The mental health of Australians bereaved during the first two years of the COVID-19 pandemic: a latent class analysis

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Abstract

Background. The COVID-19 pandemic disrupted many areas of life, including culturally accepted practices at end-of-life care, funeral rites, and access to social, community, and professional support. This survey investigated the mental health outcomes of Australians bereaved during this time to determine how these factors might have impacted bereavement outcomes.

Methods. An online survey indexing pandemic and bereavement experiences, levels of grief, depression, anxiety, and health, work, and social impairment. Latent class analysis (LCA) was used to identify groups of individuals who shared similar symptom patterns. Multinomial regressions identified pandemic-related, loss-related, and sociodemographic correlates of class membership.

Results. 1911 Australian adults completed the survey. The LCA identified four classes: low symptoms (46.8%), grief (17.3%), depression/anxiety (17.7%), and grief/depression/anxiety (18.2%). The latter group reported the highest levels of health, work, and social impairment. The death of a child or partner and an inability to care for the deceased due to COVID-19 public health measures were correlated with grief symptoms (with or without depression and anxiety). Preparedness for the person's death and levels of pandemic-related loneliness and social isolation differentiated all four classes. Unemployment was associated with depression/anxiety (with or without grief).

Conclusions. COVID-19 had profound impacts for the way we lived and died, with effects that are likely to ricochet through society into the foreseeable future. These lessons learned must inform policymakers and healthcare professionals to improve bereavement care and ensure preparedness during and following future predicted pandemics to prevent negative impacts.

Since 2020, almost seven million people have died globally from COVID-19 (World Health Organization, 2020) and many others have died from causes unrelated to the virus. These deaths occurred against a backdrop of varying, but significant disruptions to daily life and accepted end-of-life practices. Pre-pandemic literature suggested that while most people find ways of adapting to their loss without long-term impairments, at least 7–10% of bereaved people experience a chronic and disabling grief reaction, termed 'prolonged grief disorder' (PGD; previously known as complicated grief; American Psychiatric Association, 2022; Lundorff, Holmgren, Zachariae, Farver-Vestergaard, and O'Connor, 2017; Maciejewski, Maercker, Boelen, and Prigerson, 2016). However, in the context of mass deaths and disruptions resulting from COVID-19, much higher rates of chronic distress were predicted, with calls for policymakers to recognize the 'shadow pandemic' of grief anticipated in the wake of this global event (Petry, Hughes, & Galanos, 2021; Tucci & Doka, 2021; Wallace, Wladkowski, Gibson, & White, 2020).

PGD is characterized by intense and debilitating yearning, emotional pain, disbelief, avoidance of reminders, a pervasive sense of meaninglessness, a disrupted sense of self, emotional numbness, intense loneliness, and significant difficulties reengaging with life. These intense reactions must persist for at least 12 months after the death and interfere significantly with daily living. PGD is of clinical interest as it is linked with a range of negative long-term health, social and occupational outcomes (Maciejewski et al., 2016). However, PGD is just one of a range of potentially adverse bereavement-related outcomes and is often comorbid with anxiety and depression. (American Psychiatric Association, 2022; Komischke-Konnerup, Zachariae, Johannsen, Nielsen, & O'Connor, 2021; Simon et al., 2007). Further, although PGD is a chronic condition, studies indicate that high levels of grief-related distress soon after bereavement are also predictive of negative outcomes (Boelen & Lenferink, 2022; Smith & Ehlers, 2020; Stroebe, Schut, & Stroebe, 2007).

Bereavement studies across multiple countries and cultures have found that people bereaved by COVID-19 report elevated symptoms of grief, depression, anxiety, and functional impairment (Breen, Lee, & Neimeyer, 2021; Eisma, Tamminga, Smid, & Boelen, 2021; Lee & Neimeyer, 2020; Tang & Xiang, 2021; Tang, Yu, Chen, Fan, & Eisma, 2021). Findings from other studies have suggested that, during the pandemic, bereavement from any cause was associated with poorer mental health. For example, of 711 adults from the United Kingdom who were bereaved an average of five months from any cause between March and December 2020, half were at high-risk of developing PGD (Harrop et al., 2021; see also Selman et al., 2022). Likewise, 29% of Canadians bereaved during 2020–2021 had severe grief symptoms (Downar et al., 2022). In addition to pre-pandemic correlates (Lobb et al., 2010; Lundorff et al., 2017), emerging pandemic-related correlates associated with poorer outcomes have included impeded access to the dying person at the end-of-life, unexpected timing of the death, limited contact with family and friends, and loneliness (Breen, Mancini, Lee, Pappalardo, & Neimeyer, 2022; Eisma & Tamminga, 2020; Gang, Falzarano, She, Winoker, & Prigerson, 2022; Selman et al., 2022; Tang et al., 2021)

Collectively, these findings highlight that bereavement from any cause during the pandemic may place individuals at-risk of poor mental health. Australia, up to the 19th December 2021, experienced one of the lowest rates of COVID-19 infection and deaths ($n = 2700$; World Health Organization, 2020). However, bereavement during this period occurred in the context of numerous challenges, including widespread community fear of contracting the virus and government-mandated public health measures to slow the spread of the virus. These included social distancing, home 'lockdowns', curfews, restrictions on visiting hospitals and aged care facilities, limits on gatherings including funerals, COVID-19 testing and quarantine requirements, state and national border closures, forced industry shutdowns, as well as the redirection of frontline clinical staff to other roles, such as COVID-19 testing and vaccination hubs (Basseal et al., 2023; Shergold, Broadbent, Marshall, & Varghese, 2022). Some parts of Australia experienced the longest 'lockdowns' in the world at that time (Siette et al., 2021) and rates of depression and anxiety in the general Australian community were elevated (Fisher et al., 2020, 2021). A pre-pandemic Australian study of community bereavement outcomes found that 6.4% of participants were at high-risk of PGD, and another 35.2% at moderate risk (Aoun et al., 2015). With end-of-life disruptions and additional stressors

introduced by the COVID-19 pandemic, poorer bereavement outcomes in Australia were anticipated.

