1080/10705510903008220

Marsh, H. W., Morin, A. J., Parker, P. D., & Kaur, G. (2014). Exploratory structural equation modeling: An integration of the best features of exploratory and confirmatory factor analysis. *Annual Review Clinical Psychology*, *10*, 85–110. https://doi.org/10.1146/annurev-clinpsy-032813-153700

Meade, A. W., Johnson, W., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance: A Monte Carlo study. *Journal of Applied Psychology*, *93*(3), 568–592. https://doi.org/10.1037/0021-9010.93.3.568

Mondragon-Sanchez, E. J., Landeros-Olvera, E., & Pérez-Noriega, E. (2020). Validation of Collett-Lester fear of death scale in a

Mexican university nursing students. *MedUNAB, 23*(1), 23–24. https://doi.org/10.29375/01237047.3723

Mooney, D. C., & O'Gorman, J. G. (2001). Construct validity of the revised Collett-Lester fear of death and dying scale. *Omega Journal of Death and Dying, 43*(2), 157–173. https://doi.org/10.2190/13PW-QPFY-B1PB-2AQA

Mosaku, K., & Olusegun, A. (2008). The reliability and validity of revised Collett-Lester fear of death scale (version 3) in a Nigerian population. *Omega Journal of Death and Dying, 57*, 195–205. https://doi.org/10.2190/OM.57.2.e

Muthen, B., & Asparouhov, T. (2002). Latent variable analysis with categorical outcomes: Multiple-group and growth modeling in Mplus. *Mplus Web Notes*, *4*, 1–22. https://www.statmodel.com/download/webnotes/CatMGLong.pdf

Naderi, F., & Esmaili, E. (2009). Collett-Lester fear of death scale validation and gender-based comparison of death anxiety, suicide ideation and like satisfaction in university students. *Journal Applied Sciences, 9*(18), 3308–3316. https://doi.org/10.3923/jas.2009.3308.3316

Neimeyer, R. A., Moser, R. P., & Wittkowski, J. (2003). Assessing attitudes toward dying and death: Psychometric considerations. *Omega Journal of Death and Dying, 47*(1), 45–76. https://doi.org/10.2190/EP4R-TULM-W52G-L3EX

Neimeyer, R. A., Wittkowski, J., & Moser, R. (2004). Psychological research on death attitudes: An overview and evaluation. *Death Studies, 28*, 309–340. https://doi.org/10.1080/07481180490432324

Neto, F. (2014). Psychometric analysis of the short-form UCLA Loneliness Scale (ULS-6) in older adults. *European Journal of Ageing, 11*, 313–319. https://doi.org/10.1007/s10433-014-0312-1

Neto, F. (1989). L'évaluation de la conscience de soi: Réplication Portugaise. In J. Retschitzky, J. Bossel-Lagos, & P. Dasen (Eds.), *La recherche interculturelle* (tome 1, pp. 78–85). L'Harmattan.

Neto, F. (1992). Loneliness among Portuguese adolescents. *Social Behavior and Personality*, *20*, 15–22. https://www.iscet.pt/uploads/obSolidao/loneliness_portuguese_adolescents.pdf

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.

Nye, C. D. (2023). Reviewer resources: Confirmatory factor analysis. *Organizational Research Methods, 26*(4), 608–628. https://doi.org/10.1177/10944281221120541

Pais-Ribeiro, J. L., Honrado, A., & Leal, I. (2004). Contribuição para o estudo da adaptação portuguesa das escalas de ansiedade, depressão e stress (EADS) de 21 itens de Lovibond e Lovibond [Contribution to the Study of the Portuguese Adaptation of the Anxiety, Depression, and Stress Scales (EADS) by Lovibond and Lovibond with 21 Items]. *Psicologia, Saúde & Doenças*, *5*(2), 229–239. https://www.redalyc.org/pdf/362/36250207.pdf

Pradhan, M., Chettri, A., & Maheshwari, S. (2020). Fear of death in the shadow of COVID-19: The mediating role of perceived stress in the relationship between neuroticism and death anxiety. *Death Studies, 46*(5), 1106–1110. https://doi.org/10.1080/07481187.2020.1833384

