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The multidimensional orientation toward dying and death inventory: cross-cultural translation and validated in Mainland China participants

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Abstract

Background The negative impact of over-treatment in end-of-life individuals has led to attention to the value of death. Reassessing the attitude of death and dying can improve care and improve the quality of life. Therefore, the use of multidimensional tools to comprehensively assess the attitudes of individuals on dying and death, identify attitude tendencies and causes meaningful, and evaluate the effectiveness of the tools is an important prerequisite.

Objectives We aimed to obtain MODDI-F-C through cross-cultural translation and to evaluate its psychometric characteristics among mainland China participants.

Methods In order to obtain MODDI-F-C, a cross-cultural translation of MODDI- F/eng was performed using the Brislin model. The items quality, factor structure, reliability and validity were assessed among 2105 participants from mainland China. The concurrent validity was assessed using the Chinese version of DAP-R for the first time.

Results MODDI-F-C consists of 27 items, and five common factors were identified through factor analysis, accounting for 56.79% of the overall variance. The total consistency coefficient was 0.949. The correlation coefficient between DAP-R-C-Z and the overall scale was 0.55 (p < 0.001), between DAP - R-C - Z and the subscale 0.37–0.56 (p < 0.001). Most of the methods used for psychometric evaluation meet acceptable criteria.

Conclusions Our research has initially confirmed that MODDI-F-C is an effective tool to evaluate the fear dimension of death and dying attitude, which can identify individuals' tendencies and causes related to dying and death. However, the acceptance dimension needs further assessment.

Keywords Death attitudes, Psychometric assessment, Mainland China, Multidimensional orientation toward dying and death inventory

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Introduction

Presently, there is a growing prevalence of individuals with incurable and life-limiting diseases [1]. The advancement of medical technology and the implementation of treatment approaches have resulted in a prolongation of human lifespan, however, this progress has also led to a heightened prevalence of delayed death experienced towards the end of life [2]. There exists a subset of individuals who hold the belief that medical professionals possess the capability to delay or perhaps surmount death during the latter stages of life through various therapeutic interventions. This will result in the potential loss of access to palliative care, compromising their remaining quality of life and imposing a dual burden on their psychological and financial well-being [3]. The approval and implementation of delayed death and inequalities in palliative care contribute to the unnecessary affliction and excessive healthcare expenses endured by a significant number of individuals during their latter stages of life [4]. There is growing recognition of the need to "normalize" death and provide opportunities for individuals and communities to reconnect with death and dying [5]. There exists a call for more community involvement in issues related to death and dying, with the aim of fostering active engagement in decision-making processes, the provision of care, and the recognition of death as an inherent and inevitable aspect of a person's life cycle [6]. The publication of a report by Lancet addresses the significance of death, calling for a rebalancing of public attitudes towards death and dying [4].

The study of individuals' attitudes towards death and the dying had emerged as a significant focal point within the field of thanatology [7]. The development and evaluation of death attitude measurement instruments was a core element of death-related attitude research [8]and was a prerequisite for exploring the links between deathrelated attitudes and other social factors in health. In the initial stages, the measurement tools of attitudes towards death were influenced by the value judgments of early researchers in the field. Although early measures of death attitude differed in structure, content, and form, they all had one common characteristic: focusing on death anxiety or fear of death [9]. The formation of unidimensional instruments for early death attitude measurement was closely related to the assumption that death is a negative outcome [10]. In subsequent studies, multidimensional attributes of death attitude measurement tools were identified. Collett and Lester, for example, identified the four-factor structure of fear of death, supporting the distinction between death and dying [11]. Shneidman revealed three types of death acceptance: positive death acceptance, neutral death acceptance, and avoidanceoriented death acceptance [12]. Based on the dialectical analysis of previous scales, Wong et al. [10]for the first time integrated known death attitudes into one scale and constructed a multidimensional Death Attitude profile (DAP).