The National Bereavement During COVID-19 Project ('the Project') was initiated to identify the mental health outcomes and support needs of Australians bereaved from any cause during the pandemic. The Project surveyed Australians bereaved between January 2020 and February 2022 with the objective of providing an evidence-base to inform bereavement planning and policy development in future pandemics, and to identify ongoing support needs for those bereaved during the COVID-19 pandemic. In this paper, we report the baseline findings relating to mental health outcomes and functional impairments and examine how socio-demographic and pandemic-related factors were associated with outcomes. Recognizing that co-morbidity is common in bereavement and can aid understanding of psychopathology, identification of risk factors, and intervention planning (e.g. Bonanno et al., 2007; Maccallum and Bryant, 2018; Simon et al., 2007), we undertook a latent class analysis (LCA) to group participants based on shared their symptom profiles prior to identifying risk factors (Maccallum & Bryant, 2018; Nickerson et al., 2014). We expected greater symptoms associated with death of a child or partner, death due to an accident, homicide or suicide (unexpected deaths), or where subjective preparedness for the death was lower (Doering, Barke, Vogel, Comtesse, & Rosner, 2022; Lobb et al., 2010). In terms of pandemic-related challenges, we examined how experiences before (e.g. restrictions on visiting), during (e.g. inability to be present at the death), and after the death (e.g. isolation, restrictions on funerals numbers) were related to symptom patterns. We expected that factors that impeded access to the dying person and social support after the death would be associated with worse outcomes.

Method

Participants and procedure

Adults aged 18 years or over living in Australia who had a family member or friend die from any cause between January 2020 and February 2022 were invited to participate. Inclusion criteria were: self-identifying as a carer, family member, or close friend of the decedent; the bereavement occurred at least two months previously (as stipulated by the ethics committee); adequate English to complete the survey. The survey was administered via the research electronic data capture (REDCap) platform, hosted by The University of Technology, Sydney, from April 2021 to April 2022. It was advertised on social media, newsletters of national and community organizations and bereavement support services, the Australian Funeral Directors Association, and personal networks. Most surveys were completed during two periods of social media advertising (Facebook/Instagram; 15th September to 15th October, 2021, 15th February to 15th March, 2022). The survey was accessed via a Project webpage, which presented study information and invited participants to click a hyperlink to complete an informed consent procedure. Following consent, participants proceeded to the survey via hyperlink on this webpage (see online Supplementary Figure 1 for recruitment flow chart and data exclusion information). The Survey was anonymous and designed to take around twenty minutes to complete. No incentives were offered.

The survey comprised five sections: characteristics of decedent and death (including pandemic-specific challenges); end-of-life care experiences (including two preparedness questions); formal

and informal bereavement support use; mental health and well-being outcomes (including the self-report measures described below); and participant sociodemographic details. Participants responded by choosing from the options provided, using Likert-type scales to rate severity or providing free-text responses. At the end of the survey, participants were thanked and provided with a list of bereavement supports. The study protocol was approved the University of Technology, Sydney Human Research Ethics Commitee (ETH20-5447).

Measures

Prolonged Grief Scale, Revised (PG-13-R; Prigerson, Boelen, Xu, Smith, and Maciejewski, 2021) contained ten items assessing reactions aligning with the DSM-5-TR PGD diagnostic criteria (American Psychiatric Association, 2022). Participants responded on five-point Likert scales (1 = not at all to 5 = overwhelmingly). Scores were aggregated to indicate grief severity. In their validation study, Prigerson et al. (2021) suggested that scores of 30 or greater, where at least 12 months had passed since the death, suggested probable PGD; where fewer than 12 months had passed, scores should not be interpreted as PGD, but suggest grief severity (Boelen & Lenferink, 2022). For this reason, we use the term 'grief' when referring to the total sample, and 'prolonged grief' when referring to the subsample of participants who were 12 or more months bereaved (Cronbach's α = 0.93 in this study).

Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, and Williams, 2001) is a widely used nine-item measure of depressive symptoms during the previous two weeks. Participants responded on four-point scales (0 = not at all to 3 = nearly every day). Scores were aggregated to indicate depression severity. Scores above ten suggest moderate levels of depression (Cronbach's α = 0.92 in current study).

Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, and Löwe, 2006) is a widely used seven-item scale measure of general anxiety symptoms during the previous two weeks. Participants responded on four-point scales (0 = not at all to 3 = nearly every day). Scores were aggregated to indicate anxiety severity. Scores above ten suggest moderate levels of anxiety (Cronbach's α = 0.93 in current study).

The Work and Social Adjustment Scale (WSAS; Mundt, Marks, Shear, and Greist, 2002; see also Shear et al., 2016) indexed grief-related impairment across five domains (work, household management, social leisure, private leisure, and relationships). Participants responded on nine-point scales (0 = not at all impaired, 4 = definitely impaired, 8 = very severely impaired). Scores were aggregated to indicate overall impairment (Cronbach's α = 0.93 in current study).

The EQ visual analogue scale (EQ-VAS) (The EuroQol Group, 1990) is a brief self-report tool that assesses current health-related quality of life (0 = worst imaginable health state, 100 = best imaginable health state).

Survey questions

Pandemic-specific challenges: Participants answered 'yes' or 'no' to whether they had experienced each of 13 situations resulting from COVID-19, (adapted from Harrop et al., 2021; e.g. 'because of COVID-19, I was unable to say goodbye as I would have liked').

