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Assessment of professional bereavement: The development and validation of the Professional Bereavement Scale

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Original Article

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Abstract

Objectives. To develop and validate Professional Bereavement Scale (PBS), a specific measurement tool for professional bereavement experiences.

Methods. An online cross-sectional survey collected data from 563 physicians and nurses from urban hospitals in Mainland China. Item consistency analysis, component factor analysis, exploratory factor analysis, and confirmatory factor analysis were run to develop and validate the scale. Correlational analysis was conducted to evaluate the psychometric property of the scale.

Results. Two subscales of the PBS were developed: the 17-item Short-term Bereavement Reactions Subscale (PBS–SBR) and the 15-item Accumulated Global Changes Subscale (PBS–AGC). Four factors, namely, frustration and trauma, guilt, grief, and being moved, are involved in PBS–SBR. Five factors are involved in PBS–AGC, which are new insights, more acceptance of limitations, more death-related anxiety, less influenced by patient deaths, and better coping with patient deaths. Both subscales have good content validity, construct validity, and criterion validity, as well as satisfactory internal consistency and split-half reliability.

Significance of results. PBS is a specific assessment tool for professional bereavement which is clearly defined, comprehensive, rigorously tested, and generalizable to different professional caregivers from various departments. Unveiled constructs illustrate that professional bereavement experiences contain a professional dimension in addition to a personal dimension both in an event-specific and a global perspective, which distinguishes them from familial bereavement experiences.

Introduction

Professional bereavement experiences

Patient deaths are impactful events for professional caregivers (Papadatou, 2009; Katz and Johnson, 2013). The bereavement of professional caregivers after the deaths of their patients is referred to as professional bereavement (Wenzel et al., 2011).

According to previous qualitative studies, in face of patient deaths, professional caregivers experience both short-term bereavement reactions and accumulated global changes (Chen et al., 2018a). Both of them involve a professional dimension in addition to a personal dimension: the professional dimension derives from the perspective of an active practitioner in the medical process that ends up with the patient's death, and the personal one roots in the view of an ordinary person who witnesses the death of an individual he or she knows (Chen et al., 2018a).

Shortly after each specific patient death, professional caregivers experience bereavement reactions. Among those reactions, there are physical ones like fatigue (Granek et al., 2015, 2017), emotional ones like sadness, grief (Kain, 2013), and guilt (Chan et al., 2014), cognitive ones like intrusive thoughts (Mak et al., 2013), relational ones like disconnections from families and friends (Papadatou et al., 2002), existential ones like death anxiety (Shorter and Stayt, 2010), and spiritual ones like the question of religion (Masia et al., 2010).

In addition to reactions toward each patient death, repetitive death encounters in a professional caregivers' career can lead to accumulated global changes. Such changes are mainly in two aspects: in personal life, professional caregivers may experience changes in religiousness (Chan et al., 2014; Granek et al., 2015), gain new insights into life and death (Rashotte et al., 1997), and have reduced reactions to personal losses (Moss et al., 2003); in professional life, healthcare professionals would experiences changes in terms of professional identity (Gerow et al., 2010), commitment to work (Shimma et al., 2010), involvement into professional–patient relations (Jackson et al., 2005), and competence (Granek et al., 2015).

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Meanwhile, they might get less sensitive to (Granek et al., 2015) and more acceptive of (Rashotte et al., 1997) patient deaths, and become better at coping (Wilson, 2014).

When describing professional bereavement experiences, both short-term bereavement reactions and accumulated global changes should be involved. These two distinct yet related elements, when combined together, form a comprehensive picture of the phenomenon of professional bereavement, which would benefit both theoretical explorations and practical applications: short-term bereavement reactions depict how each patient death bring immediate impacts on professional caregivers, the understanding of which is the premise of in-time symptom-targeted support. Meanwhile, accumulated global changes bring insights into how patient deaths, as inseparable parts of their careers, gradually shape professional caregivers in fundamental ways. Such knowledge could inform education and care plans.

The lack of a satisfactory assessment tool

In existing quantitative explorations on professional bereavement, findings are incomparable across studies, and conclusions about prevalence, intensity, and predicting factors are hardly reliable, owing to the lack of a satisfactory assessment tool (Chen et al., 2018b).

When measuring professional bereavement experiences, most previous quantitative studies employed inventories for familial bereavement, such as the Grief Experience Inventory (Feldstein and Gemma, 1995), Inventory of Complicated Grief (Anderson and Gaugler, 2006), and Texas Revised Inventory of Grief (Anderson and Ewen, 2011). In these measurements, the whole "professional dimension" is omitted. Meanwhile, the only preexisting specific measurement tool for professional bereavement experiences — the Adult Oncologists Grief Questionnaire (Granek et al., 2016) — has several critical limitations: to begin with, the tool was not based on clear and explicit operational definitions, and accumulated global changes were not covered. In addition, its generalizability is limited as all the empirical studies it relied on for item generation were conducted exclusively among oncologists from Isreal and Canada. Moreover, it has not been strictly validated among an eligible sample so that the quality of its items, its factor structure, and its credibility all remained unknown.

The present study

The present study aims to develop and validate Professional Bereavement Scale (PBS), a specific measurement tool for professional bereavement experiences that is clearly defined, comprehensive, rigorously tested, and generalizable.

Method

Design

Since professional bereavement experiences involve two distinct yet related elements, namely, short-term bereavement reactions and accumulated global changes, two subscales were planned for the PBS. They are the Short-term Bereavement Reactions Subscale (PBS–SBR) and the Accumulated Global Changes Subscale (PBS–AGC). A cross-sectional design was adopted, and data were collected through an online survey.

Measurements

The online questionnaire consisted of three parts: basic information, items for the PBS, and measures for validity tests.

Basic information

Information about the professional caregivers themselves and their most recent patient death experience were collected.

