



Research paper

Prolonged grief disorder, posttraumatic stress disorder, and depression following traffic accidents among bereaved Balinese family members: Prevalence, latent classes and cultural correlates

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A B S T R A C T

Introduction: Qualitative studies have described the rather unique styles of Balinese people to adjust to adversity. No quantitative research assessing psychopathology among bereaved individuals has been performed yet. This study estimated the prevalence of prolonged grief disorder (PGD), posttraumatic stress disorder (PTSD) and depression among bereaved individuals after traffic deaths in Bali and the relations between subgroups sharing the same symptoms and cultural, socio-demographic characteristics and posttraumatic growth (PTG).

Methods: In this cross-sectional study, 301 participants participated in questionnaire-interviews assessing PGD, PTSD, depression, PTG and cultural and socio-demographic characteristics. On average, the time since loss was 16 months. The purpose of the rituals was examined by a thematic qualitative analysis. We performed latent class analyses and subsequently calculated the odds ratios between membership of classes and characteristics with a multivariate 3step analysis.

Results: Prevalence rates of PGD (0%), PTSD (1%) and moderate depression (2%) were low. Most participants followed the bereavement rituals characteristic for Balinese culture. The purpose of these rituals was mainly the expression of caring for the deceased. We found a large resilient class (76%) and two smaller classes, one characterized by elevated PGD symptoms (11%) and one by elevated PTSD symptoms (13%). Loss of close kin was associated with membership of the PTSD class.

Conclusions: Prevalence rates of PGD, PTSD and depression in the Balinese community were remarkably low. Participants appeared to be quite homogeneous in following religious and cultural habits. Aspects of the Balinese culture might protect bereaved individuals for developing mental health issues and could be used for an informed refinement of bereavement rituals in other cultures.

1. Introduction

The island of Bali (Indonesia) has attracted numerous Western anthropologists and other scientists for its colorful rituals around loss and bereavement (Geertz, 1966; Mead, 1955; Wikan, 1990). Bali has often been considered a paradise in which negative emotions are hardly expressed or even not experienced (Bateson and Mead, 1942). Some authors have argued that Balinese people are a world-wide exception: they do not cry at deaths, as was found in a comprehensive cross-cultural comparison of grief and mourning in 73 cultures (Rosenblatt, 1975, 2008). Others have argued that sadness and grief are experienced, but that public displays of emotions are considered culturally inappropriate and that Balinese people have strong mechanisms for handling

emotional feelings internally (Wikan, 1988, 1990).

Balinese ceremonies after the death of a loved one are traditionally embedded in the religion of Hinduism. Strong positive beliefs about death and afterlife (e.g., reincarnation, karma) are important aspects of Hinduism. Although ceremonies vary between the island regions and social casts, they show the following sequence in time: washing and embalming of the body, preservation of the body (in the house or buried), public ceremony of cremation ('ngaben'), scattering of the ashes in the sea, collecting the 'soul' and bringing it to different temples (including the family temple 'ma-ajarajar'), and, finally, re-cremation/purification from up to 12 days to several years after the last ceremony.

Recently, the amount of modern traffic has increased rapidly in Bali which resulted in an increasing number of traffic accidents and deaths.

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In 2010, 2012, and 2013, the police registered around 2166 to 3000 traffic incidents and between 578 and 601 deaths each year in a population of approximately 3,5 million people. In comparison, in the same years in the Netherlands, the number of deaths varied between 570 and 640 in a population of approximately 16,5 million people (SWOV, 2018). This means that, annually, thousands of Balinese people lose a family member due to traffic accidents.

The world-wide prevalence of posttraumatic stress disorder (PTSD) following traffic accidents has been estimated around 22% (Lin et al., 2018). Regarding low- and middle-income countries, prevalence rates of 23% among Ethiopian survivors of road traffic accidents (Yohannes et al., 2018) and 30% among Iranian victims (Khodadadi-Hassankiadeh et al., 2017) have been reported. Bereavement due to traffic incidents may also precipitate the development of other disorders, including prolonged grief disorder (PGD) and depression (Boelen and van den Bout, 2005; Bonanno and Kaltman, 2001; Djelantik et al., 2017; Kristensen et al., 2012). The world-wide prevalence of PGD after unnatural losses is very high, approximately 49% (Djelantik et al., 2020; Kokou-Kpolou et al., 2020). In other Asian developing countries prevalence rates of 75% or 88% were found (He et al., 2014; Stammel et al., 2013; Xu, Herrman et al., 2014). In a study in the United States the prevalence of depression two months after the death of a partner was 20% and decreased to around 14% at seven, thirteen and twenty-five months (Zisook et al., 1997).

The distinctiveness and co-occurrence of symptoms of PGD, PTSD, and depression have been studied in different samples, including European, Australian, and displaced communities (Djelantik et al., 2017; Maccallum and Bryant, 2019; Nickerson et al., 2014). In these studies, latent class analyses (LCA) consequently resulted in the identification of distinct subgroups (or classes) of bereaved people: a resilient class, a class with only PGD symptoms and a class with combined psychopathology.