Preparedness: Participants were asked to rate their emotional preparedness and practical preparedness on separate Likert-type scales (1 = not at all to 7 = extremely).

Subjective mental health trajectory (Aoun et al., 2015): Participants responded to the question, 'Overall, how would you describe your mental health since the death' by selecting one of the following response options: 'improved', 'stayed the same', 'got a bit worse', and 'got a lot worse'.

Data screening and analysis plan

LCA was undertaken using Mplus v.8 and full maximum likelihood estimation. Dichotomous indicators were created for each symptom item reflecting clinical cut-off recommendations. For PG-13-R items, responses of one to three were coded as symptom absent, and four to five as symptom present. For PHQ-9 and GAD-7 items, responses of zero and one were coded as 'symptom absent' and two and three as 'present.' Missing data varied across the measures (PG13-R = 3.9%; PHQ-9 = 7.6%; GAD7 = 6.3%). Pairwise deletion of missing data was adopted. Participants with more than two missing values on a measure were excluded from the LCA (n = 75; 3.9%). LCA commenced by fitting a one class model to the data, followed by models increasing by one class each time. Comparative model fit was assessed using sample-size adjusted Bayesian information criterion, Akaike's information criterion, entropy, and the Lo-Mendell-Rubin (LMR) test. Optimal model selection was based on overall model fit, class interpretability and parsimony (Nylund, Asparouhov, & Muthén, 2007). Indicator values greater than 0.60 were considered to represent a high probability the symptom was endorsed by members of that class, 0.15–0.59 a moderate probability, and below 0.15, a low probability of endorsement (Nickerson et al., 2014). One-way analysis of variance and Chi-square analyses were conducted to identify significant demographic and loss-related correlates of class membership. These variables were then entered into an iterative series of multinomial regression analyses, along with responses indexing pandemic-related challenges, to identify independent correlates of mental health class membership. The reference class was varied with each iteration to identify independent correlates for each mental health class. Given many of the sociodemographic and pandemic-specific variables were likely to be conditional on each other, we only interpret the multivariate findings.

Results

Demographic and death characteristics

The sample comprised 1911 participants (mean age of 55.18 years, s.d. = 12.11). The majority were: female (94.8%); Australian-born (79.2%); residents of a major city (66.5%); partnered (59.2%); university-educated (56.5%); and currently employed (61.1%). Mean time since the death was 10 months (s.d. = 5.89). The most common relationship to the decedent was parent (45.1%), followed by a partner (17.2%). Approximately half of deaths occurred in hospitals (52.9%). Most deaths were illness-related (67.9%). Deaths due to an accident, injury, or suicide accounted for 12.3%. Relatively few participants were bereaved due to COVID-19 (2.9%; Table 1).

Mean levels of grief, depression, anxiety, and grief impairment are presented in Table 1. Of those bereaved for at least 12 months (n = 791), 39.2% scored 30 or above on the PG-13-R (M = 26.83; s.d. = 10.24). Across the total sample, there was a small correlation between grief severity and time since the death (r = −0.05, p = 0.036) and a large correlation between grief severity and

Table 1. Participant and bereavement-related characteristics for full sample and identified latent classes

	Total	Low symptoms	Grief	Depression/ Anxiety	Grief/Depression/ Anxiety	
	%; M (s.d.)	%; M (s.d.)	%; M (s.d.)	%; M (s.d.)	%; M (s.d.)	*p*
N	1911	895 (46.8%)	330 (17.3%)	338 (17.7%)	348 (18.2%)	
Age (years)	55.18 (12.11)	56.74 (11.59)	56.23 (12.07)	53.01 (12.32)	52.41 (12.46)	**
Range	19–90	22–90	21–82	19–80	22–82	
Gender						
Female	94.8	95.5	94.0	94.7	94.0	
Male	4.7	4.2	5.7	4.6	5.1	
Use another term	0.3	0.1	0.3	0.3	0.6	
Country of origin: Australia	79.2	77.8	78.3	80.8	81.9	
Geographic location						
Major city	66.5	67.9	64.7	68.7	62.7	
Inner regional	25.3	24.7	25.0	25.4	26.9	
Outer regional/ Remote/Very remote	8.2	7.4	10.3	5.9	10.5	
Highest education						
High school or below	43.5	35.9	47.8	58.9	58.6	**
Tertiary education	56.5	64.1	52.2	41.1	41.1	
Current relationship status						
Single	13.7	10.6	15.2	18.2	15.8	**
Married/Partnered	59.2	67.0	45.7	66.5	45.2	
Separated/divorced	9.1	8.8	8.0	8.3	11.6	
Widowed	17.0	12.4	29.8	7.1	25.9	
Living in single person household	26.3	23.7	37.0	19.4	29.2	**
Employment status						
Employed	61.1	64.4	60.4	64.9	50.1	**
Looking for work	3.4	1.7	3.5	2.8	8.3	
Retired	21.8	25.1	26.9	15.4	15.0	
Other	13.7	8.9	9.2	16.9	26.5	
Relationship of deceased						
Parent	45.1	49.4	35.5	49.4	39.1	**
Partner	17.2	10.8	33.9	5.9	28.4	
Child	7.4	2.7	13.0	5.6	15.8	
Sibling	9.3	10.3	9.7	10.9	4.9	
Other family member	14.0	18.8	3.9	21.0	4.6	
Close friend/Not a family member	7.0	8.0	3.9	7.1	7.2	
Age of deceased	70.05 (21.74)	75.73 (18.12)	63.73 (23.06)	70.56 (22.3)	60.92 (37.80)	**
Cause of death						
Cancer	32.4	31.8	37.0	31.7	30.5	**
Chronic health conditions	23.2	24.9	20.3	26.0	18.7	
Sudden health event or illness	24.7	24.5	20.6	23.4	24.7	
COVID-19-related	2.9	3.7	3.0	2.7	2.9	
Accident/Injury/Suicide	12.3	8.5	15.5	11.5	19.5	
Other cause	5.2	6.6	3.6	4.7	3.7	