Item generation for the PBS

Items (they are in simplified Chinese and were translated for the present paper) were generated on the basis of a systematic review on previous qualitative studies around the world (Chen et al., 2018a) and an empirical qualitative exploration in Mainland China.[1] All open codes (the smallest meaning unit) regarding short-term bereavement reactions or accumulated global changes were extracted, and at least one item was generated for each open code.

For short-term bereavement reactions, the operational definition was "bereavement reactions that manifest within a week after the death of a patient." Participants were asked to "recall your most recent experience of patient death and rate from 0 (not at all) to 4 (extremely strong) on the intensity of your reactions within a week after that patient death."

For accumulated global changes, the operational definition is "changes jointly contributed by all patient deaths in a professional caregiver's career," and the instruction went "compared with times before you encountered your first patient death, you might have been changed after experiencing all of the patient deaths in your career. Please rate the extent to which you have been changed by patient deaths in each of the following aspects" [0 = no (no such change or the change was not induced by experiencing patient deaths) and 4 = yes, great deal].

The item pool was reviewed by four researchers on bereavement and grief, one physician, and one social science PhD candidate to assure the content validity of the scale (DeVellis, 2016). Expressions were revised in response to the reviewers' comments, and 46 and 30 items were included for PBS–SBR and PBS–AGC, respectively (Supplementary Appendix A).

Measures for validity tests

The Chinese Grief Reaction Assessment Form (GRAF; Ho et al., 2002) and the Professional Quality of Life Scale (ProQOL; Stamm, 2010) were used for validity tests.

GRAF is a tool to measure familial bereavement. Validated among Hong Kong Chinese, it has good internal reliability (Cronbach's alpha = 0.89) (Ho et al., 2002). This tool was used to reflect familial bereavement in the present study.

Professional quality of life is "the quality one feels in relation to their work as a helper" (Stamm, 2010). ProQOL involves three subscales for burnout, secondary traumatic stress, and compassion satisfaction, respectively (Stamm, 2010). With the permission from the ProQOL Office, the researchers slightly modified expressions in the official Simplified Chinese version.

While the GRAF (Ho et al., 2002) reflects short-term reactions after a specific death, the ProQOL–burnout subscale focuses on accumulative negative effects of all the impactful events in the

[1]A qualitative description study was run to understand the professional bereavement experiences of 24 physicians and nurses in Mainland China. "Short-term bereavement reactions" and "long-term changes" were two of the five themes. For more information, please refer to Chen et al. (2021).

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career of a helper (Stamm, 2010). Based on the comparability of constructs, the former was used for the construct validity test of PBS–SBR, and the latter for PBS–AGC.

For criterion validity, burnout was used for short-term bereavement reactions. As compassion satisfaction is the general attitude toward the helping job, it was used to test the criterion validity for PBS–AGC.

The secondary traumatic stress subscale measures fear and work-related trauma accumulated in the career, which usually associates with a particular event (Stamm, 2010). As there is no way to ensure that the "particular event" is the most recent patient death, this measurement was only employed to test the criterion validity of PBS–AGC.

Sampling

Formally employed physicians and nurses or medical and nursing students doing clinical practices in urban hospitals in Mainland China who have experienced deaths of at least one patient whom they had treated, cared for, or resuscitated were recruited.

The same sample size was planned for confirmatory factor analysis (CFA) (N_c) as for exploratory factor analysis (EFA) (N_E). For EFA, the minimum ratio of sample size to the number of items was set to 5:1 (Bentler and Chou, 1987). As 46 and 30 items were generated for the two subscales ($I_1 = 46$, $I_2 = 30$), respectively, the minimum eligible sample size (N) was calculated as follows:

$$N = N_E + N_C = 2 \times N_E = 2 \times 5 \times \max_{1 \le n \le 2} I_n = 460$$

A combination of convenient sampling and snowballing methods was adopted in participant recruitment. The first few participants were contacted directly by researchers, and they were asked to spread the link for the online questionnaire (on Tencent Questionnaire platform) to eligible participants after they finished the survey themselves.

Data analysis process

Identical steps for scale development and validation were applied for the two subscales. For each subscale, cases with more than 20% of missing items in that scale were dropped, and the excluded participants were compared with the remaining ones in terms of gender, age, and occupation. Missing data in the retained cases were simulated with the expectation–maximization (EM) algorithm (Graham, 2009). After that, participants were randomly split into two halves: the calibration sample and the validation sample. The cross-validation method was used, aiming for examining whether the parameter estimates of the calibration sample can replicate in the validation sample (Kyriazos, 2018). Such a method could provide valuable information about scale stability (DeVellis, 2016).

In the calibration sample, item-rest correlations were run to evaluate the consistency of items and drop ineligible ones (DeVellis, 2016). Then, principal component analysis (PCA) was run with promax rotation and parallel analysis, and items that do not have sufficiently large factor loadings on any of the major components were removed (Matsunaga, 2010). After that, EFA (principals axis factoring extraction with promax rotation and parallel analysis) was conducted, and ineligible items were dropped. As factor analysis should always be grounded in theory (Beavers et al., 2013), a few items that made sound theoretical sense (e.g., based on open codes revealed in both Chinese and foreign studies) but were not perfectly in line with statistical criteria were also retained in EFA. Eventually, in the validation sample, CFA was run to test the factor structure unveiled in the calibration sample.

While PCA aims to "summarize the information available from the given set of variables and reduce it into a fewer number of components," EFA is used to "help generate a new theory by exploring latent factors that best accounts for the variations and interrelationships of the manifest variables," and CFA for testing and existing theory (Matsunaga, 2010). The three are different in both theoretical and statistical sense, and they can be used successively to identify the factor structure.

After the structures of both subscales were validated, their reliability and validity were tested among all cases (DeVellis, 2016).