Although many measurement tools on the attitude towards death had been developed, the conceptual basis for many tools and the representation of test samples were limited [13]. Multidimensional Orientation Toward Dying and Death Inventory (MODDI-F) filled those limits [14-15]. MODDI-F was a multidimensional death attitude measurement tool developed by Wittkowski [15] based on the death state structure identified by Collett and Lester [11]. MODDI-F includes death, dying, and corpse, and provides a comprehensive assessment of attitudes toward fear and acceptance of death [16], overcoming the ambiguity of interpreting phenomena with a single-dimensional scale and matching individuals' preoccupations with death and dying at the end of life. Based on factor analysis, Wittkowski et al. derived fear of one's own death (FODe), fear of the death of others (FOPDe), fear of corpses (FC), acceptance of one's own dying and death (AODD), acceptance of the death of others (AOPDe), rejection of one's own death (RODe), Fear of one's own dying (FODy), Fear of another person's dying (FOPDy), a total of 8 sub-dimensions and 47 items. The sample of the German MODDI-F had an internal consistency range of 0.82-0.92 in reliability performance, and the correlation between the various dimensions of structural validity conforms to the conceptual premise [17]. China Hong Kong version of Multidimensional Orientation Toward Dying and Death Inventory. (MODDI-F/ chin) was translated from German and English into Chinese and validated with Hong Kong university students, MODDI-F/chin determined the basic factor structure, and the internal consistency coefficient of each dimension was 0.68-0.91 [13]. Later, MODDI-F in the United States [14], Turkey [18], Brazil [19], France [8] completed psychometric tests.

However, the tool was tested in Hong Kong, China. As an important node of cultural exchanges between the East and the West, Hong Kong had formed a unique cultural development model of the integration of the East and the West [20]. What is good or bad about life and death depends on social and cultural norms [21], there are cultural differences in the formation of death attitudes [22-23]. As a result, previous tests on samples of university students in Hong Kong were limited in their broad representation of the Chinese cultural system [13]. It is very necessary to conduct cross-cultural testing of the Chinese version of MODDI-F in mainland China. Through the cross-cultural translation of the English version MODDI-F(MODDI-F/eng) to form Mainland China Version Multidimensional Orientation Toward Dying and Death Inventory (MODDI-F-C), this study aims to preliminarily explore its psychometric performance in Chinese mainland participants.

Methods

Participants

We recruited 2,710 participants online through the Wenjuanxing (A well-known online recruitment platform in China) and set the following control criteria: (1) the sample must be from provinces in mainland China, and (2) participant's time taken to answer questionnaire (3) reverse setting questions. Details of the screening criteria are provided in the supplementary materials. Finally, 2,105 samples were obtained.

Chinese version of the multidimensional orientation toward dying and death inventory (MODDI-F-C)

MODDI-F-C was translated by MOODI-F/eng through cross-cultural translation. This tool contains 8 dimensions and 47 items. We will verify its effectiveness in mainland China in the follow-up study. Responses were recorded on a 5-point scale, from 1(strongly disagree) to 5(strongly agree).

The Chinese version of the revised death attitude profile scale (DAP-R-C-Z)

To distinguish previously obtained DAP-R measurement tools [24], the Chinese version DAP-R adopted in our study is called DAP-R-C-Z. DAP-R-C-Z was a survey tool on death attitudes translated and revised by Zhu, according to Chinese cultural and social characteristics [25]. It consists of 5 dimensions and a total of 25 items. Responses were recorded on a 5-point scale, from 1(strongly disagree) to 5(strongly agree). As a reliable and widely used death attitude measurement tool, we chose DAP-R-C-Z to cross-validate MODDI-F-C.

Procedure

This research was divided into the following two parts: (1) cross-cultural translation; (2) Psychometric assessment analysis.

Cross-cultural translation

The Brislin model [26] was regarded as a guideline for cross-cultural translation in this study. One member was assigned to participate as an observer throughout the translation process. The four members were divided into two groups to participate in forward translation and backward translation. We invited three experts from different disciplines to form a committee to examine the semantics. For more information, refer to the relevant textual descriptions and processes shown in supplementary materials and Fig. 1.