(Continued)

Table 1. (*Continued.*)

	Total	Low symptoms	Grief	Depression/ Anxiety	Grief/Depression/ Anxiety	
	%; M (s.d.)	%; M (s.d.)	%; M (s.d.)	%; M (s.d.)	%; M (s.d.)	*p*
Place of death						
At home	26.3	22.5	32.8	25.6	30.5	**
Specialist palliative care unit	16.9	15.7	15.2	20.2	18.1	
Emergency or Intensive care unit	14.3	13.2	16.4	12.5	17.0	
Other hospital ward	18.7	19.5	19.5	18.5	16.1	
Aged Care facility	19.4	26.3	10.0	20.5	9.5	
Other location	4.4	2.7	6.1	2.7	8.9	
Time since death	10.07 (5.89)	10.30 (5.94)	10.46 (5.83)	9.49 (5.91)	9.64 (9.62)	*
Grief severity (PG13-R)	27.51 (10.26)	20.07 (5.84)	35.30 (5.05)	25.36 (6.27)	41.78 (5.00)	**
Potential PGD$	39.2					
Grief related impairment (WSAS)	12.63 (11.21)	5.06 (5.84)	17.77 (8.39)	11.79 (8.24)	27.82 (8.27)	**
Practical preparedness for death	3.30 (2.09)	3.84 (2.08)	2.94 (2.01)	3.26 (1.96)	2.32 (1.84)	**
Emotional preparedness for death	2.72 (1.85)	3.33 (1.93)	2.21 (1.61)	2.71 (2.95)	1.66 (1.20)	**
Depression severity (PHQ-9)[+]	9.90 (7.06)	4.27 (3.01)	10.58 (3.85)	13.24 (4.77)	19.87 (4.42)	**
Moderate depression (10–14)	18.5					
Moderately severe depression (15+)	26.3					
GAD7[+]	7.40 (6.02)	2.97 (2.57)	5.97 (3.05)	11.41 (4.19)	15.84 (3.77	**
Moderate anxiety (10–14)	16.5					
Moderately severe anxiety (15+)	15.4					
Subjective health (EQ-VAS)	58.85 (20.91)	68.18 (18.05)	59.63 (17.25)	51.72 (18.081	42.21 (19.65)	
Subjective mental health since the death						
Improved	7.6	11.2	6.4	5.1	2.0	**
Stayed the same	23.9	39.2	13.7	15.2	2.9	
A bit worse	41.5	43.7	47.7	51.8	20.2	
A lot worse	26.9	5.8	32.2	28.0	74.9	

Note: PG13-R n = 1836; [+]PHQ9 and GAD categories n = 1828; 'Other family members' includes all other family relationships not listed; 'Other' cause of death includes nominated causes with small n's including 'elderly', 'natural causes' and 'unknown': Gender: 4 preferred not to answer. 'Partnered" includes partnered not living together, "Other" employment status = out of workforce for health reasons, carer role, "taking a break", and home duties. $ includes participants bereaved 12 or more months *n* = 791; *p < 0.05 **p<0.001.

grief-related impairment (WSAS $M = 12.63$, s.d. $= 11.09$; $r = 0.80$, $p < 0.001$). Impairment was not related to time since death ($p = 0.104$). Correlations between grief and depression ($r = 0.70$, $p < 0.001$) as well as grief and anxiety ($r = 0.61$, $p < 0.001$) were large. Near half (43.1%) of participants scored in the moderate or above range for depression on the PHQ-9 ($M = 9.90$, s.d. $= 7.06$) and 30.7% scored in the moderate or above range for anxiety on the GAD-7 ($M = 7.04$; s.d. $= 6.02$). Overall, 68.5% of participants reported their mental health had worsened since the death, and 31.5% considered it was the same or had improved. Current health status, as indexed by the EQ-VAS, varied among participants ($M = 58.85$, s.d. $= 20.91$).

Latent class analysis

Table 2 presents the model fit statistics for the LCA. LMR significance values accompanied by reductions in SSBIC and AIC suggested the four-class model explained more variance in the data than the three-class model, with equivalent entropy. The five-class model did not improve model fit and had reduced entropy. A four-class model was therefore selected as the optimal model. The largest class comprised participants with a low probability of most symptoms ('low symptom': 46.1%). A second class had a higher probability of many grief symptoms, moderate probability of some depression symptoms, and a low probability of anxiety symptoms ('grief': 17.6%). A third class had a lower probability of grief and higher probability of depression and anxiety symptoms ('depression/anxiety': 18.1%), and a fourth class had a high probability of most indexed symptoms ('grief/depression/anxiety': 18.3%; Figure 1). The four classes differed in terms of mean grief-related impairment ($F(31\ 775) = 817.04$, $p < 0.001$), subjective mental health since the death ($X^2(9) = 707.69$, $p < 0.001$), and current subjective health rating ($F(3,\ 1623) = 161.30$, $p < 0.001$). The grief/depression/anxiety class was the most negatively impacted on each of these variables (see Table 1). Fisher's exact tests also indicated that the classes differed across several sociodemographic characteristics and death characteristics (Table 1, see also online Supplementary Table 1). These variables were

Table 2. Goodness-of-fit statistics for 1 to 5 class solutions

Model/Class number	Loglikelihood	BIC	SS-BIC	AIC	Entropy	Vlmrt
1	−28 814.8	57 826.11	57 743.51	57 682.4		
2	−22 002	44 404.45	44 236.06	44 113.06	0.946	0.00
3	−20 716	42 036.53	41 782.37	41 599.13	0.915	0.00
4	−20 033.6	40 875.72	40 535.78	40 294.05	0.914	0.00
5	−19 718.2	40 448.85	40 023.13	39 724.71	0.89	0.37

included in the multinomial regression to identify independent class correlates.