Eligible criteria for each step of the analysis and related references are listed in Table 1. While the EM algorithm was run with SPSS 25.0 (IBM Corp, 2017), and the CFA was done in Mplus 7 (Muthén and Muthén, 2014), all remaining analyses were conducted in jamovi 0.9.5.12 (Leppink and Pérez-Fuster, 2019).

Ethical concerns

The present study was approved by the Human Research Ethics Committee of the University of Hong Kong (reference number: EA1807022). Participants read the whole consent letter in the first page of the online questionnaire and gave their consent by clicking "I will participate in the research" before formally entered the survey.

Results

Participants

Between August 2018 and December 2018, 563 participants completed the survey. The majority of them are females (87.6%) and nurses (83.3%), and their average age is 32.9 years old (range: 20–60, SD = 7.82). More information is shown in Table 2. For 499 participants (88.6%), their most recent patient death was not their first patient death in career. Among 401 of them, 144 (35.9%), 163 (40.7%), and 94 (23.4%) experienced less than 10, 10–49, and more than 50 patient deaths in career by the time of the survey, respectively. On average, participants rated the overall influence of the most recent patient death as 1.64 out of 4 (N = 544, SD = 1.291).

Scale development and validation

The Short-term Bereavement Reactions Subscale

For the validation of PBS–SBR, 25 cases that missed more than nine items were excluded. The excluded participants are of the same age ($p = 0.813$) and gender ($p = 0.492$) with the remained ones, but they are more likely to be nurses (100% vs. 82.53%, $\chi^2 = 5.243$, df = 1, $p = 0.022$) than the retained participants. After data imputation, the remaining 538 cases were randomly assigned into two groups (256 for calibration and 282 for validation).

Since only 13% of the total participants had religious beliefs, the present sample may not be eligible for the validation of R29

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Table 1. Steps and criteria adopted in data analysis

Sample	Step	Analysis	Parameter	Criteria
Calibration	1	Consistency of items	Item-rest correlation	>0.3
	2	PCA	Component loading	Home loading: (absolute values) >0.5 (between liberal and conservative) Cross-loadings (absolute values) <0.32 (10% overlapping variance with other items in that factor)
	3	EFA	Suitability of factor analysis	Bartlett's test of sphericity: $p < 0.05$ KMO measure of sampling adequacy >0.5
			Factor loading	Home loading and cross-loading (absolute values): >0.5/<0.2 Or >0.5/<0.32 with sound theoretical support
			Communality	>0.45: uniqueness = 1–communality <0.55
			Inter-item correlation	<0.9
Validation	4	CFA	Goodness-of-fit	Root-mean-square error of approximation (RMSEA)<0.1 Standard root mean square residual (SRMR)<0.1 Goodness-of-fit index (CFI)>0.90
Whole	5	Reliability tests	Cronbach's α	>0.8
			Split-half reliability	>0.7
	6	Validity tests	Correlations	Effect size (absolute values): small: 0.10, medium: 0.30, large: 0.50

"I doubted my religion." Therefore, this item was excluded, and the remaining 45 were entered into the analysis.

In the consistency test, R4 was deleted for having too low an item-rest correlation. The PCA revealed two main components, and 10 items (R1, R3, R8, R11, R15, R17, R24, R27, R36, and R38) were eliminated for having cross-loadings with absolute values larger than 0.32.

Among the remaining items, Bartlett's test of sphericity was significant ($\chi^2 = 9{,}755$, df = 561, $p < 0.001$) and the KMO measure of sampling adequacy was 0.963, thereby indicating suitability for EFA. Parallel analysis revealed four main factors. In the first round of EFA, 13 items (R2, R6, R7, R12, R13, R18, R22, R25, R33, R35, R39, R44, and R45) were excluded for not having a home loading with an absolute value higher than 0.50 or having one or more cross-loadings with absolute values higher than 0.32. Moreover, 4 items (R14, R19, R31, and R32) were deleted for having one or more crossing-loadings with absolute values higher than 0.20 and having no strong theoretical justification for being retained. In the second round of EFA, 1 item (R13) was eliminated for having a home loading (0.431) smaller than 0.5. Eventually, 17 items were retained (for eigenvalues, see Table 3 and the upper part of Figure 1; see loadings in Table 3). Among these items, both Bartlett's test of sphericity ($\chi^2 = 4{,}360$, df = 136, $p < 0.001$) and the KMO measure of sampling adequacy (0.945) were eligible.

The outcomes of covariance-based structural equation modeling [CB-SEM; CFI = 0.943, SRMR = 0.0461, RMSEA = 0.0895, 90% CI for RMSEA = (0.0794, 0.0998)] among the validation sample showed that the factor structure revealed in EFA is acceptable (see Figure 2).

Based on the items and loadings, the four factors were named "frustration & trauma," "guilt," "grief," and "being moved," respectively.

The Accumulated Global Changes Subscale

In order to validate PBS-LC, 18 cases were excluded for having missing data on more than five items. There was no difference between the excluded and the remained participants in terms of age ($p = 0.894$), gender ($p = 0.863$), or occupation ($p = 0.054$). After imputation, 269 and 276 cases were randomly assigned for calibration and validation, respectively.

Similar to the case in PBS–SBR, two items based on a premise of having a religious belief, namely, "I have more faith in my religion" (C7) and "My faith in religion is weakened" (C24), were excluded. Item-rest correlations of the 28 remained items were eligible. The PCA revealed two main components, and C21 was eliminated for having cross-loadings larger than 0.32.

