

Prevalence of prolonged grief disorder and its symptoms among bereaved individuals in China: a systematic review and meta-analysis

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To cite: Yuan M-D, Liu J-F, Zhong B-L. Prevalence of prolonged grief disorder and its symptoms among bereaved individuals in China: a systematic review and meta-analysis. *General Psychiatry* 2024;**37**:e101216. doi:10.1136/gpsych-2023-101216

► Additional supplemental material is published online only. To view, please visit the journal online (<https://doi.org/10.1136/gpsych-2023-101216>).

Received 09 July 2023
Accepted 05 February 2024



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ABSTRACT

Background The prevalence of prolonged grief disorder (PGD) and its symptoms among the bereaved population in China vary considerably.

Aims This meta-analysis aims to estimate the prevalence of PGD and its symptoms among bereaved individuals in China.

Methods We conducted a literature search in major Chinese and English databases from their inception to 4 October 2023, for cross-sectional studies on the prevalence of PGD or its symptoms in bereaved Chinese individuals. The risk of bias of the included studies and certainty of the evidence were assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data ('JBI checklist') and the Grading of Recommendations, Assessment, Development and Evaluations (GRADE), respectively. The 'metaprop' package in R V.4.1.2 was used to synthesise the prevalence.

Results A total of 28 studies involving 10 994 bereaved individuals were included in the analysis, with JBI checklist scores between 3 and 7. The combined prevalence (95% confidence interval) of PGD and its symptoms was 8.9% (4.2% to 17.6%) and 32.4% (18.2% to 50.8%), respectively. PGD and its symptoms were most prevalent among those who had lost their only child (22.7%) and those bereaved by earthquakes (80.4%), respectively. The GRADE system assigned a very low certainty level to the evidence for the pooled prevalence of PGD and its symptoms.

Conclusions The pooled prevalence of PGD and its symptoms indicate a potential high need for grief counselling services among bereaved individuals in China. This need is particularly pronounced in those who have lost their only child and those bereaved due to earthquakes. Further methodologically rigorous studies are needed to provide more accurate prevalence estimates.

PROSPERO registration number CRD42023432553.

INTRODUCTION

China, the world's most populous country for several decades, had the highest number of fatalities globally until being surpassed by India in 2021–2022. From 2018 to 2022, the annual number of deaths in China ranged from 9.9 to 10.5 million.¹ Bereavement, caused by the death of a significant other, is

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ China currently has the second-largest annual number of fatalities globally, leading to a substantial number of individuals experiencing the loss of their loved ones. However, reported prevalence rates for prolonged grief disorder (PGD) and its symptoms among bereaved individuals in China vary considerably, ranging from 0% to 37.8% and 2.5% to 88.9%, respectively.

WHAT THIS STUDY ADDS

⇒ This meta-analysis found that the pooled prevalence rates of PGD and its symptoms among bereaved individuals in China were 8.9% and 32.4%, respectively. Both rates were lowest among those who lost loved ones to illnesses other than AIDS and COVID-19, while higher rates were observed among individuals who experienced the loss of their only child or a loved one due to earthquakes, AIDS or COVID-19.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Given the inadequate provision of grief counselling services, the large number of bereaved individuals and the high prevalence of PGD and its symptoms among the bereaved, there is a pronounced unmet need for grief counselling services for the bereaved population in China. Potential public health strategies to address this issue include regular screening for PGD among the bereaved, integrating grief counselling and social work services into primary care settings, establishing a two-way referral system between higher-level mental health institutions and primary care clinics and providing training to primary care and social workers to manage PGD. It is crucial to prioritise the allocation of these service resources to individuals who have lost their only child or experienced the loss of a loved one due to earthquakes, AIDS or COVID-19.

one of the most common and distressing life events. While it is difficult to provide an exact number of individuals experiencing grief after losing a loved one, the number of those

bereaved in China could potentially exceed several times the number of deaths. For instance, a single suicide death may leave up to 135 people mourning, while a COVID-19-related death may result in approximately nine family members experiencing bereavement.^{2,3}

Bereavement has been linked to an increased risk of physical health issues, emotional and cognitive problems, behavioural issues and impaired social functioning.⁴ While most individuals adapt to the loss over time, a small subset of bereaved individuals experience persistent and intense grief, which may develop into prolonged grief disorder (PGD). PGD is distinguished by persistent and intense yearnings for the deceased, with distinct clinical features different from those seen in major depression and post-traumatic stress disorder.⁵ Although PGD has been provisionally included in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) and formally added to the International Classification of Diseases and Related Health Problems, 11th Edition (ICD-11), controversies persist regarding its clinical symptomatology and diagnostic criteria.⁶ Specifically, the cross-cultural adaptation of the two diagnostic criteria to Chinese societies remains inadequate.^{7,8}

Culture plays a significant role in shaping various aspects of mental health, including the sources of distress, the experience of mental disorders, symptomatology, the interpretation of psychiatric symptoms, help-seeking behaviours for mental health problems and the social response to distress.^{9,10} In Chinese culture, bereaved individuals tend to deny the reality of death and suppress their grief, particularly if the deceased is not an older adult.^{11,12} Chinese individuals who have lost a spouse or child may be unfairly stigmatised as unlucky and even blamed for the death, leading to an increased level of social isolation and stigma.^{13,14} This cultural context may increase the risk of PGD and create substantial barriers to accessing grief counselling services for bereaved individuals in China.