Quantitative studies of mental health issues following traumatic events or traffic incidents in Bali are scarce. Following the disastrous Bali Bombings in 2002, to our knowledge, only one study examined mental health difficulties of Balinese participants. In that study, 2000 Balinese children (8-18 years old) were screened for PTSD symptoms. The prevalence of probable PTSD was 10%, six weeks after the event (Lesmana et al., 2009).

1.1. Study objectives

Our exploratory mixed method study had three objectives. First, we were interested whether the prevalence rates and symptoms among Balinese bereaved people are similar or lower in comparison to those observed in other populations. Hypothetically, due to the Balinese ways of regulating emotions, the prevalence rates of PGD, PTSD, and depression could be expected to be lower among Balinese people, compared to other populations.

Secondly, we investigated socio-demographic and cultural characteristics known to be associated with loss-related psychopathology such as loss of close kin, level of education and cultural factors (Djelantik et al., 2017). We considered that posttraumatic growth (PTG) was also relevant here, as it refers to the notion that a traumatic experience may help to value one's life more, because one has been confronted with the transience of life (Splevins et al., 2010). Anthropological research has suggested that the Balinese culture might be strong in focusing on positive notions about life and death because of beliefs in karma and reincarnation (Wikan, 1990).

Thirdly, we investigated whether, in Bali, the same symptomatic classes can be distinguished as in other studies using the technique of LCA (i.e., a resilient, a PGD only, and a combined PGD/PTSD class). Additionally, we explored the associations between class membership and socio-demographic and cultural characteristics. We expected that loss of close kin and low level of education would be associated with membership of more severely disturbed classes. Considering the

supportive impact of ceremonies of the Balinese religion, engagement in such ceremonies was expected to be associated with membership of the more resilient class. Furthermore, we explored the association between the classes and PTG. There is rather paradoxical evidence from Western samples that stronger growth is associated with more posttraumatic and bereavement related distress (e.g., Eisma et al., 2019, Sleijpen et al., 2017). Accordingly, it could be expected that stronger growth in our sample would be reported by people in either the more resilient or more disturbed classes.

2. Methods

2.1. Design and procedure

Because of the lack of quantitative studies on the one hand and the supposedly special way the Balinese cope with bereavement on the other hand, a mixed methods approach was chosen, to obtain both qualitative (meaning) and quantitative (frequency) data (Erzberger and Kelle, 2003). A cross-sectional study was conducted across the island, supervised by the first author (a Dutch psychiatrist and researcher and descendant of Balinese migrants) and the second author (a Balinese public health medical doctor and researcher). They followed the STROBE guidelines (Vandenbroucke et al., 2007). Information about names and addresses of bereaved families was gathered from a list from the insurance company specialized in traffic accidents (i.e., Jasa Raharja). Trained members of the Faculty of Medicine of Udayana University (a counterpart trusted by the Balinese community) contacted the participants by phone and when the participant agreed to participate, visited the participant to conduct the interview.

2.2. Participant recruitment

Eligible respondents were adult inhabitants of Bali who lost close kin due to traffic accidents in the three years before the survey. Furthermore, the participant needed to be proficient in Bahasa Indonesia.

A total of 417 traffic accidents were reported at the insurance company list, including 319 deaths. Eighteen descriptions of these cases did not include an address or phone number of the family. The families of 150 deceased persons lived in an area which could not be accessed by vehicles or the head of the village could not explain the interviewers how to reach the family or address. The families of 43 deceased persons were not present at the address or were not willing to participate. In the case of 108 case descriptions, the families could be reached; they were willing to participate. The interviews of the participants took place in August and September 2017. The final sample consists of 301 participants, from 103 different families.

2.3. Ethics statement

Ethical permission for the study was provided by the Udayana University in Bali. The study was conducted according to the ethical provisions of the Declaration of Helsinki for medical research involving human subjects. The respondents received an information letter about the study and gave written consent prior to the commencement of the interviews. Interviews were conducted in a private location or within the home of the participant, depending on their preference.

2.4. Field personnel training

Alumni of the Faculty of Medicine of the Udayana University (from the Medicine, Public Health, Psychology and Nursing Programs) were selected on the basis of their competence and commitment to the project. They received a three-day training giving by MD, AP and other medical doctors who were part of the research unit of the department of Public Health, Udayana University. The training was focused on general research skills, information about mental health issues which could be

present in bereaved individuals, familiarity with the research protocol, and practicing the administration of the questionnaires. Eventually, four alumni were hired as research assistants. Interrater-reliability was supervised and assessed by AP (Udayana University). Each newly trained research assistant needed to administer at least two interviews with a respondent, side to side with another research assistant. The interrater-agreement of these interviews was good (couple 1: 93%, couple 2: 95%).

Questionnaires completed during the interviews were checked for errors by AP. She was also the contact person in case the research assistants needed consultation. Furthermore, a Balinese psychiatrist and researcher (CL) and MD could be consulted in case she needed extra consultation. All completed questionnaires were entered into an electronic database by the research assistants and cross-checked by AP. In the Netherlands the database was once again checked for missing data and unusual values by MD.