Correlates of class membership

Results of the multinomial regressions are presented in Table 3. The first analysis identified variables that differentiated the three high-symptom classes from the low symptom group. In comparison to low-symptom class, the grief and grief/depression/anxiety classes were more likely to have had a partner or child die than a non-family member. The depression/anxiety class was more likely to have had a second-degree relative die than a non-family member. All three symptom classes were more likely than the low class to have had a parent die compared to non-family member die. They also all had lower levels of death preparedness and education. Additional correlates of the membership of the grief/depression/anxiety class included: a death at home rather than a hospital ward; less time since death; lower age of the participant; being separated or divorced; and being unemployed and looking for work or out of the workforce for reasons other than retirement. Correlates of the depression/anxiety class included: less time since death; lower age of the deceased; being single; and being out of the workforce for reasons other

than retirement. In terms of pandemic-specific challenges that differentiated the three high-symptom classes from the low-symptom class, indicating that 'COVID-19 impacted my ability to care for them as I would have liked' was a correlate for both the grief and grief/depression/anxiety classes. The experience of social isolation and loneliness differentiated all three high-symptom classes from the low-symptom class. Additionally, relative to the low-symptom class, the grief class was less likely to have been unable to say goodbye to the deceased and less likely to have had reduced contact in the last days of life.

The next iteration of the multinomial regression identified variables that differentiated the grief/depression/anxiety class from the other classes. Compared to the grief/depression/anxiety class, the other two high-symptom classes reported greater subjective preparedness for the death and were more likely to be tertiary-educated. They were also less likely to be looking for work or out of the workforce for reasons other than retirement. The grief class was also likely to have been bereaved for a longer time. The depression/anxiety class was less likely to have had a partner or child die, and more likely to have had a second-degree relative die than a non-family member. They were also less likely to be separated or divorced. In terms of pandemic-specific challenges, compared to the grief/depression/anxiety class, the grief
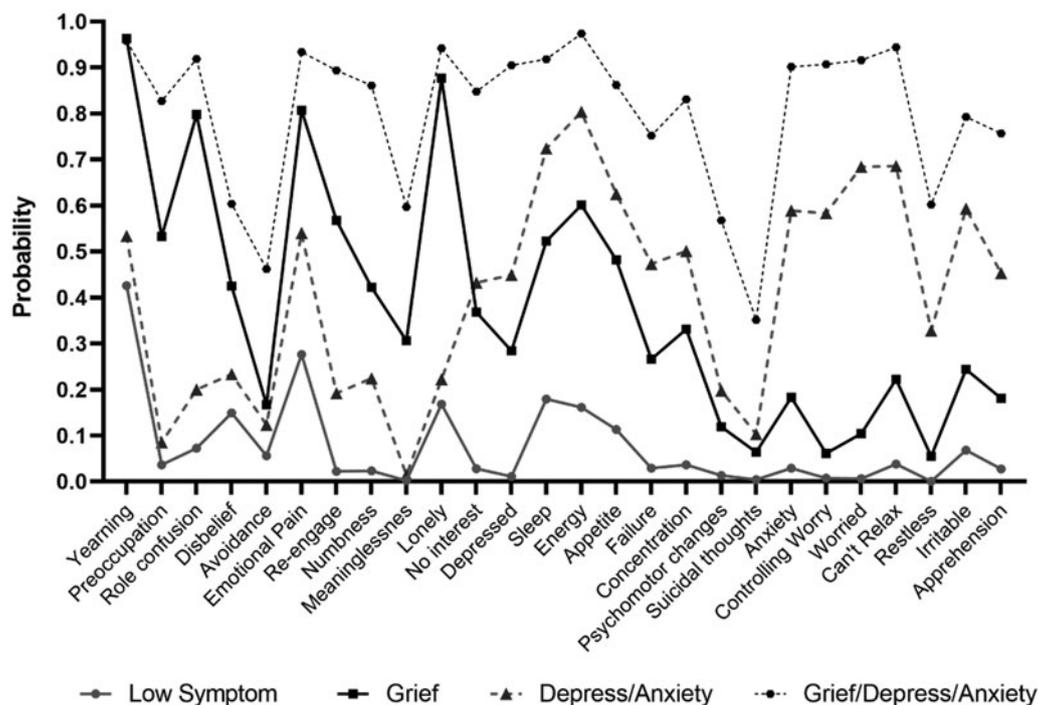

Figure 1. Estimated symptom prevalence for 4-class solution.

Table 3. Multinomial logistic regression identifying independent covariates of class membership