In recent years, there has been an increasing research interest in the epidemiology and clinical characteristics of PGD in bereaved individuals in China. However, reported prevalence rates (PRs) for PGD and its symptoms have shown a wide variation, ranging from 0% to 37.8% and 2.5% to 88.9%, respectively.^{15–18} Additionally, studies on high-risk subgroups yielded inconsistent findings. For example, a study conducted by Wang found a similar prevalence of PGD in bereaved men and women (8.5% vs 10.3%, $p=0.454$), whereas Yi and colleagues reported a significantly lower prevalence of PGD in bereaved men than women (6.6% vs 9.8%, $p=0.033$).^{19,20} The inconsistent findings on the prevalence of PGD and its high-risk subgroups may be related to the small sample sizes in prior studies, necessitating a meta-analysis for further insights.

In China, two prior meta-analyses have investigated the prevalence of grief in bereaved individuals.^{21,22} However, both studies have certain limitations. One focused only on both PGD and its symptoms in Chinese parents who lost their only child,²¹ while the other solely investigated

PGD symptoms in bereaved individuals.²² Furthermore, the latter meta-analysis combined prevalence data for PGD and its symptoms without considering their clinical heterogeneity and did not identify high-risk subgroups.²² In general, individuals who experience grief symptoms that persist and become clinically significant are more likely to develop PGD. Therefore, it is important to focus on PGD symptoms as they have potential implications for the early prevention of PGD. Studies that examine both PGD and its symptoms are likely to yield more interesting findings. Therefore, we conducted a meta-analysis that considers various causes of bereavement, distinguishes between PRs of PGD and its symptoms and examines high-risk subgroups among bereaved individuals in China.

METHODS

We reported this systematic review and meta-analysis in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (online supplemental material appendix 1),²³ and the protocol was registered in the International Prospective Register of Systematic Reviews. The literature search, study selection, data extraction, risk of bias (RoB) assessment and certainty assessment of the available evidence were conducted independently by the first and second authors. Disagreements were resolved through mutual agreement.²⁴

Literature retrieval

We conducted a literature search across major Chinese and English bibliographic databases from their inception until 4 October 2023. The databases searched included China National Knowledge Infrastructure, Wanfang Data, SinoMed, VIP Information, PubMed, Embase and PsycInfo. The search terms used were '(grief*) AND (bereave* OR mourn* OR sorrow OR surviv* OR Shidu OR los* OR death OR die* OR suicid*) AND (Chin* OR Taiwan OR Hong Kong OR Macau)'. Additionally, we manually searched the reference lists of related literature to ensure that no potential studies were overlooked. Details of the literature search strategies are provided in online supplemental material appendix 2.

Inclusion and exclusion criteria

The inclusion criteria for the present study were as follows: (a) cross-sectional surveys or baseline data of cohort and interventional studies that reported the prevalence of PGD and/or its symptoms; (b) participants must be Chinese individuals who have experienced bereavement due to various reasons, including suicide, earthquake and illness; (c) standardised tools, such as the 13-item Prolonged Grief Disorder and the Inventory of Complicated Grief, should be used to assess the presence of PGD and its symptoms. PGD is a mental disorder characterised by an intense and prolonged grieving process that significantly impairs functioning and well-being. Diagnosis can be made using existing diagnostic criteria like ICD-11 and DSM-5 or criteria proposed by

researchers, such as the Prigerson *et al*'s criteria and the Maciejewski *et al*'s criteria. Symptoms of PGD typically include intense yearning and longing for the deceased, emotional distress, difficulty accepting the death and an inability to move forward in life. These symptoms should be assessed using validated scales, such as the Inventory of Complicated Grief. If multiple studies using the same data were available, only the study with the most complete data was included. Conference papers, reviews and case reports were excluded as well as studies focusing on anticipatory grief or bereavement, resulting from the ending of a significant relationship, abortion, stillbirth or the loss of a pet.

Data extraction

Information extraction was performed using a pre-designed spreadsheet, which captured the following data: (a) basic study details, such as first author, year of publication, study site and survey date; (b) study characteristics, including sampling method, sample size, mean age of participants and outcome assessment; (c) data related to the bereaved individuals, such as PRs or symptom severity scores based on sex and marital status; (d) data related to the deceased individuals, such as PRs or symptom severity scores based on the cause of death; (e) outcome data such as PRs of PGD and its symptoms.

RoB assessment of included studies

The RoB of the included studies was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Studies Reporting Prevalence Data (hereafter abbreviated as the 'JBI checklist').²⁵ Nine items covering four domains of RoB in a cross-sectional study were evaluated in the JBI checklist: sampling methods, study population, data collection, and analysis methods.²⁶ The assessment was carried out by authors who had undergone extensive training by experienced epidemiologists and used a four-choice response scale (yes, no, unclear and not applicable). A score of one was assigned to an 'yes' response, while a score of zero was given for all other responses. A higher total score on the JBI checklist indicates a lower RoB.

Certainty of evidence

We used the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) method to determine the certainty of evidence.²⁷ The GRADE method examines five domains: RoB, imprecision, inconsistency, indirectness and publication bias.²⁸ By applying the rules of downgrading and upgrading within the GRADE method, we were able to rate the certainty levels of evidence for the pooled prevalence of PGD and its symptoms separately. The rating levels used were high, moderate, low or very low.