Data analysis

We assigned the values of items successively (m1 to m47) according to the order of items in the MODDI-F/eng. We used discrete trend, responsiveness, correlation coefficient and homogeneity test to item analysis. We chose the standard deviation to reflect the size of the discrete trend, and items with a standard deviation more than 1.00 will be retained [27]. The independent sample T-test was used to compare whether there was a significant difference between the scores of high and low groups as a criterion to evaluate the better discrimination ability of items. Pearson correlation coefficient analysis determined the correlation between each item and the scale score. After considering other research criteria [28], we retained items with a correlation coefficient > 0.30 and statistical significance. The Corrected item-total correlation (CITC) was used as the main reference for the homogeneity test. CITC is an indicator that indicates an item's relevance to the rest of the scale that does not include the item itself. Generally, items with CITC more than 0.35 are retained [29]. We adopted exploratory factor analysis to determine the tool's factor structure in the participants from mainland China. We used the maximum variance method for orthogonal rotation. Items with factor loadings more than 0.40 were retained. The extracted cofactors (eigenvalues>1) or the criteria of other studies can be used as the basis for determining the factor structure of this study. Cronbach's alpha and split-half reliability were used for reliability analysis. The validity analysis includes construct validity, concurrent validity, convergent validity and discriminative validity. The structural equation model (SEM) was constructed for confirmatory factor analysis (CFA), the results of confirmatory factor analysis were used as the response criteria for construct validity. For concurrent validity, we used DAP-R-C-Z as the standard to analyze whether the correlation between MODDI-F-C and DAP-R-C-Z was statistically significant. The average variance extraction (AVE) and composite reliability (CR)was calculated using the standardized factor loading the CFA, and the convergence validity and discrimination validity of the tool were analyzed using average variance extracted and composite reliability. All P-values were 2-sided, and statistical significance was set at p < 0.05. We used SPSS version 26.0 and Mplus 8.0 for data analysis.

Results

Demographic description of participants

Among the 2105 participants, 54.7% were female and the main age groups were 18–29 years (40.8%) and 39–59 years (49%). The sample included provinces in mainland China. According to China's economic zone, the eastern region contributed the main sample (60.2%). Table 1 showed the details of the participants characteristics.



Fig. 1 The cross-cultural translation procedure for MODDI-F-C

Table 1 Demographic characteristics of participants (N = 2105)

Characteristic	Ν	%
Sex		
Male	953	45.3
Female	1152	54.7
Age(years)		
<18	166	7.9
18–29	858	40.8
30–59	1033	49
≥60	48	2.3
Area		
Eastern region	1267	60.2
Central region	382	18.1
Western region	337	16
Northeast region	119	5.7

Items analysis

Meeting the minimum threshold of the four item analysis methods simultaneously was the criterion for retaining items in our study. Finally, m2, m4, m7, m11, m17, m19, m24, m26, m32, m34, m36, m40, m44, and m47 did not meet the inclusion criteria, and the remaining 33 items were included in the following analysis. Table 2 illustrates the performance of all items in the four quality control procedures.

Factor structure

A four-factor structure was initially obtained. Following the original factor structure and adjustment, five or six cofactors fit this study. Although the cumulative variance contribution rate of the six-factor structure was larger than the five-factor structure (59.320%>56.79%), the sixth cofactor had only one item. Previous studies found that each subscale has three or more entries, reducing parameter estimation error [30]. Therefore, the five-factor structure was retained. In the five-factor structure, m9, m25, m38, m10, m18, and m23 broke from the original cofactor structure. Therefore, these six items were excluded. The five-factor structure factor loading and distribution of each item is shown in Table 3. The original RODe and FODe were combined into a new dimension F1.

Confirmatory factor analysis

Table 4 shows the confirmatory factor analysis results for five-factor, adjusted, and second-order structures.

Reliability of the scale

Cronbach's alpha for the entire scale was 0.949, and the Split-half coefficient 0.940. The Cronbach's alpha for each subscale ranged from 0.682 to 0.899. The Split-half coefficients ranged from 0.612 to 0.869 (see Table 5).

Concurrent validity

As shown in Fig. 2, the total score of DAP-R-C-Z positively correlated with the total score of MODDI-F-C (r=0.55, p<0.001). The correlation coefficient between the total score of DAP-R-C and the MODDI-F-C subscale ranged from 0.37 to 0.56 (p<0.001).

Note MODDI-F-C = The mainland Chinese version of MODDI-F. DAP-R-C-Z = The Chinese version DAP-R formed by scholar Zhu through cross-cultural translation; F1 = FODe + RODe (Fear of one's own death + Rejection of one's own death); F2 = FC (Fear of corpses); F3 = FODy (Fear of one's own dying); F4 = FOPDe (Fear of another person's death); F5 = FOPDy (Fear of another person's dying). The sequence of variables shown in the figure has no special meaning.