		Grief				Depress/Anxiety				Grief/Depress/Anxiety		
			95 CI for odds ratio				95 CI for odds ratio				95 CI for odds ratio	
	B (s.e.)	L	OR	U	B (s.e.)	L	OR	U	B (s.e.)	L	OR	U
Low class as reference class												
Participant age	−0.08 (0.13)	0.72	0.92	1.20	−0.09 (0.11)	0.74	0.91	1.12	−0.29 (0.13)	0.58	0.75	0.97
Age of deceased	−0.28 (0.17)	0.55	0.76	1.05	−0.36 (0.13)	0.54	0.70	0.89	−0.28 (0.16)	0.55	0.76	1.05
Time since death (months)	−0.02 (0.01)	0.96	0.98	1.01	−0.04 (0.01)	0.94	0.96	0.99	−0.05 (0.01)	0.93	0.96	0.98
Place of death												
Hospital: Other ward	−0.26 (0.24)	0.49	0.77	1.23	−0.14 (0.23)	0.55	0.87	1.37	−0.53 (0.26)	0.35	0.59	0.99
Relationship of deceased												
Parent	0.88 (0.43)	1.05	2.42	5.58	0.71 (0.34)	1.04	2.03	3.97	0.81 (0.40)	1.03	2.24	4.91
Partner	1.75 (0.47)	2.29	5.76	14.47	−0.04 (0.48)	0.38	0.97	2.46	1.53 (0.47)	1.85	4.62	11.54
Child	1.61 (0.50)	1.89	5.01	13.25	0.47 (0.46)	0.65	1.59	3.92	1.60 (0.47)	1.96	4.93	12.45
Other family member	−0.33 (0.49)	0.27	0.72	1.89	0.81 (0.35)	1.12	2.25	4.52	−0.79 (0.49)	0.17	0.42	1.06
Preparedness	−0.29 (0.06)	0.67	0.75	0.83	−0.16 (0.05)	0.78	0.85	0.94	−0.53 (0.06)	0.52	0.59	0.67
Current relationship status												
Single	0.29 (0.28)	0.77	1.34	2.33	0.55 (0.25)	1.07	1.73	2.83	0.47 (0.28)	0.92	1.61	2.79
Separated/divorced	0.37 (0.31)	0.79	1.45	2.65	0.02 (0.29)	0.58	1.02	1.79	0.88 (0.30)	1.34.	2.42	4.36
Tertiary education	−0.39 (0.16)	0.49	0.68	0.92	−0.40 (0.15)	0.50	0.67	0.91	−0.81 (0.17)	0.32	0.44	0.62
Employment status												
Looking for work	0.80 (0.46)	0.88	2.22	5.58	0.16 (0.49)	0.44	1.17	3.15	1.77 (0.31)	2.55	5.87	13.49
Not employed for other reasons	−0.21 (0.27)	0.48	0.81	1.38	0.50 (0.22)	1.07	1.65	2.55	1.03 (0.23)	1.78	2.80	4.40
I was unable to care for them as I would have liked	0.53 (0.18)	1.18	1.69	2.43	0.09 (0.17)	0.79	1.10	1.52	0.73 (0.20)	1.41	2.07	3.04
I was unable to say goodbye as I would have liked	−0.48 (0.24)	0.39	0.62	0.98	−0.10 (0.21)	0.60	0.90	1.36	−0.12 (0.23)	0.56	0.89	1.40
I had reduced contact with them at the end-of-life	−0.60 (0.22)	0.38	0.55	0.81	−0.22 (0.17)	0.58	0.81	1.13	−0.33 (0.20)	0.48	0.72	1.07
I experienced social isolation and loneliness	1.39 (0.19)	2.80	4.02	5.78	0.94 (0.17)	1.84	2.55	3.55	1.48 (0.20)	2.97	4.37	6.45

(*Continued*)

Table 3. (*Continued.*)

$Grief/Depression/anxiety as reference class %Grief as reference class	Grief$ B (s.e.)	95% CI for Odds Ratio L	OR	U	Depress/Anxiety$ B (s.e.)	95% CI for Odds Ratio L	OR	U	Depress/Anxiety% B (s.e.)	95% CI for Odds Ratio L	OR	U
Time since death (months)	0.03 (0.02)	1.00	1.03	1.06	0.01 (0.02)	0.98	1.01	1.04	−0.02 (0.02)	0.95	0.98	1.01
Relationship of deceased												
Partner	0.22 (0.52)	0.45	1.25	3.43	−1.57 (0.55)	0.07	0.21	0.61	−1.79 (0.56)	0.06	0.17	0.50
Child	0.02 (0.53)	0.36	1.02	2.85	−1.13 (0.51)	0.12	0.32	0.87	−1.15 (0.54)	0.11	0.32	0.91
Other family member	0.46 (0.60)	0.49	1.58	5.13	1.60 (0.51)	1.82	4.96	13.49	1.14 (0.53)	1.12	3.14	8.80
Preparedness	0.24 (0.07)	1.11	1.27	1.46	0.38 (0.07)	1.27	1.46	1.67	0.14 (0.06)	1.01	1.15	1.30
Current relationship status												
Separated/divorced	−0.51 (0.33)	0.31	0.60	1.15	−0.87 (0.34)	0.22	0.42	0.81	−0.36 (0.35)	0.35	0.70	1.40
Tertiary education	0.42 (0.18)	1.07	1.52	2.17	0.41 (0.18)	1.05	1.51	2.18	−0.01 (0.19)	0.69	0.99	1.43
Employment status												
Looking for work	−0.97 (0.41)	0.17	0.38	0.84	−1.61 (0.49)	0.08	0.20	0.53	−0.64 (0.54)	0.18	0.53	1.52
Other	−1.24 (0.27)	0.17	0.29	0.49	−0.53 (0.24)	0.37	0.59	0.95	0.71 (0.29)	1.16	2.03	3.54
I was unable to care for them as I would have liked	−0.20 (0.21)	0.54	0.81	1.23	−0.64 (0.21)	0.35	0.53	0.80	−0.44 (0.21)	0.43	0.65	0.97
I was unable to visit them before their death	0.33 (0.27)	0.81	1.35	2.37	0.65 (0.27)	1.13	1.91	3.23	0.32 (0.27)	0.82	1.38	2.33
Unable to travel to them due to border closures	0.58 (0.26)	1.08	1.78	2.93	0.35 (0.25)	0.86	1.42	2.34	−0.23 (0.24)	0.50	0.80	1.28
I experienced social isolation and loneliness	−0.08 (0.22)	0.60	0.92	1.40	−0.54 (0.22)	0.38	0.58	0.90	−0.45 (0.21)	0.42	0.64	0.96