Statistical analysis

Meta-analysis of prevalence data was conducted using the 'metaprop' package in R V.4.1.2. This analysis employed one-step generalised linear mixed models with the

Logit link function, as recommended by Lin and Chu.²⁹ Heterogeneity among studies was evaluated using the I^2 statistic. When I^2 was less than 50%, a fixed-effects model was used to obtain combined estimates. If I^2 was 50% or greater, a random-effects model was employed. Subgroup analysis was carried out to identify potential sources of heterogeneity in the prevalence estimates. The Q -value test was employed to assess the significance of differences in estimated PRs across various subgroups. These subgroups were defined based on the study site, type of bereavement, average age, proportion of men in the study sample, survey method and the assessment of PGD or its symptoms. Publication bias was evaluated using funnel plots and Egger's test. A two-sided p value of less than 0.05 was considered statistically significant.

As some of the included studies provided and directly compared subgroup-specific data—for instance, comparing PRs of PGD between males and females, and comparing time since loss (expressed as mean and SD) between grieving and non-grieving bereaved individuals—we performed a meta-analysis of these comparative data. This allowed us to better characterise individuals with PGD or its symptoms. For example, if the meta-analysis identified significantly higher PGD prevalence in females than in males, it could indicate that bereaved women are more likely to experience PGD than bereaved men. We conducted meta-analyses of both dichotomous and continuous outcomes using the 'metabin' and 'metacount' packages in R software V.4.1.2. Prevalence ratios and standardised mean differences (SMDs) were used as corresponding effect size measures.³⁰

RESULTS

Characteristics of the included studies

The flowchart of study inclusion is shown in figure 1. Twenty-eight studies involving 10 994 bereaved persons were included: 14 focused solely on PGD,^{8 17 19 20 31–40} 12 focused solely on PGD symptoms,^{15 16 41–50} and two on both PGD and its symptoms.^{18 51} Detailed characteristics of the included studies are displayed in online supplemental material appendix 3.

RoB of the included studies

The JBI checklist scores of the included studies ranged from 3 to 7, with a median score of 6. The two most common methodological problems among the included studies were a problematic sample frame ($n=23$) and an inappropriate sampling method ($n=23$).

Meta-analysis of the prevalence of PGD and its symptoms

The combined PRs of PGD and its symptoms were 8.9% (95% confidence interval (CI): 4.2% to 17.6%) and 32.4% (95% CI: 18.2% to 50.8%), respectively (figure 2).

In comparison to men, women exhibited significantly higher PRs of both PGD (12.6% vs 8.4%, PR: 1.84, $p<0.001$) and its symptoms (29.6% vs 20.1%, PR: 1.69, $p<0.001$) (table 1). Additionally, women had higher PGD symptom