2.5. Measures

Assessment modules preparation. The questionnaires for assessing PGD, PTSD and PTG were translated from English into Bahasa Indonesia with a forward translation by a bilingual public health medical doctor and a backward translation by another independent bilingual public health medical doctor. The translation of the depression questionnaire (QIDS) was derived from a previous study conducted in Jakarta (Arjadi et al., 2017). After this, the translated questionnaires underwent a critical review process focusing on the comprehensibility, relevance and cultural appropriateness consisting of a consultation with CL and two focus groups including the research assistants, public health staff, AP and MD (one before and one after the pilot of 20 administered interviews and three in-depth interviews).

Traumatic Grief Inventory Self-Report (TGI-SR). The Traumatic Grief Inventory Self-Report (TGI-SR) taps into putative markers of disturbed grief as put forth in DSM-5 (American Psychiatric Association, 2013) and proposed by Prigerson et al. (2009). It consists of 18 grief items rated on a 5-point scales (Boelen et al., 2018; Boelen and Smid, 2017). Cronbach's alpha in this sample was .88.

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5). The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) is a commonly used self-report questionnaire to examine PTSD symptoms. It consists of 20 items that can be rated on a 5-point Likert scale to measure the severity of the PTSD symptoms (Blevins et al., 2015). Cronbach's alpha was .87.

Quick Inventory of Depressive Symptomatology Self Report (QIDS-SR). The Quick Inventory of Depressive Symptomatology (QIDS-SR) is a 16-item questionnaire available in a self-rating format (Rush et al., 2003). This questionnaire includes a subset of questions of the Indonesian Inventory of Depressive Symptomatology Self Report (IDS-SR) which is known to have good validity and reliability in a sample of Javanese participants (Arjadi et al., 2017). The items are scored in a 4-point Likert scale. Cronbach's alpha was .66.

Post-Traumatic Growth Inventory – Short Form (PTGI-SF). With the Balinese researchers (see the above-mentioned assessment preparation), it was decided to use the Post-Traumatic Growth Inventory-SF as the items mirrored the Balinese vision of adjustment after difficult situations in life. The PTG-SF includes 10 items, scored on a 6-point Likert scale, covering five factors (i.e., 1) New possibilities, 2) Relating to others, 3) Personal strength, 4) Spiritual change, and 5) Appreciation of life) associated with a significant positive change following challenging life circumstances (Cann et al., 2010). Cronbach's alpha was .92.

Socio-demographic and loss characteristics. In close discussion between the authors (see the section on assessment modules preparation), questions were formulated assessing a wide range of socio-demographic and loss-related characteristics including the loss of close kin and level of education (Djelantik et al., 2017).

Cultural and ceremonial characteristics. The questionnaire about the cultural and ceremonial characteristics was developed as described

in the section assessment modules preparation. Following the death of a loved one, numerous rituals are usually performed in Bali, varying among castes and regions. In discussion with the Balinese researchers, we decided to ask about the purpose of the funeral ceremony using the following open question: 'What was the purpose of the ceremony for the deceased?'

2.6. Statistical and qualitative analyses

All our analyses were exploratory.

Aim 1. We estimated the probable prevalence rates of PGD, PTSD and depression using established algorithms or cutoff scores of each questionnaire. We counted the number of people meeting criteria for PGD by treating each item rated as 4="frequently" or 5="always" as a symptom endorsed and then follow Prigerson et al.'s (2009) diagnostic rule which requires endorsement of (i) the Criterion B item (item 3), (ii) ≥ 5 Criterion C items (items 4-12), and (iii) the Criterion E item (item 13) (Boelen & Smid, 2017). For PTSD, we used a sum score of >32 (Blevins et al., 2015). For depression, we used the scoring model of the QIDS-SR for mild and moderate depression (Rush et al., 2003).

Aim 2. The analysis of the open question 'What was the purpose of the ceremony for the deceased?' was predominantly thematic. We made a synthesis of the answers in separate categories, by exploring similarities and differences across the individual answers (as assessed by MD and RK). We discussed our final descriptions of these categories until we reached consensus (MD, PB, RK). Next, we repeated this process to find overarching themes. The interrater-agreement for these analyses was excellent (MD and RK: 95%). We discussed our results with the Balinese researchers (AP and CL).

Aim 3. LCA was used to identify classes of individuals with similar endorsements of PGD, PTSD and depression symptoms. This was carried out in Mplus version 8 (Muthén and Muthén, 1998-2017). We could only examine a subset of core symptoms of PGD, PTSD and depression to keep the number of estimated parameters in proportion to our sample size. We used the 10 TGI-SR items representing the PGD criteria according to Prigerson et al. (2009), a subset of 6 items corresponding to the symptoms from each of the DSM-IV symptom clusters for PTSD (Lang and Stein, 2005) and 10 symptoms resembling the criteria for MDD as defined in DSM-5 (American Psychiatric Association, 2013).

First, conform earlier LCA studies (Djelantik et al., 2019; Maccallum and Bryant, 2019; Nickerson et al., 2014), items were dichotomized with the highest three-values (in case of the PGD and PTSD items) and the highest two-values (in case of the MDD items) signifying endorsement. We used the following indices to find the optimal number of classes: Sample-Size Adjusted Bayesian Information Criterion (SS-BIC), Akaike's Information Criterion (AIC), entropy and VLRT. Lower BIC and AIC values and higher entropy values indicate better fit.