Convergent validity

In this study, the CR values of the five factors ranged from 0.687 to 0.909. The AVE values ranged from 0.425 to 0.674 (see Table 6).

Discriminant validity

The Table 6 shows that the correlation coefficients of each subscale were <0.85, meeting the critical value requirement of the discriminative validity correlation coefficient [31]. The results showed that only the AVE square root value of F3 was close to the value of the phase relationship. The AVE square root values of the other dimensions were greater than the corresponding correlation coefficients.

Discussion

Our study obtained a five-factor MODDI-F-C scale for self-reported attitudes towards death and dying. MODDI-F-C was obtained from the cross-cultural translation of MODDI-F/eng. We tested the reliability and validity of MODDI-F-C using data from 2105 participants from mainland China. To our knowledge, this is the first study to attempt to evaluate MODDI-F-C in a sample from mainland China.

The original tool contained eight factors, whereas MODDI-F-C has five cofactors with 27 items. The five cofactors and item distributions are F1 = Fear of one's own death and Rejection of one's own death (10 items), F2 = Fear of corpses (4 items), F3 = Fear of one's own dying (7 items), F4 = Fear of another person's death (3 items), and F5 = Fear of another person's dying (3 items).

Our results showed that most of the items in the acceptance subscale were temporarily discarded in item analysis, which is different from the results of other cross-cultural studies. One possible explanation is that we used four methods and stricter criteria to assess item quality. The choice and use of statistical methods may

Items	T CITC Correlation Coefficient		Correlation Coefficient	Standard Deviation	
m1	-1.763*	0.547	0.577*	1.179	
m2	-0.064 ^a	0.034 ^a	0.031 ^a	0.982 ^a	
m3	-1.494*	0.474	0.509*	1.167	
m4	0.166 ^a	-0.037 ^a	-0.055* ^a	0.960 ^a	
m5	-1.846*	0.580	0.627*	1.197	
m6	-1.484*	0.464	0.502*	1.161	
m7	-0.978*	0.417	0.418*	0.934 ^a	
m8	-1.880*	0.600	0.635*	1.181	
m9	1.079*	-0.421	-0.369*	1.164	
m10	-1.415*	0.514	0.529*	1.061	
m11	-0.818*	0.303 ^a	0.310*	1.050	
m12	-2.063*	0.632	0.674*	1.219	
m13	-2.086*	0.644	0.688*	1.228	
m14	-1.503*	0.424	0.458*	1.252	
m15	-1.870*	0.594	0.635*	1.185	
m16	-1.887*	0.612	0.644*	1.164	
m17	0.261*	-0.111 ^a	-0.093*a	1.200	
m18	-1.492*	0.503	0.532*	1.142	
m19	0.292*	-0.106	-0.124* ^a	0.916 ^a	
m20	-1.984*	0.618	0.661*	1.181	
m21	-1.547*	0.465	0.501*	1.201	
m22	-1.564*	0.547	0.568*	1.106	
m23	-1.158*	0.392	0.401*	1.139	
m24	-0.001 ^a	0.011 ^a	0.022 ^a	1.115	
m25	-1.892*	0.641	0.685*	1.114	
m26	0.114 ^a	-0.042 ^a	-0.39 ^a	0.996ª	
m27	-2.132*	0.652	0.694*	1.223	
m28	-1.950*	0.604	0.648*	1.213	
m29	-1.601*	0.491	0.525*	1.210	
m30	-1.727*	0.561	0.600*	1.157	
m31	-2.122*	0.669	0.711*	1.198	
m32	0.038 ^a	-0.015 ^a	-0.008 ^a	1.158	
m33	-1.712*	0.579	0.613*	1.123	
m34	0.095 ^a	-0.011 ^a	-0.17 ^a	1.041	
m35	-1.873*	0.613	0.651*	1.153	
m36	-0.604*	0.194 ^a	0.202 ^{*a}	1.127	
m37	-1.734*	0.564	0.578*	1.178	
m38	1.309*	-0.509	-0.451*	1.169	
m39	-1.734*	0.581	0.608*	1.149	
m40	0.191 ^a	-0.049 ^a	-0.054* ^a	1.055	
m41	-2.017*	0.648	0.689*	1.186	
m42	-2.043*	0.632	0.669*	1.214	
m43	-1.648*	0.512	0.549*	1.225	
m44	0.101*	-0.029 ^a	-0.026 ^a	1.048	
m45	-2.122*	0.637	0.674*	1.243	
m46	-1.894*	0.578	0.614*	1.229	
m47	-0.136 ^a	0.021 ^a	0.033 ^a	1.132	