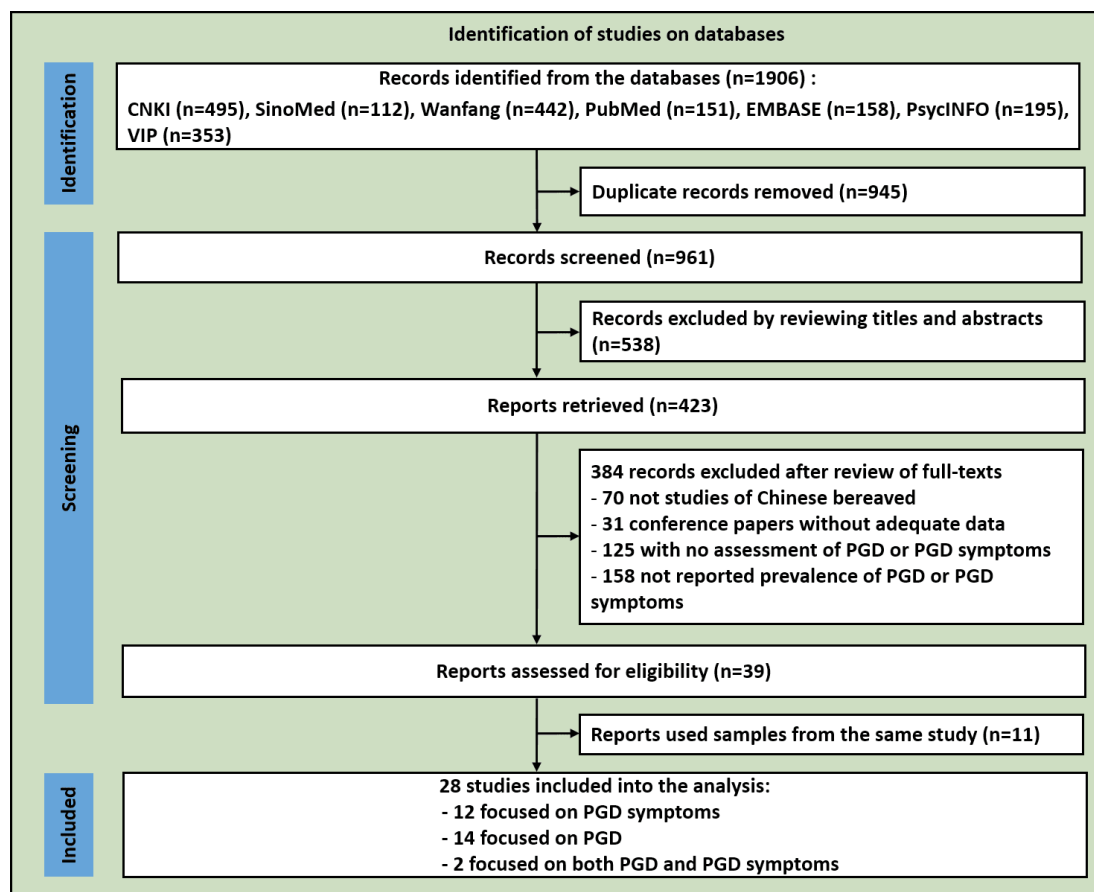


Figure 1 Flowchart of the study inclusion for the meta-analysis of the prevalence of PGD and its symptoms among bereaved Chinese. PGD, prolonged grief disorder.

scores compared with men (SMD: 0.24, $p=0.031$). Individuals diagnosed with PGD had a significantly shorter duration since the loss compared with those without PGD (SMD: -0.39 , $p<0.001$). Moreover, individuals with religious beliefs had statistically higher PGD symptom scores than those without (SMD: 0.25, $p=0.016$), while people who lost loved ones due to violent causes scored higher on PGD symptom scales compared with those whose deceased loved ones died due to illnesses (SMD: 0.45, $p=0.010$) (online supplemental appendix 4).

Publication bias among the included studies

As depicted in online supplemental material appendix 5, the funnel plot for the meta-analysis of PGD was visually asymmetrical, while the funnel plot for the meta-analysis of PGD symptoms was visually symmetrical. Nonetheless, the results of Egger's test indicated no statistically significant publication bias across the 16 studies regarding PGD ($z=1.50$, $p=0.067$) or the 14 studies regarding PGD symptoms ($z=0.50$, $p=0.308$).

Sources of heterogeneity in the meta-analysis of the prevalence of PGD and its symptoms

As displayed in table 2 and table 3, study site, type of bereavement and diagnostic criteria for PGD were significant sources of heterogeneity in the meta-analysis of the prevalence of PGD, while study site,

type of bereavement and mean age of the study sample were significant sources of heterogeneity in the meta-analysis of the prevalence of PGD symptoms. Specifically, surveys conducted solely online (18.1%) and offline (15.2%) had a significantly higher PGD prevalence than those conducted both online and offline (1.0%). Among bereaved participants, those who had deceased loved ones as their only children had the highest prevalence of PGD (22.7%), followed by those who experienced loss due to COVID-19 (16.8%) and earthquakes (8.5%). Bereaved individuals who experienced loss due to illnesses had the lowest prevalence of PGD (1.7%). In addition, surveys using the ICD-11 diagnostic criteria for PGD yielded a significantly higher PGD prevalence than those using the Prigerson *et al's*⁵² criteria (22.9% vs 5.8%, $p=0.010$).

Similarly, surveys conducted solely online (22.0%) and offline (50.9%) had a significantly higher prevalence of PGD symptoms than those conducted both online and offline (3.8%). The highest prevalence of PGD symptoms was observed among bereaved participants whose loved ones died due to earthquakes (80.4%), followed by those who experienced loss due to AIDS (35.1%) and COVID-19 (30.7%). Additionally, individuals whose deceased loved ones