Lastly, we examined the associations of correlates with class membership. For this analysis, we dichotomized all categorical predictors. For each category of aim 2, we made a dummy variable with 1 referring to this purpose being mentioned by the individual and 0 referring to this purpose not being mentioned. For loss of close kin, 1 refers to a loss of a child or partner; for high education, 1 refers to the participant having been to college or university. We conducted the 3step method which includes a multinomial regression and enables the user to conduct all analyses at once in one model without the LCA losing its formation and meaning due to the influence of the covariates. We used complex modeling to generate a model for the entire population while taking into account the possible non-independence between family members (Asparouhov and Muthén, 2014; Zhu et al., 2017).

3. Results

3.1. Descriptives and prevalence rates of PGD, PTSD, and depression in Bali

Socio-demographic and cultural characteristics are presented in Table 1. There were 129 female participants (43%). Mean age was 44.2 (SD = 15.2) years; 59 participants had a high level of education. The loss happened on average 16 months ago (SD = 6.8); 148 (49%) participants lost their spouse or child and only nine participants (3%) witnessed the accident.

None of the participants was found to suffer from a probable diagnosis of PGD (as per Prigerson et al., 2009). Only 1% of the participants scored above the diagnostic cut-off point for PTSD; 21% of the participants would be considered mildly to moderately depressed. Of the participants 2% met criteria for at least one diagnosis of PGD, PTSD or moderate depression.

Table 1
Characteristics of the sample.

	Participants (N = 301)
<i>Socio demographic characteristics</i>	
Female gender, n (%)	129 (43)
Age, M (SD)	44.2 (15.2)
High level of education, n (%)	59 (20)
<i>Trauma and Loss-related characteristics</i>	
Loss of partner/child, n (%)	148 (49)
Relationship in more detail, n (%)	
• Father	52 (17)
• Mother	45 (15)
• Child	89 (30)
• Partner	59 (20)
• Sibling	45 (15)
• Grandchild	4 (1)
• Brother-in-law	3 (1)
• Nephew	1 (0)
• Son-in-law	2 (1)
Being a witness of the accident, n (%)	9 (3)
Time since loss in months, M (SD)	16 (6.8)
<i>Cultural characteristics (qualitatively assessed)</i>	
Purification, n (%)	87 (29)
Calming, n (%)	118 (39)
Helping to enter heaven, n (%)	72 (24)
Unite with the soil, n (%)	9 (3)
Reincarnation, n (%)	10 (3)
Obligatory, n (%)	5 (2)
Performing rituals according to the culture/religion, n (%)	300 (100)
Hindu religion, n (%)	286 (95)
<i>Posttraumatic growth</i>	
PTGI-SF sum score mean (SD)	18.2 (6.4)
<i>Questionnaires characteristics</i>	
TGI total score mean (SD)	13.57 (0.46)
People scoring above cut-off point for PCBD	0 (0)
People scoring above cut-off point for PGD	0 (0)
PCL-5 total score, mean (SD)	7.02 (0.38)
People scoring above cut-off point for PTSD	4 (1)
QIDS-SR (corrected) total score mean (SD)	3.1 (0)
People scoring below cut-off point for no depression, n (%)	239 (79)
People scoring above cut-off point for mild depression, n (%)	57 (19)
People scoring above cut-off point for moderate depression, n (%)	5 (2)
People scoring above cut-off point for severe depression, n (%)	0 (0)
People scoring above cut-off point for very severe depression, n (%)	0 (0)

Note. PCBD = Persistent complex bereavement disorder; PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5; PGD = Prolonged grief disorder; PTSD = Posttraumatic stress disorder; PTGI-SF = Posttraumatic Growth Inventory–Short Form; TGI = Traumatic Grief Inventory; QIDS-SR; Quick Inventory of Depressive Symptomatology Self Report.

3.2. Religious and cultural characteristics

In our sample, almost all (i.e. 95%) participants endorsed that they were Hindu and that they performed rituals according to their culture/religion. The PTGI-SF mean score was 18.2 (SD = 6.4), which is moderate compared to Korean victims of various kinds of (traffic) accidents or crimes (M = 19.2, SD = 12.3; Lee, Yu, and Kim (2020)). In the qualitative analyses, two overarching themes and six categories were found. Themes and categories are described below. The categories were included in the database.

3.2.1. Theme 1. Caring for the deceased

Purification of the spirit of the deceased. According to Hindu belief, the atman is considered as the heavenly part of the spirit. During life, this atman is covered by human ego. Before the atman can be reunited with heaven or God, the human ego needs to be cleaned off. This motive for the rituals was mentioned 87 times (29%).

Calming the spirit of the deceased. In Bali, it is believed that the spirit (atman) of the deceased is confused after the death. To prevent the spirit from going around and haunting, the spirit needs to be calmed down by rituals. There were 118 participants (39%) for whom this was the main motive for doing the rituals.