Bartlett's test of sphericity was significant ($\chi^2 = 7{,}512$, df = 351, $p < 0.001$), and the KMO measure of sampling adequacy was 0.954 for the remaining 27 items. Parallel analysis identified five main factors. In the first and second round of EFA, 8 items (C6, C11, C12, C13, C14, C15, C16, and C20) were excluded for not having a home loading with an absolute value higher than 0.50 or having one or more cross-loadings with absolute values higher than 0.32. Moreover, 2 items (C2 and C23) were deleted for having one or more crossing-loadings with absolute values higher than 0.20 and having no strong theoretical support for being retained. In the second round of EFA, two items (C22 and C28) were eliminated further for not having a home loading with an absolute value larger than 0.50 or having one or more cross-loadings with absolute values higher than 0.32, and 1 item (AC30) was deleted for having one or more crossing-loadings with absolute values higher than 0.20 and having no strong theoretical support for being retained. Among retained items (for eigenvalues, see Table 4 and the lower part of Figure 1; see loadings in Table 4), Bartlett's test of sphericity ($\chi^2 = 3{,}622$, df = 105, $p < 0.001$) and the KMO measure of sampling adequacy (0.908) were satisfactory.

In the validation sample, the CFA revealed eligible results [CFI = 0.958, SRMR = 0.0471, RMSEA = 0.0838, 90% CI for RMSEA = (0.0715, 0.0963), see Figure 3].

The five factors were named "new insights," "more acceptance of limitations," "more death-related anxiety," "less influenced by patient deaths," and "better coping with patient deaths," respectively.

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Table 2. Basic information about participants ($n = 563$)

Aspect	Variable	*n* (%)
The participant	Gender	
	Male	70 (12.4%)
	Female	493 (87.6%)
	Occupation	
	Physician	94 (16.7%)
	Nurse	469 (83.3%)
	Working condition	
	Graduated, undergoing standardized training/have taken office	546 (97.0%)
	Student, doing clinical practice	17 (3.0%)
	Accreditation level of hospital	
	Tertiary	361 (64.1%)
	Secondary	179 (31.8%)
	Primary	23 (4.1%)
	Years of clinical practice (since internships)	
	Less than 1 year	15 (2.7%)
	1–3 years	65 (11.5%)
	4–9 years	264 (46.9%)
	10–20 years	125 (22.2%)
	More than 20 years	94 (16.7%)
	Department	
	Internal medicine	173 (30.7%)
	Geriatrics	82 (14.6%)
	Oncology	77 (13.7%)
	Surgery	54 (9.6%)
	Emergency department	50 (8.9%)
	Intensive care unit	28 (5.0%)
	Operating room	18 (3.2%)
	Palliative care	10 (1.8%)
	Pediatrics	9 (1.6%)
	Obstetrics & Gynecology	8 (1.4%)
	Anesthesiology	6 (1.1%)
	Others ($n \leq 5$): Orthopedics, Dialysis, Gastroenterology, medical examination center, Chinese medicine, Radiology, Dermatology, Medical care department, Otolaryngology, Recovery unit, General medicine	48 (8.5%)
	Losses of immediate families, relatives, and friends within the past 2 years	
	Yes	262 (46.5%)
	No	301 (53.5%)
	Having religious belief	
	Yes	73 (13.0%)
	No	490 (87.0%)
The most recent patient death	Time since the death	
	<1 week	87 (15.5%)
	1 week to 1 month	152 (27.0%)

(*Continued*)

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Table 2. (*Continued.*)

Aspect	Variable	*n* (%)
	1 month to 6 months	164 (29.1%)
	6 months to 1 year	56 (9.9%)
	≥1 year	104 (18.5%)
	Duration of the most enduring reaction (*n* = 504)	
	<1 day	181 (35.9%)
	1–3 days	150 (29.8%)
	3 days to 1 week	77 (15.3%)
	1–2 weeks	41 (8.1%)
	2 weeks to 1 month	23 (4.6%)
	≥1 month	32 (6.3%)
	Duration of intact memory (*n* = 500)	
	<1 week	238 (47.6%)
	1 week to 1 month	124 (24.8%)
	1 month to 6 months	64 (12.8%)
	6 months to 1 year	25 (5.0%)
	≥1 year	49 (9.8%)
	Gender of the patient	
	Male	379 (67.3%)
	Female	184 (32.7%)
	Age of the patient	
	Younger than 18	16 (2.8%)
	18–29	11 (2.0%)
	30–49	63 (11.2%)
	50–69	177 (31.4%)
	70–89	257 (45.6%)
	90 and older	39 (6.9%)
	Fundamental cause of death	
	Primary disease	481 (85.4%)
	Accident	28 (5.0%)
	Not sure, cannot answer	34 (6.0%)
	Others	20 (3.6%)
	Relationship with the patient	
	I was the leader of the treatment/nursing team	95 (16.9%)
	I was the doctor/nurse directly in charge of the patient	126 (22.4%)
	I was not the doctor/nurse directly in charge of the patient but had participated in the patient's daily treatment/care	266 (47.2%)
	I have participated in the patient's care at home	33 (5.9%)
	I had never participated in the patient's daily treatment/care	43 (7.6%)
	Participated in the resuscitation	
	Yes	219 (38.9%)
	No	344 (61.1%)

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Table 3. Loadings of retained items after EFA for the PBS–SBR

Factor (eigenvalue)	Item		Loading[a]			
			F_1	F_2	F_3	F_4
F_1 (10.371)	R41	I felt exhausted	1.115			
	R42	I felt frustrated	0.939			
	R40	I doubted the value of my occupation	0.864			
	R37	I felt nervous and worried about potential professional–patient conflicts	0.718			
	R20	I felt fatigue	0.529		0.231	
	R43	The scene of the event intruded on my mind repeatedly	0.522	0.232	0.238	
	R46	I felt anxious for my own death in the future	0.508			
F_2 (0.785)	R28	I felt guilty		1.003		
	R23	I blamed myself		0.835		
	R30	I thought that I am not a good doctor/nurse		0.834		
	R34	I was confused about why the patient died	0.246	0.643		
F_3 (0.536)	R9	I felt grief			0.928	
	R10	I felt that life is uncertain			0.830	
	R5	I felt sad			0.818	
	R26	I felt pity for the death of the patient			0.702	
F_4 (0.421)	R21	I was moved by the patient's family's gratitude				0.920
	R16	I was moved by the patient's family's understanding				0.859

[a]Loadings with absolute values smaller than 0.20 were omitted.