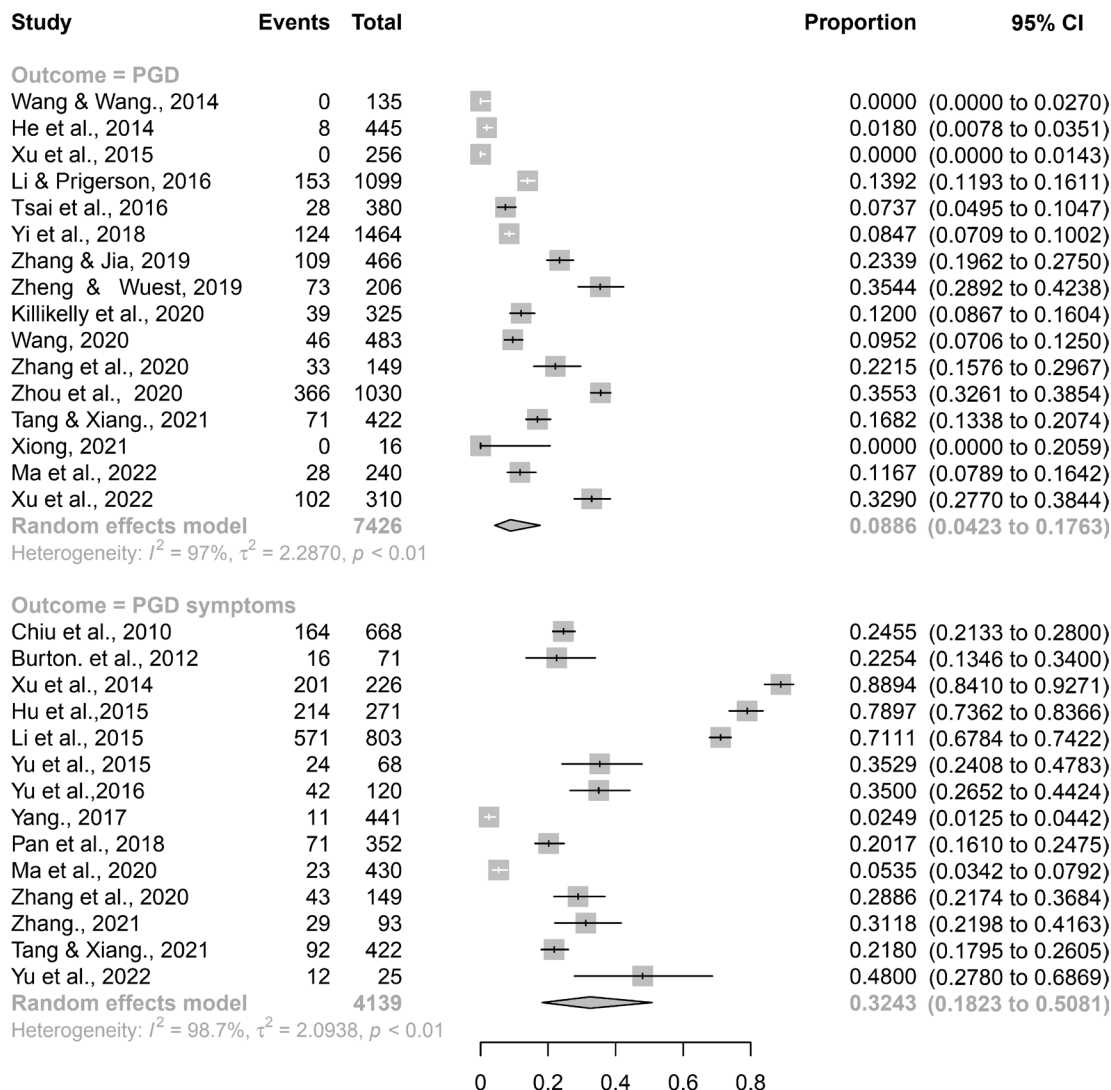


Figure 2 Forest plot of meta-analyses of PGD and its symptoms among bereaved Chinese. CI, confidence interval; PGD, prolonged grief disorder.

were the only children (28.9%) and those whose loved ones died of illnesses (13.6%) also exhibited notable rates of PGD symptoms. Studies predominantly involving middle-aged participants (49.7%) and older adults (23.5%) demonstrated significantly higher PRs of PGD symptoms compared with studies predominantly involving young adult participants (6.9%).

Certainty of the evidence for the pooled prevalence of PGD and its symptoms

All our included studies were cross-sectional studies, so we initially classified the certainty levels for both the pooled prevalence of PGD and its symptoms as 'low'. However, given the considerable RoB, wide 95% CIs, high levels of heterogeneity and clinical diversity among the samples from the included studies in this meta-analysis, we ultimately rated the certainty levels for both outcomes as 'very low'.

DISCUSSION

Main findings

Characterising the prevalence of PGD and its symptoms in the context of Chinese culture has important nosological, clinical and management implications. The present study systematically reviewed and quantitatively analysed the PRs of PGD and its symptoms among bereaved individuals in China. First, we found a prevalence of 8.9% for PGD and a prevalence of 32.4% for its symptoms. The rates of both PGD and its symptoms were statistically higher in women compared with men. Second, we found that individuals whose deceased loved ones died from illnesses had the lowest prevalence of PGD and its symptoms. On the other hand, individuals whose deceased loved ones were the only child had the highest prevalence of PGD, and those whose deceased loved ones died due to earthquakes had the highest prevalence of PGD symptoms. Third, the study observed that individuals with PGD had a shorter duration since the loss compared with those without PGD. Finally, several study-level factors

Table 1 Meta-analyses of the prevalence rates of prolonged grief disorder and its symptoms by subpopulations of the bereaved Chinese and their corresponding prevalence ratios

Subpopulation		Number of studies	Sample size	Number of grieving individuals	Pooled prevalence (95% CI), %	PR (95% CI), %	P
PGD							
Sex	Female	5	1799	228	12.62 (4.89 to 28.71)*	1.84 (1.19 to 2.85)	<0.001
	Male		1042	85	8.41 (4.32 to 15.71)*	1	
Religious beliefs	Yes	5	482	64	18.54 (9.68 to 32.52)*	1.58 (0.96 to 2.60)*	0.071
	No		2367	249	9.90 (3.63 to 24.09)*	1	
Marital status	Married	4	666	100	13.57 (5.54 to 29.71)*	1.03 (0.79 to 1.34)	0.832
	Others		716	89	9.11 (2.60 to 27.93)*	1	
Kinship to the deceased	Child	2	287	43	15.01 (11.32 to 19.61)*	6.72 (0.30 to 151.13)*	0.230
	Spouse		213	25	11.70 (8.10 to 16.81)	3.90 (0.29 to 59.77)*	0.306
	Parent		458	32	3.63 (0.71 to 16.84)*	1	
Cause of death of the deceased	Violent	4	375	68	15.72 (8.20 to 28.03)*	1.17 (0.70 to 1.96)*	0.550
	Illness		973	121	10.61 (2.77 to 32.64)*	1	
Sex of the deceased	Male	3	602	116	20.11 (10.51 to 35.10)*	1.01 (0.78 to 1.31)	0.974
	Female		336	65	18.93 (10.12 to 32.73)*	1	
PGD symptoms							
Sex	Female	3	500	148	29.61 (25.80 to 33.81)	1.69 (1.29 to 2.23)	<0.001
	Male		307	56	20.14 (12.34 to 31.21)*	1	

*Random effects models.
CI, confidence interval; PGD, prolonged grief disorder; PR, prevalence ratios.

were found to be associated with the prevalence of PGD or its symptoms including the survey site, the diagnostic criteria used to define PGD and the mean age of the study sample.