Purimahua, D. I., Manik, M., & Manurung, E. I. (2021). Fear of death between nursing students in the academic and professional programs. *Open Access Macedonian Journal of Medical Sciences, 9*(T5), 1–5. https://doi.org/10.3889/oamjms.2021.7825

Quintero, S., & Simkin, H. (2017). Validación de la escala de miedo a la muerte abreviada al contexto argentino [Validation of the Abbreviated Death Anxiety Scale in the Argentine Context]. *Revista de Investigación em Psicologia Social*, *3*(1), 53–59. https://ri.conicet.gov.ar/bitstream/handle/11336/112360/CONICET_Digital_Nro.59d499d1-4591-4b9f-85bf-09d9ab26295e_A.pdf?sequence=2&isAllowed=y

Reise, S. P., Waller, N. G., & Comrey, A. L. (2000). Factor analysis and scale revision. *Psychological Assessment, 12*, 287–297. https://doi.org/10.1037/1040-3590.12.3.287

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, *39*(3), 472–480. https://doi.org/10.1037//0022-3514.39.3.472

Sharabati, I., Mustafa, M. M. M., Ateeq, M., Al-jabali, H., Elsayed, A. A., Kandil, A. H., Hamouda, M. N., Alrawajfeh, N., Sharib, S. A., Abumayyla, R. A., Alkhateeb, O. R., Bishtawi, M., Rahmeh, J. A., Hetta, T., Abuzant, R., & Al-Mubaid, F. (2024). Approach to death and dying patients and its relation with death anxiety among medical interns: A multicenter cross-sectional study. *BMC Psychology, 12*, 794. https://doi.org/10.1186/s40359-024-02321-4

Sousa, C., Gonçalves, G., & AL-Dossary, S. A. (2025). Death anxiety and work passion: Cross-cultural analyses from Portugal and Saudi Arabia. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. Advanced online publication. https://doi.org/10.1007/s12144-024-07274-w

Su, R., Zhang, Q., Liu, Y., & Tay, L. (2019). Modeling congruence in organizational research with latent moderated structural equations. *Journal of Applied Psychology*, *104*(11), 1404–1433. https://doi.org/10.1037/apl0000411

Thiemann, P., Quince, T., Benson, J., Wood, D., & Barclay, S. (2015). Medical students' death anxiety: Severity and association with psychological health and attitudes toward palliative care. *Journal of Pain and Symptom Management, 50*(3), 335–342. https://doi.org/10.1016/j.jpainsymman.2015.03.014

Tómas-Sábado, J., Limonero, J. T., & Abdel-Khalek, A. M. (2007). Spanish adaptation of the Collett-Lester fear of death scale. *Death Studies, 31*, 249–260. https://doi.org/10.1080/07481180601152625

Venegas, M. E., Alvarado, O. S., & Barriga, O. (2011). Validação de escala de medo da morte de Collett-Lester em uma amostra de estudantes de enfermagem [Validation of the Collett-Lester Fear of Death Scale in a sample of nursing students]. *Revista Latino Americana de Enfermagem, 19*(5), 1171–1180. https://doi.org/10.1590/S0104-11692011000500015

Zeyrek, Y., & Lester, D. (2008). Cronbach alpha reliability and concurrent validity of the Collett-Lester fear of death scale in a Turkish sample. *Psychological Reports, 102*(3), 706–708. https://doi.org/10.2466/pr0.102.3.706-708

Zhai, Y., & Du, X. (2020). Loss and grief amidst COVID-19: A path to adaptation and resilience. *Brain Behavior and Immunity, 87*, 80–81. https://doi.org/10.1016/j.bbi.2020.04.053

Zuccala, M., Modini, M., & Abbott, M. J. (2021). The role of death fears and attachment processes in social anxiety: A novel hypothesis explored. *Australian Journal of Psychology, 73*(3), 381–391. https://doi.org/10.1080/00049530.2021.1917307

Zuccala, M., Menzies, R. E., Hunt, C. J., & Abbott, M. J. (2022). A systematic review of the psychometric properties of death anxiety self-report measures. *Death Studies, 46*(2), 257–279. https://doi.org/10.1080/07481187.2019.1699203