Table 4. Loadings of retained items after EFA for the PBS–AGC

Factor (eigenvalue)	Item	Loading[a]				
		F_1	F_2	F_3	F_4	F_5
F_1 (8.116)	C3 — I am more aware that life is uncertain	0.929				
	C4 — I cherish my life more	0.920				
	C1 — I am more aware that death is inevitable	0.744				
	C10 — I cherish the present more	0.563				
F_2 (1.031)	C26 — The goals in my career have become more practical		0.981			
	C27 — I achieve more acceptance of my own death		0.750			
	C25 — I am more aware of the limitation of medical science		0.686			
F_3 (0.601)	C5 — I feel fatigued by my job			0.846		
	C29 — I am more anxious about my own mortality			0.820		
	C6 — I am more anxious about the future deaths of my loved ones	0.200		0.788		−0.281
	C19 — I deliberately avoid building very close relationships with patients		0.226	0.624		0.231
F_4 (0.320)	C8 — The immediate impact that a patient death has on me becomes weaker				0.947	
	C9 — The aftereffects of patient deaths become weaker for me				0.878	
F_5 (0.247)	C18 — I achieve more acceptance of patient deaths					0.915
	C17 — I am better at coping with patient deaths					0.820

[a]Loadings with absolute values smaller than 0.20 were omitted.

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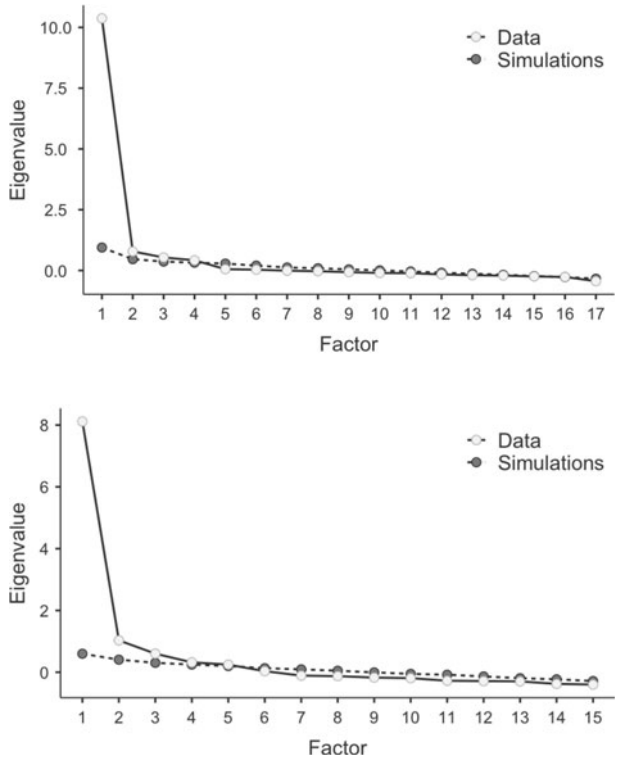

Fig. 1. EFA (parallel analysis) scree plots for PBS–SBR (upper) and PBS–AGC (lower).

Psychometric properties of the scale

The Short-term Bereavement Reactions Subscale

Cronbach's alpha for the PBS–SBR subscale and F_1 ($M = 8.95$, SD = 8.04), F_2 ($M = 3.98$, SD = 4.22), F_3 ($M = 7.37$, SD = 4.63), and F_4 ($M = 3.38$, SD = 2.46) among all 538 cases were 0.960, 0.949, 0.923, 0.888, and 0.900, respectively. The split-half reliability was 0.935 ($p < 0.001$).

Cronbach's alphas for GRAF and ProQOL–Burnout were 0.979 and 0.607, respectively. The PBS–SBR score was the sum of all 17 retained items in the scale. The correlational coefficient between the PBS–SBR score ($M = 23.68$, SD = 16.98) and the GRAF score ($M = 30.55$, SD = 37.67) and the ProQOL–Burnout score ($M = 17.57$, SD = 5.96) was 0.678 ($p < 0.001$) and 0.333 ($p < 0.001$), respectively.

The Accumulated Global Changes Subscale

Cronbach's alpha for the PBS–AGC subscale and F_1 ($M = 11.70$, SD = 4.39), F_2 ($M = 7.40$, SD = 3.74), F_3 ($M = 7.35$, SD = 4.61), F_4 ($M = 3.82$, SD = 2.59), and F_5 ($M = 5.26$, SD = 2.47) among all 545 participants were 0.943, 0.917, 0.910, 0.859, 0.949, and 0.948, respectively. The split-half reliability was 0.933 ($p < 0.001$).

Cronbach's alphas for compassion satisfaction, burnout, and secondary traumatic stress subscales were 0.949, 0.611, and 0.947, respectively. The correlational coefficient between the PBS–AGC score ($M = 35.54$, SD = 14.69) and burnout score ($M = 18.15$, SD = 5.03), compassion satisfaction score ($M = 23.39$, SD = 1.14), and secondary traumatic stress score ($M = 17.33$, SD = 10.75) was 0.149 ($p < 0.001$), 0.562 ($p < 0.001$), and 0.598 ($p < 0.001$), respectively.

Discussion

Among more than 500 physicians and nurses in urban hospitals from Mainland China, the present study developed and validated the PBS (full scale in Supplementary Appendix B). Statistics show that both the subscales, namely, the Short-term Bereavement Reactions Subscale and the Accumulated Global Changes Subscale, have satisfactory reliability.