The 8.9% prevalence of PGD suggests that a significant proportion of bereaved individuals in China meet the diagnostic criteria for PGD; additionally, the 32.4% prevalence of its symptoms indicates that a larger portion of this population experiences symptoms of complex grief, even though they may not meet the full diagnostic criteria for PGD. The higher prevalence of PGD and its symptoms, as well as the greater severity of PGD symptoms in women compared with men among the bereaved Chinese, is consistent with findings from previous international studies.^{53 54} This difference may be attributed to females' vulnerability, their involvement in caregiving and nurturing roles and their tendency to express emotions more openly.^{21 55 56}

The literature indicates that the risk of PGD or its symptoms is higher when the death of a loved one occurs unexpectedly, suddenly, violently or under traumatic circumstances.^{57–61} Previous meta-analyses of international studies have reported PRs of PGD following non-violent bereavement, loss of family members due to cancer, unnatural deaths and loss during the COVID-19 pandemic at 9.8%, 14.2%, 49.0% and 46.4%, respectively.^{61–64} The PRs of complicated grief among bereaved family members of patients with cancer in Japan and

earthquake survivors in Iran were 14% and 76%, respectively.^{65 66} Similarly, the present study found that the nature of bereavement is a significant determinant of the prevalence of PGD and its symptoms among the bereaved Chinese population.

In general, deaths due to illnesses are often anticipated and not violent, which may result in lower PRs of PGD and its symptoms as well as lower levels of PGD symptoms in Chinese bereaved individuals. However, the sudden and violent loss of lives and significant damage to physical assets during natural disasters like earthquakes intensify feelings of grief in bereaved individuals. This heightened intensity can persist for an extended period of time, leading to a higher risk of PGD and its symptoms among those who have experienced earthquakes.

Due to the stigma, discrimination and misconceptions associated with HIV/AIDS, the loss associated with AIDS can lead to additional complications in the grief process.^{46 67} This may explain the high prevalence of PGD symptoms, as high as 35.1%, observed among Chinese individuals bereaved by AIDS-related loss in this study. Additionally, due to the one-child policy in China, the loss of the only child can be particularly devastating for the bereaved parents. These parents may experience self-blame, guilt and a sense of not fulfilling their filial duties to their ancestors due to their inability to continue the family line.¹³ Moreover, since adult children traditionally serve as the primary home carers for their elderly parents

Table 2 Subgroup analysis of the source of heterogeneity of the meta-analysis of prevalence of prolonged grief disorder

Subpopulation by variable		Number of studies	Sample size	Number of grieving individuals	Heterogeneity, I ² (%), P	Pooled prevalence (95% CI), %	Q (P)
Study site	Online and offline	3	836	8	0.03, 1.00	0.97 (0.51 to 1.92)	
	Online	4	2052	336	94.90, <0.001	18.10 (11.62 to 27.16)	4.04 (0.031)
	Offline	9	4538	836	97.82, <0.001	15.23 (9.63 to 23.33)	4.26 (0.039)
Type of the bereavement*	Death due to illness	7	2656	228	86.01, <0.001	1.74 (0.32 to 10.44)	
	Death due to earthquake	1	1464	124	Not applicable	8.52 (7.21 to 10.00)	2.96 (0.085)
	Death of the only child	7	2884	757	95.91, <0.001	22.68 (15.63 to 31.84)	8.02 (0.005)
	Death due to COVID-19	1	422	71	Not applicable	16.83 (13.58 to 20.72)	6.30 (0.012)
Sample size†	≤325	8	1637	275	90.14, <0.001	4.21 (0.64 to 25.87)	
	>325	8	5789	905	98.31, <0.001	11.69 (6.52 to 20.10)	0.98 (0.322)
Sampling method	Convenience	13	6554	1073	97.32, <0.001	7.40 (2.73 to 18.61)	
	Probability	3	872	107	87.57, <0.001	13.41 (8.72 to 20.00)	1.26 (0.263)
% of males among the study sample‡	≤41.3	8	4309	773	98.32, <0.001	14.83 (7.53 to 27.31)	
	>41.3	8	3117	407	82.43, <0.001	3.65 (0.64 to 18.02)	2.43 (0.119)
Mean age of the study sample‡	18–35 years	4	1208	118	92.61, <0.001	5.88 (1.81 to 17.52)	
	36–59 years	4	1941	254	96.01, <0.001	5.43 (0.54 to 38.46)	0.01 (0.941)
	60+ years	8	4277	808	97.84, <0.001	13.34 (6.11 to 26.90)	1.38 (0.240)
Assessment of PGD	PG-13	12	5270	815	97.38, <0.001	6.17 (2.14 to 17.03)	
	Others	4	2156	365	95.42, <0.001	17.80 (11.81 to 26.04)	3.58 (0.058)
Survey method	Self-report	12	5417	995	96.56, <0.001	8.93 (3.42 to 21.37)	
	Interview	4	2009	185	89.70, <0.001	9.83 (5.31 to 17.52)	0.03 (0.863)
Diagnostic criteria	Prigerson <i>et al</i> ⁵²	12	5339	602	94.73, <0.001	5.81 (2.13 to 14.96)	
	ICD-11	4	2087	578	96.84, <0.001	22.89 (14.34 to 34.55)	6.67 (0.010)
JBI checklist score	3–5	6	1534	254	95.12, <0.001	5.01 (0.72 to 28.64)	
	6–7	10	5892	926	96.70, <0.001	10.90 (5.61 to 20.03)	0.58 (0.446)