Helping the deceased to reach or enter heaven. After calming and purifying the atman, rituals are needed to guide the spirit to heaven in three stages. In the first stage, the spirit is separated from the body and stays in the house of the family. In the second stage, the spirit goes to the family temple. Finally, during a large ceremony, the spirit is united with God. This was the main motive for 72 participants (24%).

Uniting the body with the soil. Once atman has left the body, the body is cremated and scattered in the sea to be part of the earth again. This was mentioned 9 times (3%).

Reincarnation. After the atman is reunited with God, reincarnation will occur by giving atman to a newborn baby (n = 10; 3%).

3.2.2. Theme 2. Obligation (adat)

Five participants (2%) mentioned that the main motive for the rituals was that it is obligatory because of their culture.

3.3. Latent class analysis

The symptoms ‘feeling distant or cut-off from people’ (PGD), ‘negative view of myself’ and ‘suicidal thoughts’ (depression) were not endorsed at all. These items had to be excluded in the LCA (items in an LCA need variation). Nevertheless, we reported them in the LCA graph in Fig. 1 with a probability of 0 in each class. Both the two-class and three-class solution had good fit indices, but the three-class solution yielded the best fit and interpretability of the classes (i.e., classes with high and low probabilities of the symptoms: Fig. 1 shows a visual graph of the three-class solution, Table 2 shows the latent class models and fit-indices, and Supplementary Materials A shows a visual graph of the two-class solution).

We considered a value of >.6 as a high probability and a value between .2 and .6 as a moderate probability of symptom endorsement (Maccallum and Bryant, 2019; Nickerson et al., 2014). The three-class solution consisted of: 1. A class of participants with prominent PGD symptoms of ‘yearning’ and ‘feeling stunned’ and moderate PGD symptoms of ‘difficulty accepting the loss’, ‘avoidance of reminders of the loss’, ‘emotional numbness’, ‘feeling life is meaningless’, ‘feeling shocked’, and the PTSD symptom ‘recurrent memories of the event’ (PGD class 1, 11%), 2. A class of participants with the prominent PTSD symptoms ‘repeating and disturbing memories of the event’ and ‘feeling very upset when being reminded of the event’ symptoms (PTSD class 2, 13%), and 3. A class of patients with no prominent or moderate PGD, PTSD, and depression symptoms (resilient class 3, 76%) (Fig. 1 and Table 3).