Note: MODDI-F-C=The mainland Chinese version of MODDI-F; T-value represents the degree of difference between the two samples; CITC=Corrected item-total correlation; * P < 0.05; ^a indicates that the item does not pass the test for the method

influence the acceptance dimension results. Death and dying are two different concepts, they represent different meanings, death and dying are widely used in the world, which indirectly indicates that individuals in the world think there is a difference between death and dying. If that were not the case, the researchers could have used one word instead of two. The AODD subscale included both dying and death. Both the state of death (death)

	F1	F2	F3	F4	F5
m21	0.744				
m14	0.701				
m29	0.697				
тб	0.489				
m35	0.648				
m42	0.613				
m28	0.620				
m20	0.596				
m13	0.577				
m5	0.542				
m27		0.725			
m41		0.720			
m45		0.689			
m12		0.672			
m1			0.683		
m8			0.642		
m37			0.637		
m31			0.509		
m46			0.593		
m16			0.473		
m43			0.524		
m22				0.743	
m30				0.688	
m15				0.638	
m3					0.700
m33					0.633
m39					0.565

Table 3 Factor loadings and distribution of 5-factor structure of MODDI-F-C (N=2105)

Note: MODDI-F-C=The mainland Chinese version of MODDI-F; F1=FODe + RODe (Fear of one's own death + Rejection of one's own death); F2=FC (Fear of corpses); F3=FODy (Fear of one's own dying); F4=FOPDe (Fear of another person's death); F5=FOPDy (Fear of another person's dying)

Table /	The reculte	of the co	anfirmatory	factor analy	ucic for M	M = 2105
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Tool structure model	x ²	df	р	CFI	TLI	SRMR	RMSEA
5-factor structure	1493.693	314	0.000	0.959	0.954	0.031	0.042
Adjust the 5-factor structure	1302.099	313	0.000	0.965	0.961	0.029	0.039
Second order 5-factor structure	1156.747	311	0.000	0.970	0.967	0.027	0.036

Note: MODDI-F-C=The mainland Chinese version of MODDI-F; df=degrees of freedom; CFI=Comparative Fit Index; TLI=Tucker-Lewis index; SRMR=Standardized Root mean Square Residual; RMSEA=Root Mean Square Error of Approximation

Table 5 The results of reliability analysis for MODDI-F-C (N=2105)

	Cronbach's alpha	Split-half coefficient
FI	0.899	0.857
F2	0.881	0.869
F3	0.849	0.811
F4	0.773	0.688
F5	0.682	0.612
Total Scale	0.949	0.940

Note: MODDI-F-C=The mainland Chinese version of MODDI-F; F1=FODe+RODe (Fear of one's own death+Rejection of one's own death); F2=FC (Fear of corpses); F3=FODy (Fear of one's own dying); F4=FOPDe (Fear of another person's death); F5=FOPDy (Fear of another person's dying) and the process of death (dying) represent the end of life, and the simultaneous existence of death and dying may be misleading to Chinese people, resulting in different measurement focuses. When participants make choices, they are affected by the double contradiction between the same concept of "end of life" and the different meanings of "death" and "dying", which may interfere with participants' choices and cause the items to fail to meet expectations. For the AODD subscale, dividing it into two parts of death and dying may be a good choice for participants in mainland China, although this would undermine the original tool structure, and it would be necessary to focus on the participants' ability to identify death and dying in the next study.