*Studies that included participants bereaved by the loss of loved ones due to a variety of causes of death, primarily illnesses, were categorised as ‘death due to illness’. Studies that included participants bereaved by the loss of loved ones solely due to earthquakes, AIDS and COVID-19 were categorised as ‘death due to earthquake’, ‘death due to AIDS’ and ‘death due to COVID-19’, respectively. Studies that included participants who lost their only child, regardless of the causes of death, were categorised as ‘death of the only child’.

†The two continuous variables were dichotomised at the median value.

‡Studies with the mean age of the sample being ‘18–35 years’, ‘36–59 years’ and ‘60+ years’ were crudely categorised into studies with predominantly young, middle-aged and older adults, respectively.

CI, confidence interval; ICD-11, International Classification of Diseases and Related Health Problems, 11th Edition; JBI checklist, Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data; PG-13, Prolonged Grief Disorder-13; PGD, prolonged grief disorder.

Table 3 Subgroup analysis of the source of heterogeneity of the meta-analysis of prevalence of prolonged grief disorder symptoms

Subpopulation by variable	Number of studies	Sample size	Number of grieving individuals	Heterogeneity, I ² (%), P	Pooled prevalence (95% CI), %	Q (P)
Study site	Online and offline	871	34	77.76, 0.030	3.83 (2.22 to 6.31)	
	Online	870	191	68.34, 0.020	22.00 (19.32 to 24.80)	45.68 (<0.001)
	Offline	2398	1288	98.61, <0.001	50.92 (31.91 to 65.60)	44.28 (<0.001)
Type of the bereavement*	Death due to illness	2055	314	95.80, <0.001	13.60 (6.42 to 26.71)	
	Death due to earthquake	1300	986	93.42, <0.001	80.38 (70.27 to 87.71)	44.83 (<0.001)
	Death due to AIDS	188	66	0.01, 0.970	35.11 (28.63 to 42.20)	7.43 (0.006)
Death of the only child	149	43	Not applicable	28.90 (22.21 to 36.62)	4.17 (0.041)	
Death due to COVID-19	447	104	87.93, <0.001	30.72 (16.11 to 50.50)	2.93 (0.087)	
Sample size†	>226	3387	1146	99.34, <0.001	24.00 (8.32 to 52.32)	
	≤226	752	367	96.22, <0.001	28.90 (25.11 to 61.64)	1.26 (0.262)
Sampling method	Convenience	3764	1269	98.72, <0.001	27.84 (15.31 to 45.02)	
	Probability	375	244	99.13, <0.001	64.42 (18.31 to 93.64)	1.87 (0.172)
% of males among the study sample†	≤37.0	2348	905	99.10, <0.001	28.91 (9.12 to 62.40)	
	>37.0	1791	608	97.43, <0.001	36.01 (23.42 to 50.94)	0.17 (0.680)
Mean age of the study sample†	18–35 years	1293	126	97.61, <0.001	6.92 (2.28 to 19.01)	
	36–59 years	2345	1273	98.42, <0.001	49.74 (32.11 to 67.42)	13.81 (<0.001)
	60+years	501	114	77.48, <0.001	23.50 (18.12 to 30.01)	5.43 (0.020)
Assessment of PGD symptoms	ICG	3497	1362	98.90, <0.001	34.92 (17.00 to 58.51)	
	Others	642	151	34.86, 0.220	23.52 (20.41 to 27.02)	1.21 (0.272)

Continued

Table 3 Continued

Subpopulation by variable	Number of studies	Sample size	Number of grieving individuals	Heterogeneity, I ² (%), P	Pooled prevalence (95% CI), %	Q (P)
Survey method	6	1682	381	98.81, <0.001	22.46 (7.01 to 52.74)	
Interview	8	2457	1132	98.72, <0.001	41.10 (24.00 to 60.72)	1.21 (0.272)
JBI checklist score	7	1229	238	93.14, <0.001	24.92 (15.23 to 38.00)	
	7	2910	1275	99.20, <0.001	40.42 (14.91 to 72.33)	0.89 (0.347)

*Studies that included participants bereaved by the loss of loved ones due to a variety of causes of death, primarily illnesses, were categorised as 'death due to illness'. Studies that included participants bereaved by the loss of loved ones solely due to earthquakes, AIDS and COVID-19 were categorised as 'death due to earthquake', 'death due to AIDS' and 'death due to COVID-19', respectively. Studies that included participants who lost their only child, regardless of the causes of death, were categorised as 'death of the only child'.