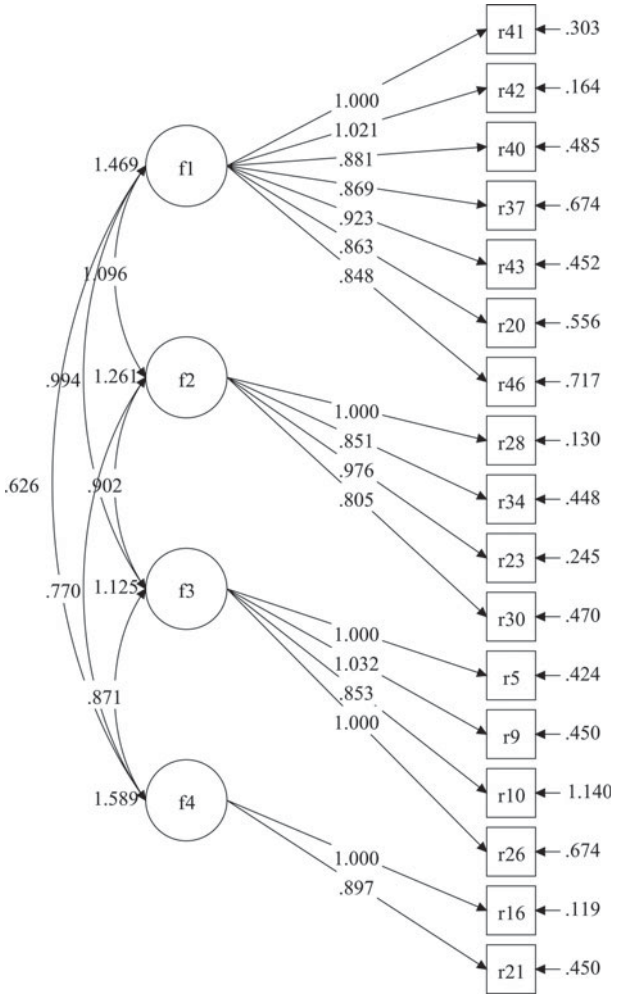

Fig. 2. CFA outcome of PBS–SBR.

The validity of the two subscales

The validity of PBS–SBR

The PBS–SBR score had a large-sized positive association with the familial bereavement score. As professional bereavement and familial bereavement share the personal dimension conceptually, such a link reflects the satisfactory convergent validity (DeVellis, 2016) of PBS–SBR.

Participants' PBS–SBR scores and burnout scores share a medium-sized significant correlation. Among professional caregivers, burnout has been found to link with trauma exposure (Eroglu and Arikan, 2016), omnipotence guilt (Duarte and Pinto-Gouveia, 2017), and complicated grief (Anderson, 2008), which are all relevant to certain elements measured in PBS–SBR. Therefore, the significant association between PBS–SBR scores and burnout scores reflects the satisfactory concurrent validity of the latter.

The validity of the PBS–AGC

Participants' PBS–AGC scores had significant positive correlations with burnout (small effect size), compassion satisfaction

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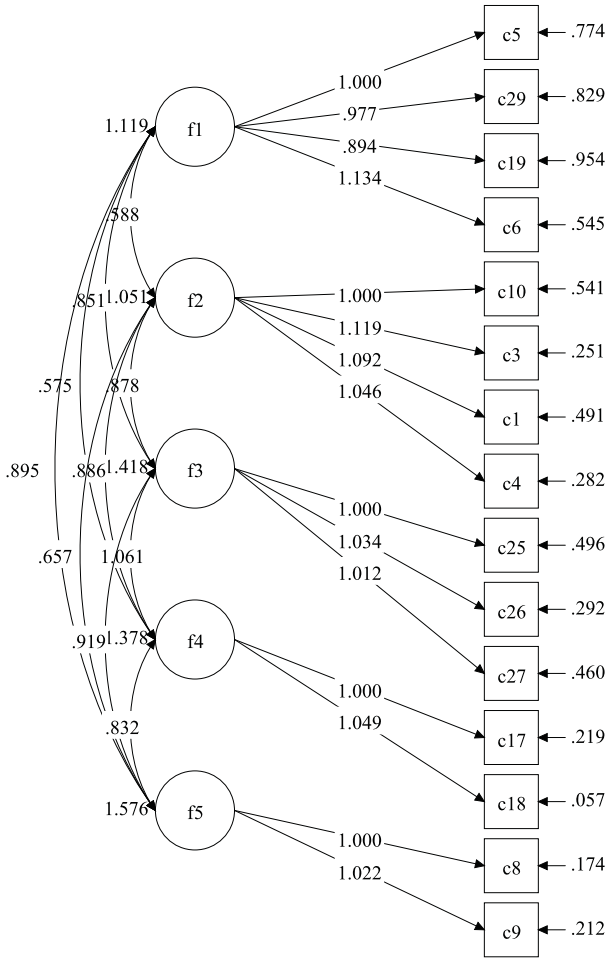

Fig. 3. CFA outcome of PBS–AGC.

(large effect size), and secondary traumatic stress (large effect size) scores.

The concepts of both burnout and long-term changes are based on the accumulated effects of events in professional caregivers' careers. As the former emphasizes negative outcomes attributed by general events in work while the latter mainly reflects growth lead by patient deaths, the overlap of the two is limited. Therefore, the low correlation revealed the high discriminate validity of PBS–AGC.

Compassion satisfaction reflects participants' positive feelings relating to their abilities to be effective caregivers (Stamm, 2010). Since the more professional caregivers achieve positive changes in career, the more they may derive pleasure from doing the job well, the high correlation between compassion satisfaction and long-term care shows the satisfactory criterion validity of PBS–AGC.