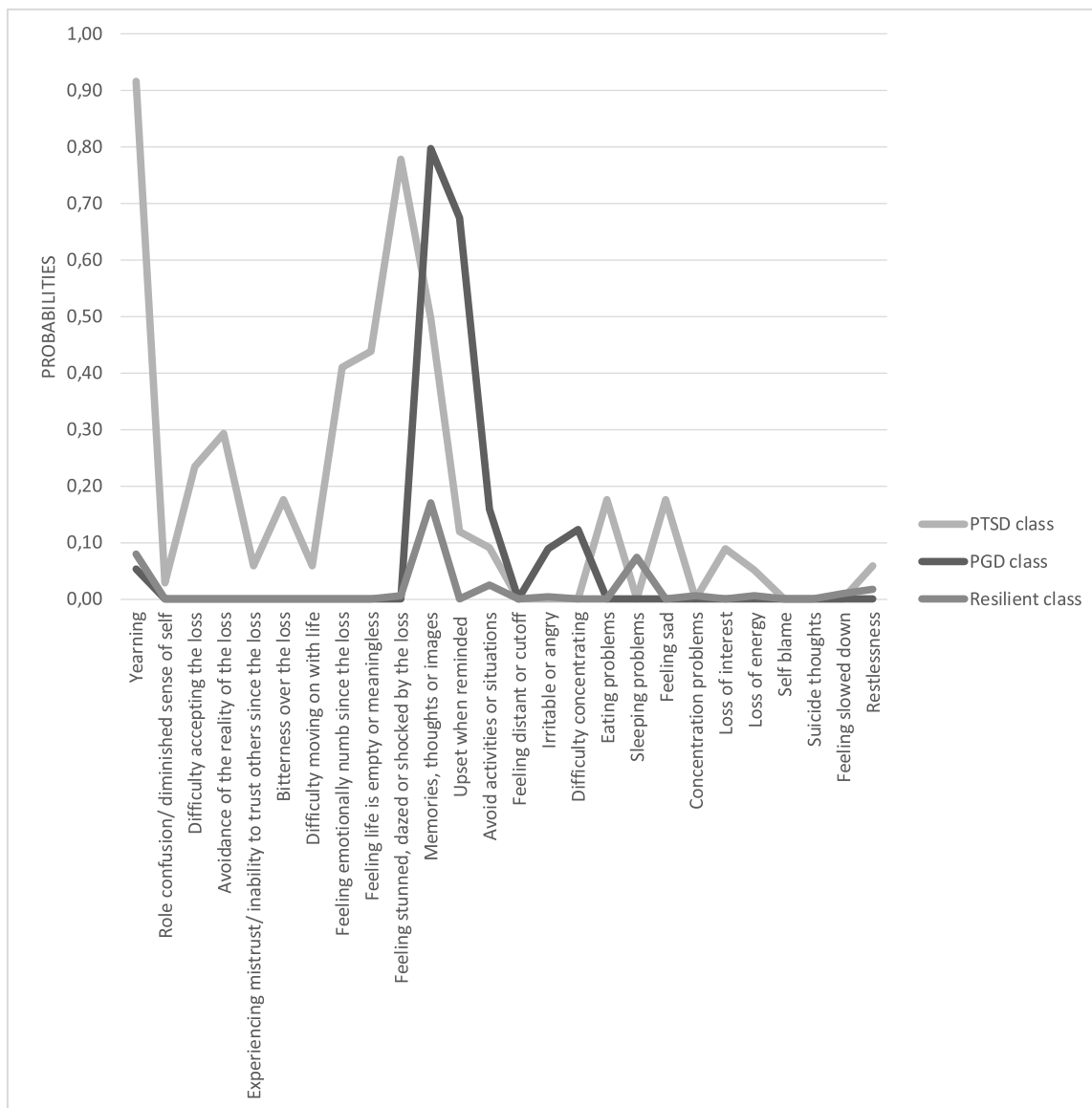


Fig. 1. Visual graph of the three-class solution.

Table 2
Latent class models and fit-indices.

Model tested	Loglikelihood	AIC	BIC	SS – BIC	Entropy	VLMRT	Lowest sample size
1 class	-1106.150	2258.301	2343.564	2270.62			301
2 class	-905.412	1904.824	2079.059	1930.001	0.978	0.0000	34
3 class	-862.979	1867.957	2131.162	1905.991	0.873	0.0075	34
4 class	-838.254	1866.507	2218.683	1917.397	0.862	0.4198	18

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; SS-BIC = Sample-Size Adjusted BIC; VLMRT = Vuong-Lo-Mendell-Rubin test.

3.4. Loss-related, socio-demographic, PTG and cultural correlates of class membership

Finally, we examined if class-membership varied as a function of loss of close kin, high level of education, the PTGI-SF sum score and ceremonial purposes. Because of low variance, the categories ‘unite with the soil’, ‘reincarnation’ and/or ‘obligatory’ had to be excluded from the 3step procedure. There were no significant associations between the correlates and class membership of the PGD class compared to the resilient class. In the PTSD class, bereaved individuals were more likely to have lost a partner or a child compared to the resilient class (Table 4).

4. Discussion

This study shows that, among bereaved Balinese individuals, a probable diagnosis of PGD, PTSD or depression following the accidental death of a loved one by a traffic accident is relatively rare. Almost the complete sample reported to be Hindu and followed characteristic Balinese cultural traditions after a loss. One overarching theme in the purposes of rituals was identified, namely, ‘caring for the deceased’. There were three classes of bereaved individuals sharing the same mental health symptoms, namely a so-termed resilient class, a PGD class and a PTSD class. Loss of a child and/or partner was found to be

Table 3
Probabilities for the symptoms for each class.

Symptom names	Overall symptom frequency	PGD class (11%)	PTSD class (13%)	Resilient class (76%)
	%	Probability	SE	Probability SE
TGI-SR PGD items <i>Prigerson et al. 2009</i>				
Yearning	17	0.916	0.051	0.053 0.052 0.079
Role confusion/ diminished sense of self	0	0.029	0.029	0 0 0
Difficulty accepting the loss	3	0.234	0.054	0 0 0
Avoidance of the reality of the loss	3	0.293	0.090	0 0 0
Experiencing mistrust/ inability to trust others since the loss	1	0.059	0.039	0 0 0
Bitterness over the loss	2	0.176	0.057	0 0 0
Difficulty moving on with life	1	0.059	0.039	0 0 0
Feeling emotionally numb since the loss	5	0.41	0.121	0 0 0
Feeling life is empty or meaningless	5	0.439	0.105	0 0 0
Feeling stunned, dazed or shocked by the loss	9	0.779	0.074	0 0.006 0.008
PCL-5 PTSD checklist items <i>Lang et al. 2005</i>				
Memories, thoughts or images	31	0.498	0.114	0.798 0.074 0.17 0.066
Upset when reminded	12	0.119	0.067	0.674 0.251 0 0
Avoid activities or situations	5	0.091	0.064	0.158 0.069 0.024 0.018
Feeling distant or cutoff	0	0	0	0 0 0 0
Irritable or angry	2	0	0	0.088 0.064 0.003 0.004
Difficulty concentrating	2	0	0	0.123 0.077 0 0
QIDS-SR Depression criteria items <i>Blevins et al. 2015</i>				
Eating problems	2	0.176	0.073	0 0 0 0.000
Sleeping problems	5	0	0.000	0 0.073 0.025
Feeling sad	2	0.176	0.062	0 0 0 0.000
Concentration problems	0	0	0.000	0 0 0.005 0.005
Loss of interest	1	0.088	0.044	0 0 0 0.000
Loss of energy	1	0.051	0.043	0 0 0.006 0.007
Self blame	0	0	0	0 0 0 0
Suicide thoughts	0	0	0	0 0 0 0
Feeling slowed down	1	0	0.000	0 0 0.009 0.007
Restlessness	2	0.059	0.041	0 0 0.018 0.009

Note. PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5; PGD = Prolonged grief disorder; PTSD = Posttraumatic stress disorder; TGI-SR = Traumatic Grief Inventory – Self Report; QIDS-SR; Quick Inventory of Depressive Symptomatology Self Report.