Note: $ = grief/depression/anxiety class as reference class % = grief class as reference class; R^2 = 0.38 (Cox and Snell) 0.42 (Nagelkerke). Model = $X^2(117)$ = 811.47, p = 000; L = lower 95% CI limit, OR = odds ratio and U = upper 95% CI limit; Reference classes for covariates are: cause of death: 'traumatic/human involvement'; setting of death: home; relationship of deceased: not a family member; education level: not tertiary educated; relationship status: partnered; household: not living alone; employment: employed/self-employed; Covid-19 related variables No. Participant age and deceased age were standardised for inclusion. Due to missing data on correlates, n = 1681. See online Supplementary Table 1 and Table 2 for nonsignificant variables.

class was more likely to have experienced restricted travel. The depression/anxiety class was less likely to have been unable to care for the person as they would have liked, and less likely to have experienced social isolation and loneliness. However, they were more likely to have been unable to visit the person at all before the death.

The final iteration of the analysis identified independent correlates that differentiated the depression/anxiety class and the grief class. Compared to the grief class the depression/anxiety class was less likely to have had a partner or child die, and more likely to have had a second-degree relative die than a nonfamily member. They were also more likely to have higher mean subjective preparedness and be out of the workforce for reasons other than retirement. Finally, the depression/anxiety class was less impacted in their ability to care as they would have liked and less likely to have experienced social isolation and loneliness than the grief class.

Discussion

This study contributes to the growing body of literature examining the impacts of COVID-19 on bereavement outcomes. Significantly, our findings provide insights from a country that experienced very low rates of infection and death from COVID-19 infection during the window of the study, while simultaneously experiencing wide ranging restrictions and lockdowns. Overall, 68.5% of participants reported their mental health had worsened since the death; 31.5% considered it was the same or had improved. At an average of ten months after the death, almost 20% of participants reported concurrently high symptoms of grief, depression, and anxiety, which were accompanied by significant work and social impairments. Notably, the mean level of grief-related impairment reported by this subgroup was greater than that of treatment seeking adults in pre-pandemic studies (Shear, Frank, Houck, & Reynolds, 2005; Shear et al., 2016). Moreover, almost 40% of the participants bereaved for at least 12 months reported grief symptoms in the range suggestive of PGD (Prigerson et al., 2021). Of the full sample, 15% scored in this range, and could be considered at higher risk of developing PGD (Boelen & Lenferink, 2022). Concerningly, this is more than double the rate identified as 'high risk' by Aoun et al. (2015). Rates of clinically relevant depression and anxiety were also 10–20% higher than those reported for most locations in surveys of the general Australian population during the first year of COVID-19 (Batterham et al., 2021; Fisher et al., 2021; Stocker et al., 2021). These results are consistent with international literature showing that bereavement from any cause during the pandemic placed individuals at risk of poorer mental health (Breen et al., 2021; Downar et al., 2022; Eisma & Tamminga, 2020; Harrop et al., 2021).

Our study identified outcome correlates that differentiated all symptom classes from the low symptom class, as well as correlates that differentiated the three symptom classes from each other. Consistent with expectations, a closer kinship relationship with the deceased was associated with greater overall likelihood of membership of any symptom class. The death of a parent increased the likelihood of being in any of the three symptom classes (compared to experiencing the death of a nonfamily member) and the death of a child or partner was linked with greater likelihood of grief symptoms (with and without concurrent depression and anxiety). The relatively low number of participants bereaved due to COVID-19 was consistent with the low

rates of COVID-19 death in Australia during the survey period (Australian Bureau of Statistics, 2022). Contrary to expectation, however, cause of death was not an independent correlate of class membership. Dependence among correlates might explain this; for example, 31% of suicide deaths were of a participant's (adult) child. Similarly, subjective preparedness for the death, which is typically lower in unexpected or traumatic deaths, did differentiate between all four classes, and those with the lowest mean level of preparedness were more likely to be in the grief/depression/anxiety class. It may also be that pandemic-related challenges contributed additional burdens and stressors that increased distress for many participants (e.g. Fountoulakis et al., 2022), or produced a sense of disenfranchisement associated with bereavements not due to COVID-19 (Albuquerque, Teixeira, & Rocha, 2021). Of course, the degree to which one can be prepared for a death will be influenced by the characteristics of the death. Nonetheless, these findings have relevance for clinical practice, by suggesting that implementation of strategies to increase preparedness, such as providing relevant information on the dying processes, end-of-life care plans, grief reactions, coronial processes and timelines, and grief support services could contribute to better bereavement outcomes.

With one exception, the setting of death was not independently related to symptom class. This is perhaps surprising given that public health orders varied across settings (e.g. hospital v. home death). To account for the changing nature of health orders across settings, time, and location, participants were asked to self-report how COVID-19 impacted their end-of-life and bereavement experiences. While differences between classes were identified at a univariate level, few factors emerged as independent correlates in the multivariate analysis. An inability to care for the deceased as one would have liked was associated with grief symptoms (either alone or with concurrent depression and anxiety). Perhaps surprisingly, the grief-only class was less likely than the low-symptom class to have been unable to say goodbye and less likely to have had reduced contact in the last days of their close person's life. This may reflect differences in the extent to which some participants in the grief and low-symptom classes wished to be present at end-of-life. Anecdotal reports also indicated that in some cases, rules may have been relaxed to allow visiting of the close person in the days immediately preceding their death. Analysis of qualitative responses will assist in shedding further light on these relationships. However, the present findings suggest that when visiting must be restricted, services should ensure there are available and accessible virtual communication links with family/friends to limit the negative impact of reduced caring ability. Findings also highlight the need to provide outreach and follow-up to those who have their ability to care impacted.