For the strong positive correlation between secondary traumatic stress and PBS–AGC, insights could be gained from studies on post-traumatic growth: for cancer survivors, the threat of cancer perceived by them is positively linked with their post-traumatic growth (Jim and Jacobsen, 2008), which demonstrates "no pain, no gain." Moreover, a longitudinal study among bereaved adults unveiled that the positive link between traumatic symptoms and growth exists only when symptoms are at a low to a moderate level (Eisma et al., 2019). According to the cutoff points (Stamm, 2010), 90.5% of the present sample have low to average levels of secondary traumatic stress. Therefore, the strong positive correlation between secondary traumatic stress and PBS–AGC reflects the high criterion validity of the latter.

Clearer distinctions between professional bereavement and familial bereavement

From an event-specific perspective and a global one, respectively, unveiled factorial structures of PBS–SBR and PBS–AGC reinforced the key distinction between professional bereavement and familial bereavement.

Regarding short-term reactions, professional caregivers' average GRAF score (30.55 out of 160) in the present study is much lower than that among families of the deceased (69.78/160 for males and 87.49/160 for females) in Hong Kong (Ho et al., 2002). This vividly demonstrates how a familial bereavement assessment tool underestimates short-term reaction in professional bereavement by just telling parts of the whole story. On the contrary, the factor structure of PBS–SBR shows the more comprehensive picture by involving both the personal and the professional dimension: "Grief" and "being moved" grasp the personal one while "guilt" reflects the professional one, and "frustration & trauma" lies across the boundary.

In PBS–AGC, four out of the five factors depict growth. Such an idea of "great good can come from great suffering" (Tedeschi and Calhoun, 2004) bears many similarities to the concept of post-traumatic growth (Tedeschi and Calhoun, 1996). However, two differences between the long-term changes in professional bereavement and post-traumatic growth after familial bereavement are worth noticing. Firstly, as patient deaths challenge professional caregivers' "basic assumptions" in not only daily lives but also their careers, PBS–AGC captures deeper insights and corresponding growth in both fields. Secondly, one major long-term change in professional bereavement is that professional caregivers become more at ease with numerous similar patient death events in the future through learning from past experiences ("less influenced by patient deaths" and "better coping with patient deaths" in PBS–AGC). This is seldom the case in familial bereavement, as it is very rare for one individual's several loved ones to die from similar traumatic events at different times.

Significances

The present research yielded the first specific measurement tool for professional bereavement that is clearly defined, comprehensive, rigorously tested, and generalizable to different professional caregivers from various departments. Consisting of two subscales for short-term bereavement reactions and accumulated global changes, respectively, the PBS can measure multidimensional reactions during professional bereavement, and both immediate and accumulated, both event-specific and global impacts are covered. The scale has good content validity, construct validity, and criterion validity, as well as satisfactory internal consistency and split-half reliability. Such a tool enables all studies on professional bereavement that used to be limited by difficulties in a precise and holistic measurement of the phenomenon. Based on the aims and focuses of future assessments, the subscales could be used singly or in combination.

Meanwhile, findings have promoted the clarification of the concept of professional bereavement: from the factorial constructs of both PBS–SBR and PBS–AGC, the existence of a professional

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dimension in addition to a personal dimension, which is the key to distinguish professional bereavement from familial bereavement, is vividly illustrated.

Limitations

In the present study, only physicians and nurses in urban hospitals are involved, and participants are relatively young. Moreover, owing to limited resources, convenient sampling was adopted so that physicians were underrepresented in the sample. All these might impede the external validity of the findings. Besides, participants' ratings on short-term reactions to the most recent patient death were based on memory, which might introduce recall bias. Also, the test–retest validity of the tool was unknown.

Future directions

For future studies, it would be ideal to validate such a tool among professional caregivers who work in nursing homes, hospices, or patient homes in different regions of the world. In those studies, the test-rest reliability could be evaluated. Also, future studies could reveal the chronological and causal links between short-term bereavement reactions and long-term changes, identify influencing factors on subscale scores, and explore how the two constructs link with well-beings of professional caregivers and qualities of the service received by patients.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S1478951521000250.

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References

Anderson KA (2008) Grief experiences of CNAs — Relationships with burnout and turnover. *Journal of Gerontological Nursing* **34**(1), 42–49.

Anderson KA and Ewen HH (2011) Death in the nursing home: An examination of grief and well-being in nursing assistants. *Research in Gerontological Nursing* **4**(2), 87–94.

Anderson KA and Gaugler JE (2006) The grief experiences of certified nursing assistants: Personal growth and complicated grief. *OMEGA – Journal of Death and Dying* **54**(4), 301–318.

Beavers AS, Lounsbury JW, Richards JK, *et al.* (2013) Practical considerations for using exploratory factor analysis in educational research. *Practical Assessment, Research & Evaluation* **18**, 8–13.

Bentler PM and Chou C-P (1987) Practical issues in structural modeling. *Sociological Methods & Research* **16**(1), 78–117.

Chan WCH, Fong A, Wong KLY, *et al.* (2014) Impact of death work on self: Existential and emotional challenges and coping of palliative care professionals. *Health and Social Work* **41**(1), 33–41.

Chen C, Chow AYM and Tang S (2018a) Bereavement process of professional caregivers after deaths of their patients: A meta-ethnographic synthesis of qualitative studies and an integrated model. *International Journal of Nursing Studies* **88**, 104–113.

Chen C, Chow AYM and Tang S (2018b) Professional caregivers' bereavement after patients' deaths: A scoping review of quantitative studies. *Death Studies* **43**(8), 500–508.

Chen C, Chow AYM and Xu K (2021) Bereavement after patient deaths among Chinese physicians and nurses: A qualitative description study. *OMEGA – Journal of Death and Dying*. doi:10.1177/0030222821992194.