Table 4
Multivariate parameter estimates for the latent class model.

	Class resilient 3 vs Class 1 PGD						Class resilient 3 vs PTSD class 2					
	β	SE	p	Lower Bound	Upper bound	Exp(B)	β	SE	p	Lower Bound	Upper bound	Exp(B)
Purification	0.60	1.19	.62	-1.73	2.93	1.82	0.56	0.93	.55	-1.27	2.38	1.75
Calming	0.44	1.14	.70	-1.80	2.68	1.55	0.53	0.89	.55	-1.22	2.29	1.71
Helping to enter heaven	0.12	1.21	.92	-2.24	2.49	1.13	1.06	0.91	.24	-0.71	2.84	2.90
PTGI-SF sum score	-0.01	0.05	.86	-0.10	0.08	0.99	0.00	0.03	.96	-0.05	0.05	1.00
Loss of close kin	-0.05	0.40	.91	-0.82	0.73	0.96	1.21	0.45	.01	0.32	2.10	3.34
High level of education	-0.26	0.57	.65	-1.38	0.87	0.77	-0.51	0.59	.39	-1.66	0.65	0.60

Note. β = Beta coefficient; CI = Confidence Interval; p = p-value; PGD = Prolonged grief disorder; PTSD = Posttraumatic stress disorder; SE = Standard Error.

correlated with membership of the PTSD class.

4.1. Prevalence rates of PGD, PTSD, and depression in the Balinese community

The low prevalence rates of PGD (0%), PTSD (1%) and moderate depression (2%) confirm our first hypothesis, namely that in comparison with findings in other societies (i.e., world-wide prevalence of PTSD after traffic incidents: 22% (Lin et al., 2018); world-wide prevalence of PGD after unnatural losses: 49% (Djelantik et al., 2020)), Balinese bereaved individuals tend to have a lower prevalence of psychopathology following a loss of a loved one by a traffic accident. However, regarding PTSD, in most prevalence studies, participants were involved in the traffic accident themselves. In our sample, we focused on bereaved family members and most of them were not a witness of the accident. The PTSD prevalence of family members who were no

witnesses may be lower in other countries too.

As for our low psychopathology figures, it could of course be possible that Balinese people will develop more other mental disorders. However, there is no evidence for this, although epidemiological data for Bali specifically are very scarce. The suicide rate in Bali is around 4.5 per 100.000 inhabitants, which is lower compared to other countries, such as Malaysia (6.2) and the Netherlands (9.6) (Kurihara et al., 2009). Median lifetime prevalence for schizophrenia in Indonesia is 4.0 per 1,000 persons. Around the world, prevalence rates are higher in developed countries compared with Low- and Middle-Income Countries, such as Indonesia (McGrath et al., 2008). However, the impact of schizophrenia tends to be higher in LMIC's. The DALY (Disability-adjusted life years) rate of schizophrenia in Indonesia is rather high, probably due to the different availability of medical treatment (Mathers, 2008). Finally, the overall depression prevalence of 3,7% in Indonesia is higher than the rate in our study in Bali among bereaved individuals, although still

rather low compared with other countries worldwide (WHO, 2017).

Interestingly, the symptoms ‘feeling distant or cut-off from people’, ‘negative view of myself’ and ‘suicidal ideations’ had no positive endorsement at all. In a study of a western sample of patients confronted with loss and trauma, symptoms connected to social isolation and diminished sense of self were important symptoms connecting networks of PGD, PTSD, and depression symptoms (Djelantik et al., 2019). It is possible that, because of the Balinese cultural rituals and notions, bereaved individuals are not likely to endorse these negative emotions which, in turn, protects them for developing more psychopathology.

Overall, our results confirm earlier findings from qualitative research that Balinese people may have strong coping strategies for bereavement-related psychological issues (Rosenblatt, 1975; Wikan, 1988, 1990). Remarkably, our findings are in line with the well-known description of Balinese culture by Bateson and Mead (1942) as a culture in which strong negative emotions seem not to exist or at least are not shown. Balinese may not respond to the world emotionally but rather contained or dissociated. This provocative hypothesis has led to a long-term debate in cultural anthropology. Critical authors (Jennaway, 2002) have emphasized that the experience of emotions among Balinese may be profound while historians have stressed that Bali is not (only) the island of paradise as often mentioned, but a society that has struggled with violence, war and terror, just like almost any other region in the world (Robinson, 1995).