†The two continuous variables were dichotomised at the median value.

‡Studies with the mean age of the sample being '18–35 years', '36–59 years' and '60+years' were crudely categorised into studies with predominantly young, middle-aged and older adults, respectively.

CI, confidence interval; ICG, Inventory of Complicated Grief; PGD, prolonged grief disorder.

in China, losing the only child also means losing the major source of financial and emotional support.²¹ These socio-cultural factors could contribute to the increased risk of PGD and its symptoms in individuals who experience the loss of their only child.

Our study found that PGD and its symptoms were highly prevalent among those who have lost loved ones to COVID-19, with rates as high as 16.8% and 30.7%, respectively. These findings highlight the critical need for post-pandemic grief counselling services in China, as patients COVID-19 often passed away in isolated settings without the opportunity for loved ones to say goodbye. This is supported by previous findings that a lack of meaningful communication before or during death can increase the risk of PGD among bereaved family members.⁶⁸

Consistent with the universal phenomenon that grief alleviates over time,⁶¹ we found that individuals with PGD were more likely to have experienced a more recent loss. The positive association between the severity of PGD symptoms and religious beliefs among bereaved Chinese aligns with the higher prevalence of mental health challenges observed in Chinese individuals with religious beliefs, compared with those without.^{69 70} This could be due to the fact that, in China, the world's most atheistic country, people often turn to religions for assistance when facing mental health challenges such as complicated grief.²¹

Compared to the Prigerson *et al's* criteria,⁵² the ICD-11 diagnostic criteria are more lenient,³⁶ which might explain the lower prevalence of PGD when conducting a meta-analysis of studies using the Prigerson *et al's* criteria compared with those using the ICD-11 criteria. The findings that the study site and mean age of the study sample were associated with the pooled prevalence of PGD and its symptoms highlight the importance of considering an appropriate sample frame when examining the epidemiology of PGD.

Limitations

We acknowledge that this study has certain limitations. First, none of the included studies was rated as having a low RoB. The dynamic nature of the population of bereaved individuals and the challenges of reaching them through household-based surveys led to the majority of the included studies being conducted solely online or through a combination of online and offline approaches. This makes it challenging to ascertain the representativeness of the online samples, warranting caution when generalising the findings to the broader population of bereaved individuals in China. Second, due to the limited number of included studies focusing on bereavement due to COVID-19, AIDS and earthquakes, the ranking of PRs for PGD and its symptoms by type of bereavement in this study may not be robust enough. Third, the identification of high-risk subgroups for PGD and its symptoms in this study was based solely on the results of direct comparisons between subgroups, without adjusting for potential confounders. As a result, the findings regarding high-risk

subgroups are preliminary and require further validation through additional studies.

Implications

In China, mental health service resources remain insufficient to meet the growing needs of the general population.^{71 72} This inadequacy constitutes a significant barrier to accessing grief counselling and other mental health services.^{73 74} Specifically, grief counselling services in China are still in their early developmental stages, which results in an insufficient and uneven distribution of these services in hospitals and communities. Concerns have also been raised regarding the quality of grief counselling services offered within China's medical institutions.²¹ Additionally, the challenges of providing culturally adapted services further complicate the task of addressing the needs of the bereaved. Notably, no established community-based system for screening, managing or referring PGD currently exists in China.⁷⁵

Considering the sheer size of the bereaved population in China, along with an 8.9% prevalence of PGD and a 32.4% prevalence of PGD symptoms, the demand for grief counselling services could be exceptionally high. Our study emphasises the urgency of strengthening these services for the bereaved population in China. Strategies could include integrating services into primary care, developing a two-way referral system between mental health institutions and clinics and providing training for community mental health workers.

The shorter duration of grief observed in bereaved individuals with PGD implies that the early provision of grief counselling services could be more effective in preventing PGD. Services could include psychosocial support, regular PGD screening and facilitating psychiatric referrals when necessary. If these services targeted high-risk groups such as women, individuals with religious beliefs, those who lost their only child and those grieving severe losses, they could be more cost-effective.

Finally, the very low level of evidence certainty suggests that further large-scale, representative studies employing stringent methodology are necessary. These would yield more accurate prevalence data on PGD and its symptoms in the bereaved Chinese population.

Contributors BZ designed and conducted the analysis and critically revised the manuscript. M-DY and J-FL retrieved the literature, conducted the data analysis and wrote the first draft of this paper. BZ is the guarantor of this study and accepts full responsibility for the work and the conduct of the study, had access to the data, and controlled the decision to publish. All authors read and approved the final version submitted for peer review.

Funding This work was supported by National Natural Science Foundation of China (grant number: 71774060), 2015 Irma and Paul Milstein Program for Senior Health Awards from the Milstein Medical Asian American Partnership Foundation, the Young Top Talent Program in Public Health from Health Commission of Hubei Province (grant number: EWEITONG[2021]74, PI: B-LZ) and Wuhan Health and Family Planning Commission (grant numbers: WX17Q30; WG16A02; WG14C24). The funding sources listed had no role in the study design, the collection, analysis and interpretation of data, the writing of the report; and the decision to submit the paper for publication.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer-reviewed.

Data availability statement All data relevant to the study are included in the article.

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