Fig. 2 The results of criterion-related validity for MODDI-F-C (N=2105)

Table 6	The results of conver-	aent validity and discrir	ninant validity for	r MODDI-F-C (/	N = 2105)
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	Convergent validity		Discriminant	validity			
	CR	AVE	F1	F2	F3	F4	F5
F1	0.909	0.503	0.709				
F2	0.880	0.647	0.674***	0.804			
F3	0.849	0.448	0.697***	0.715***	0.670		
F4	0.773	0.532	0.623***	0.660***	0.690***	0.730	
F5	0.687	0.425	0.599***	0.634***	0.636***	0.575***	0.652

Note: MODDI-F-C=The mainland Chinese version of MODDI-F; F1=FODe+RODe (Fear of one's own death+Rejection of one's own death); F2=FC (Fear of corpses); F3=FODy (Fear of one's own dying); F4=FOPDe (Fear of another person's death); F5=FOPDy (Fear of another person's dying); CR: Composite Reliability; AVE: Average variance extraction; * * * P < 0.001

Participants' attitudes on others' deaths are explored in AOPDE. For the Chinese, the meaning of death is embodied in social relations [32]. The collectivist cultural system represented by Confucian culture emphasizes the structure and order of interpersonal relations, which represents different degrees of intimate relations. The degree of intimacy affects participants' roles in social interactions [33]. While accepting the death of others, collectivists need more information to identify the degree of intimacy and complete the choice according to the degree of intimacy. The results of cross-cultural translation may not provide the subjects with valid intimate identification information, and in the original tool translation, the translator raised a similar problem, taking into account biases that may be formed by subjectivity. In addition, there was no emphasis on interpersonal relationships in the theory contained in the original tool. Therefore, we chose to keep the original concept rather than adjust it to fit the hierarchical structure of Chinese relationships. All of the above factors will have an impact on the choice of participants.

Ultimately, our results provide preliminary evidence of the importance of interpersonal structure for AOPDe in Chinese participants. In future studies, it is necessary to increase the content of interpersonal structure in order to maintain the specificity of the tool in Chinese culture [33]. The acceptance subscale also produces differential results in other cross-cultural tests. In the American test, AODD and AOPDE became one dimension due to their high correlation, there may be cross-cultural differences in acceptance of the concepts of death and dying [14]. Although deleting the acceptance subscale will cause damage to the conceptual dimension of the tool, it will help us further understand and recognize individuals' attitudes towards death and dying in different cultural systems, and provide a basis for the next step of updating the structure of the tool.

In addition, we found that RODe and FODe form a common factor, which means that there is a very high correlation between the two. In the detection of MODDI-F/chin, it was also found that the correlation coefficient between RODe and FODe was 0.76 (p < 0.001) [34]. We try to analyze the reasons from the following aspects. First, we found that the order of items of RODe and FODe is adjacent (RODe: m6,m14,m21,m29,m36) and FODe: m5,m13,m20,m28,m35,m42). According to item position effect theory, participants' responses to items were directly or indirectly influenced by factors other than the "main trait or construct the test is intended to measure" [35]. Some researchers believed that item position is a factor in producing the effect [36-37]. As a result, the participants' performance may have been impacted by the questionnaire's item sequence. Second, participants' attitudes regarding their own deaths were evaluated based on the results of RODe and FODe measures. Rejection is one of the triggers for fear, so fear and rejection may be connected in some way. We are not referring to F1 as a brand-new dimension since we believe that would go against the theoretical foundation of the instrument itself. Based on the analysis's underlying causes, improvements and modifications will be made in the following study.

In the reliability test of tools, generally, the value of the reliability coefficient should be >0.70 [38]. The lower reliability threshold of psychological measurements can be moderately reduced [39]. Therefore, in this study the

reliability of the scale is acceptable to a certain extent. However, the reliability of F4 and F5 was significantly lower than that of other subscales, which may be related to the small number of items in F5 and F6 (three items in both subscales).

This is the first time known to include DAP-R-C-Z in a MODDI-F validity test. The statistically significant relationship between the DAP-R-C-Z total score and the MODDI-F-C confirms the homogeneity and validity of these two tools for measuring attitudes towards death.This study meets the ideal criteria for strucvalidity (CFI = 0.970 > 0.90, TLI = 0.967 > 0.90, tural RMSEA = 0.036 < 0.06, SRMR = 0.027 < 0.05) based on prior studies [40-41]. However, X²/df (3.719 > 3) exceeded optimum.As square values are sensitive to sample volume [42], bigger samples can impair adjustment quality. Our study referenced ideal convergent validity criteria (average variance extracted (AVE)>0.50, and composite reliability (CR) > 0.60 [43]. The AVE standard adopted by Zhang [44], 0.36 to 0.50 is acceptable. By calculating the value of the AVE arithmetic square root and comparing it with the value of the correlation coefficient between the latent variables, the square root of the AVE must be greater than the estimated value of the corresponding correlation coefficient between the two factors according to previous research criteria [43]. Only the AVE square root value of F3 was close to the phase-relation value, thus failing to meet the standard. According to the calculation principle of discriminant validity, we assumed that F3 was likely to have factors that were highly correlated with other dimensions or that the factor load of a certain item would be too low. In general, the tool passed the test of convergent validity and discriminant validity. This scale is suitable for evaluating the attitudes of participants in mainland China towards death/dying under the dimension of fear. It can provide a basis for the development of interventions.