4.2. Religious and cultural characteristics

Nearly all participants reported to perform the Hindu rituals; this indicates that, although modern times have arrived in Bali and tourism is omnipresent at the island, people keep their traditions very much alive. Most people carried out the rituals with a purpose to care for their deceaseds. Rituals have been described as cultural devices that provide ways to comprehend the complex and contradictory aspects of human existence (Turner, 1969). Funeral rituals in particular may include both affirmative and meaning making aspects for the bereaved and may serve as a transitional phase for the deceased to go from life to death and for the bereaved to go to a new status as a bereaved person in its community (Fulton, 1988; Pine, 1989). Several authors, e.g., Romanoff (1998), have argued that in the contemporary way of performing funerals in the western world, these ritual purposes have been deteriorated, which might have resulted in more pathological grieving symptoms in bereaved individuals (cf. Mitima-Verloop et al., 2019). In our study in Bali, the transition of the deceased from life to death appeared to be the most central purpose for the rituals. This purpose may play a role in the low prevalence of reported psychopathology. Another possible mechanism could be that organizing these extensive funeral rituals enhanced social support, which is a widely found to be correlated with positive outcomes in mental health following adverse events (Drogendijk et al., 2011; Maercker and Horn, 2013). As avoidance of painful emotions is commonly seen in bereaved individuals with mental health problems (Boelen and van den Bout, 2010), performing multiple and repetitive rituals over years may help in breaking through this avoidance and could provide time to integrate the loss in autobiographic memory. A third explanation could be that effects are moderated by spirituality in general (i.e., spiritual people might be less affected by complicated grief, irrespective of the specific ritual). This relationship has been examined in several studies, but results are inconclusive (Becker et al., 2007). Yet, these insights could inform modern psychotherapy to address elements like performing rituals, even though the loved one has died a few years ago, and to discuss the focus on caring for the deceased.

4.3. Classes of bereaved individuals and correlates of class membership

Based on symptom-levels, we identified three classes or classes of bereaved individuals: a large resilient class (73%) and two smaller classes, one characterized by PGD symptoms (11%) and another by

PTSD symptoms (13%) respectively. No class characterized by depression symptoms was found. These classes of co-occurring symptoms are roughly similar to the classes found in other bereaved populations (Djelantik et al., 2017; Maccallum and Bryant, 2019; Nickerson et al., 2014). However, as we hypothesized, the resilient class was much larger compared to the other groups, which is in line with the low indications for clinically relevant PGD, PTSD and depression diagnoses.

Lastly, loss of a child and/or partner was found to be correlated with the PTSD class when considering all other characteristics. This is in line with prior evidence that losing a child and/or partner is one of the strongest predictors for psychopathology following bereavement (Heeke et al., 2019; Wijngaards-De Meij et al., 2007).

We assessed posttraumatic growth based on the view that a traumatic experience might help to value one’s life after been confronted with the transiency of life. Interestingly, we did not find that the PTGI-SF sum score was associated with class membership. Research has shown that individuals adapt to an adverse event in heterogeneous ways and that PTG is not necessarily related to a high symptom PTSD class or a low symptom PTSD class (Birkeland et al., 2015). Taken together, PTG does not seem to play a crucial role in the prevalence of PGD, PTSD and depression in bereaved individuals in Bali.

5. Limitations

The findings of this mixed methods study need to be interpreted in the light of several limitations. First, in this study, we have based the prevalence rate on the algorithm of questionnaires. Scoring above a clinical cut-off of a questionnaire should be a better alternative, while only a structured clinical interview assessing all criteria and taking into account an examination by licensed clinicians is needed to obtain formal diagnoses.

Another limitation is the little variation in the dataset. For the latent class analysis, it meant that not all symptoms could be included. In addition, in the 3step analysis not all predictors could be included because of their low variance. We can also not preclude that distress following loss may manifest itself in non-assessed problems, including substance misuse and other externalizing symptoms. Nevertheless, we reason that the low variation in cultural characteristics in our sample is a remarkable finding itself and shows the dedication of Balinese people to follow their own traditions. Therefore, direct comparison with other populations in future studies could inform us on the relevance of these cultural characteristics. Furthermore, it could be that our questionnaires were not sufficiently adapted for the Balinese community or that people did not fully disclose their psychological problems because of a stigma regarding mental health issues. However, that this research was carried out in close collaboration with Balinese researchers, focus groups were used, and forward and backward translations were conducted before administering questionnaires strengthens confidence in the validity of our findings. Yet, replication and validation studies are needed to verify our findings.

6. Conclusion

In this first large mixed-methods study addressing psychopathology following bereavement in Bali, a low prevalence of psychopathology following a loss of a loved one after traffic accidents was found. The Balinese participants appeared to be quite homogeneous in terms of following their typical Balinese bereavement rituals and stressed the purpose of these rituals as expressions of caring for the deceased. This may indicate that certain aspects of the Balinese culture protect bereaved individuals from developing mental health problems; that finding might be used to refine bereavement rituals in other cultures and perspectives on treatment of PGD.

Authors' contribution

MD, AP, PB, CL and RK were responsible for the design of the study. MD, AP and CL were responsible for the data-collection. MD was responsible for the data-analysis and MD, AP and RK for the interpretation of the data. PB and RK supervised MD. MD and RK wrote the drafts of the manuscript. All authors were involved in revising the draft versions critically and all authors approved the final version of the manuscript.

Declaration of Competing Interest

The author(s) declared no conflicts of interest with respect to the authorship or the publication of this article.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jad.2021.05.085](https://doi.org/10.1016/j.jad.2021.05.085).

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