DeVellis RF (2016) *Scale Development: Theory and Applications*. Thousand Oaks, CA: Sage Publications.

Duarte J and Pinto-Gouveia J (2017) Empathy and feelings of guilt experienced by nurses: A cross-sectional study of their role in burnout and compassion fatigue symptoms. *Applied Nursing Research* **35**, 42–47.

Eisma MC, Lenferink LIM, Stroebe MS, *et al.* (2019) No pain, no gain: Cross-lagged analyses of posttraumatic growth and anxiety, depression, posttraumatic stress and prolonged grief symptoms after loss. *Anxiety, Stress, & Coping* **32**(3), 231–243.

Eroglu BS and Arikan S (2016) Trauma among rescue workers: Do coping strategies moderate the relationship between traumas, burnout and life satisfaction among ambulance personnel? *Turkish Journal of Psychology* **31**(78), 45–61.

Feldstein M and Gemma P (1995) Oncology nurses and chronic compounded grief. *Cancer Nursing* **18**(3), 228–236.

Gerow L, Conejo P, Alonzo A, *et al.* (2010) Creating a curtain of protection: Nurses' experiences of grief following patient death. *Journal of Nursing Scholarship* **42**(2), 122–129.

Graham JW (2009) Missing data analysis: Making it work in the real world. *Annual Review of Psychology* **60**, 549–576.

Granek L, Bartels U, Scheinemann K, *et al.* (2015) Grief reactions and impact of patient death on pediatric oncologists. *Pediatric Blood & Cancer* **62**(1), 134–142.

Granek L, Krzyzanowska MK, Nakash O, *et al.* (2016) Gender differences in the effect of grief reactions and burnout on emotional distress among clinical oncologists. *Cancer* **122**(23), 3705–3714.

Granek L, Ben-David M, Shapira S, *et al.* (2017) Grief symptoms and difficult patient loss for oncologists in response to patient death. *Psycho-Oncology* **26**(7), 960–966.

Ho S, Chow A, Chan C, *et al.* (2002). The assessment of grief among Hong Kong Chinese: A preliminary report.

IBM Corp (2017) *IBM SPSS Statistics for Macintosh*. Armonk, NY: IBM Corp.

Jackson VA, Sullivan AM, Gadmer NM, *et al.* (2005) "It was haunting …": Physicians' descriptions of emotionally powerful patient deaths. *Academic Medicine* **80**(7), 648–656.

Jim HS and Jacobsen PB (2008) Posttraumatic stress and posttraumatic growth in cancer survivorship: A review. *The Cancer Journal* **14**(6), 414–419.

Kain VJ (2013) An exploration of the grief experiences of neonatal nurses: A focus group study. *Journal of Neonatal Nursing* **19**(2), 80–88.

Katz RS and Johnson TG (2013) *When Professionals Weep: Emotional and Countertransference Responses in End-of-Life Care*. New York: Routledge.

Kyriazos TA (2018) Applied psychometrics: The 3-faced construct validation method, a routine for evaluating a factor structure. *Psychology* **09**(8), 2044–2072.

Leppink J and Pérez-Fuster P (2019) Mental effort, workload, time on task, and certainty: Beyond linear models. *Educational Psychology Review* **31**, 421–439.

Mak YW, Chiang VCL and Chui WT (2013) Experiences and perceptions of nurses caring for dying patients and families in the acute medical admission setting. *International Journal of Palliative Nursing* **19**, 423–431.

Masia RT, Basson WJ and Ogunbanjo GA (2010) Emotional reactions of medical doctors and students following the loss of their patients at the Dr George Mukhari Hospital emergency unit, South Africa. *South African Family Practice* **52**(4), 356–363.

Matsunaga M (2010) How to factor-analyze your data right: Do's, don'ts, and how-to's. *International Journal of Psychological Research* **3**(1), 97–110.

Moss MS, Moss SZ, Rubinstein RL, *et al.* (2003) The metaphor of "family" in staff communication about dying and death. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences* **58**(5), S290–S296.

Muthén LK and Muthén BO (2014). *MPlus User's Guide 7th ed*. Los Angeles, CA: Muthén and Muthén.

Papadatou D (2009) *In the Face of Death. [Electronic Resource]: Professionals Who Care for the Dying and the Bereaved*. New York: Springer Pub.

Papadatou D, Bellali T, Papazoglou I, *et al.* (2002) Greek nurse and physician grief as a result of caring for children dying of cancer. *Pediatric Nursing* **28**(4), 345.

Rashotte J, Fothergill-Bourbonnais F and Chamberlain M (1997) Pediatric intensive care nurses and their grief experiences: A phenomenological study. *Heart & Lung: The Journal of Critical Care* **26**, 372–386.

Shimma E, Nogueira-Martins MCF and Nogueira-Martins LA (2010) The experience of infectologists faced with death and dying among their patients over the course of the AIDS epidemic in the city of Sao Paulo: Qualitative study. *Sao Paulo Medical Journal* **128**(2), 74–80.

Shorter M and Stayt LC (2010) Critical care nurses' experiences of grief in an adult intensive care unit. *Journal of Advanced Nursing* **66**(1), 159–167.

Stamm BH (2010) *The Concise ProQOL Manual*. Pocatello, ID: ProQOL.org.

Tedeschi RG and Calhoun LG (1996) The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress* **9**(3), 455–471.

Tedeschi RG and Calhoun LG (2004) Target Article: "Posttraumatic growth: Conceptual foundations and empirical evidence". *Psychological Inquiry* **15** (1), 1–18.

Wenzel J, Shaha M, Klimmek R, *et al.* (2011) Working through grief and loss: Oncology nurses' perspectives on professional bereavement. *Oncology Nursing Forum* **38**, 455.

Wilson J (2014) Ward staff experiences of patient death in an acute medical setting. *Nursing Standard* **28**, 37–45.

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