Limitations

There are some limitations in this study. First, However, in the process of cross-cultural translation, we have adjusted the language expression and found that the AOPDE dimension lacks the content of the interpersonal relationship structure of Chinese culture. Because the tool is generated in the Western cultural environment, although we have carried out a very rigorous translation process, there are still parts of the content that require some time for Chinese people to understand the real meaning. The lack of objective indicators reflecting expert opinions in cross-cultural translation is an important limitation of this study (such as: Content Validity Index (CVI) for each item and an overall scale). Secondly, we have had to rely on online research because of policies to prevent and control the new coronavirus epidemic. Several groups that lacked the ability to use network equipment were excluded from the study, which had a significant impact on the elderly population. Thirdly, unfortunately, we did not compare MODDI-F/chin with MODDI-F-C and therefore missed some of the findings that might be important for improving and advancing the development of the tool. Finally, considering the representativeness of the sample, we chose to use the total sample for factor analysis, which will cause the research results to be affected by sample bias, overfitting of the model and error in parameter estimation, etc. Future studies should be conducted by randomly dividing the samples into two subgroups to complete EFA and CFA.

Conclusions

Our study demonstrated that the MODDI-F-C fear dimension is a useful instrument for determining how participants in mainland China feel about death and dying as well as for identifying the cause of their fears. Although the psychometric validity of the acceptance component has not been established, it has confirmed the value of cross-cultural study. The next stage of the research has to further connect the acceptance factor with Chinese culture. MODDI-F-C can help professionals identify the death attitude tendencies of participants in mainland China, and provide assistance in formulating effective intervention and education strategies for patients at the end of life.

Abbreviations

MODDI-F-C	Mainland China Version Multidimensional Orientation
	Toward Dying and Death Inventory
DAP	Death Attitude profile
MODDI-F	Multidimensional Orientation Toward Dying and Death Inventory
FODe	Fear of one's own death
FOPDe	Fear of another person's death
FC	Fear of corpses
AODD	Acceptance of one's own dying and death
AOPDE	Acceptance of another person's death
RODE	Rejection of one's own death
FODY	Fear of one's own dying
FOPDY	Fear of another person's dying
MODDI-F/chin	China Hong Kong version of Multidimensional Orientation Toward Dying and Death Inventory
DAP-R-C-Z	Chinese version of The Revised Death Attitude Profile Scale
DAP-R	The Revised Death Attitude Profile Scale
MODDI-F/eng	English Version Multidimensional Orientation Toward Dying and Death Inventory
CITC	The corrected item-total correlation
SEM	Structural Equation Model
CFA	Confirmatory Factor Analysis
AVE	Average Variance Extracted
CR	Composite Reliability

Supplementary Information

The online version contains supplementary material available at https://doi.or g/10.1186/s12904-025-01697-3.

Supplementary Material 1

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Author contributions

Author contributionsYW, YL, YX contributed equally to this study. MJ is responsible for the overall research direction and paper structure. YW, YL was responsible for writing the paper. YX is responsible for data analysis. YZ, JW, JG, JS have carried out cross-cultural translation work. MM and LZ are responsible for data sorting and screening. All authors worked hard on the submission of the final paper.Before submitting the manuscript, all authors have carefully read and agreed to submit.

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Data availability

The data and information required for this study can be obtained by contacting the corresponding author.

Declarations

Ethics of approval and consent to participate

This study was approved by the Research Ethics Committee of Harbin Medical University (Project identification Code: KY2020-162). Participants received an informed consent before responding. Minor participants must obtain informed consent from their guardians before answering. Informed consent was obtained from all participants, and for minor participants, informed consent was obtained from their legal guardians. Participants are anonymous and can opt out at any time. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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