Reflecting the relationship between loneliness and wellbeing (Brown, Gallagher, & Creaven, 2018; Leigh-Hunt et al., 2017; Australian Psychological Society, 2018; Wang, Mann, Lloyd-Evans, Ma, & Johnson, 2018), the experience of pandemic-related loneliness and social isolation differentiated all classes from the low symptom class, and the grief and depression/anxiety classes from the grief/depression/anxiety class. This was independent of whether or not participants lived alone and their current relationship status: Reinforcing the importance of the subjective experience of loneliness, living alone did not independently correlate with outcomes. In contrast, identifying as either single or separated/divorced was independently correlated with the two classes featuring depression and anxiety, suggesting the impacts of these

variables were due to factors beyond potential loneliness. These findings add weight to calls for a more systematic analysis of loneliness and social isolation in bereavement (Smith, Wild, & Ehlers, 2020; Vedder et al., 2021, 2022). In considering factors contributing to loneliness, the experience may have been intensified by the death of an attachment figure during a period of heightened stress related to the pandemic. Participant free text responses also implicated reduced or delayed social contact and the isolating experience of online funerals and online support. While some of these factors are not modifiable, future public health orders should actively consider the modifiable causes and impacts of isolation on those caring for the dying and the bereaved, and offer outreach services to increase avenues for social connection, including active consideration of visiting rules and travel restrictions. Further, given anecdotal reports indicating 'vulnerable' members of the population continue to self-isolate for fear of contracting COVID-19, it is important to recognize that the impacts of the pandemic on loneliness and social connection might last well into the future.

Beyond kinship relationships and pandemic-related challenges, several indices of socio-economic disadvantage also emerged as independent correlates in the sample. Overall, while rates of tertiary education were higher than the Australian population (Australian Bureau of Statistics, 2022), those without tertiary education were more likely to be members a symptom class than the low class, and also more likely to be a member of the grief/depression/anxiety class compared to the grief and the depression/anxiety classes. Being out of the workforce for reasons other reasons other than retirement (e.g. health, 'taking a break') was correlated with membership of both the depression/anxiety and grief/depression/anxiety classes compared to the low class, suggesting that unemployment might be a stronger risk factor for depression and anxiety than grief. Those in the grief/depression/anxiety class were also less likely to be actively looking for employment than the other two symptom classes. This is consistent with the higher levels of functional impairment reported by members of this group. Although the current study cannot determine the causal direction of these relationships, concurrent high symptom load and ongoing unemployment have the potential to compound difficulties.

While this study provides an important snapshot of the mental health of Australians bereaved during the pandemic several limitations to the conclusions that can be drawn from the study warrant consideration. First, the cross-sectional nature of the study prevents comment on the direction of observed relationships. In Australia, the pandemic came on the back of a prolonged drought, the 2019/2020 catastrophic east coast bushfires and significant flooding, all of which affected people's mental health (Charlson et al., 2021). To assess the direction and stability of the responses observed here, we have continued to collect data for a subsample of participants across the first 15 months of their bereavement. Second, the sample was a convenience sample, self-selected and ultimately weighted towards tertiary-educated women. Therefore, caution is needed in extrapolating findings to the population level, especially for men and people from culturally and linguistically diverse communities. Third, almost all participants were recruited online. Australia has a high rate of active smartphone and internet use (> 90%), and social media use (ABS, 2016–17; Datareportal, 2023), and so this method aided the timely collection of data from a large sample. However, people with limited digital literacy or limited access to the internet might be underrepresented. Fourth, the study relied on self-report measures to index symptoms. Therefore, caution is warranted before interpreting the findings as indicative of formal diagnostic status. It is also possible that rates of probable PGD may be elevated, compared to pre-pandemic studies, due to the restricted timeframe included in this study; this this does not reduce the significance of the reported distress and impairment, but is a factor that must be generally considered when comparing rates of PGD across different literatures. Further, we focused here on grief, depression, and anxiety as primary bereavement mental health outcomes. Future studies may benefit from including a broader range of outcome measures, for example substance use (see Lee, Neimeyer, and Breen, 2021). Finally, LCA is a data driven approach and so the extent to which socio-demographic and loss-related correlates are associated with symptom class outcomes will be impacted by the sample under investigation.

Notwithstanding these limitations, this study points to the significant mental health burdens experienced by many of those bereaved during the pandemic, while also highlighting several modifiable factors for consideration in reviewing end-of-life care and bereavement practices. At policy and service levels, bereavement care should be elevated within the health system to avoid family and friends 'falling between the cracks' and to equip a workforce to provide the necessary care to those at high risk of poorer outcomes. At the clinical level, findings advocate for clinicians to inquire about bereavement during clinical interactions, including for those presenting with depression and anxiety, to identify those experiencing chronic distress and facilitate appropriate referrals for support (Aoun et al., 2015; Aoun, Breen, White, Rumbold, & Kellehear, 2018).

Conclusion

The COVID-19 pandemic changed our ways of living, dying, and grieving. Emerging evidence suggests that the mental health impacts of the pandemic may be multidimensional and evolve over time, impacting people differentially based on personal vulnerabilities and changing contextual factors (De Berardis, Di Carlo, Di Giannantonio, & Pettorruso, 2022; Fountoulakis et al., 2022). In this study we observed high levels of grief and/or depression and anxiety were experienced in almost half of participants. Compared to those who reported few current symptoms, current grief symptoms were associated with the inability to provide care to their close person, and all symptom groups experienced more social isolation and loneliness. These findings provide important information about risk factors and bereavement outcomes to inform government, policymakers, and healthcare professionals in developing future pandemic and post-pandemic support responses that recognize the mental health, social and functional impacts to individuals, and workforce needs associated with these events (see also Basseal et al., 2023; Shergold et al., 2022). The lessons learned from COVID-19 also highlight many opportunities for improving existing end-of-life and bereavement care practices to better support this population.

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