Grief trajectories after loss in pregnancy and during the neonatal period

Sofie Mørk a,b,⁎, Dorte Hvidtjørn a,c, Sören Møller a,d, Tine Brink Henriksen c,e, Maja O’Connor f, George A. Bonanno g

a Department of Clinical Research, University of Southern Denmark, Odense, Denmark
b Department of Obstetrics and Gynecology, Odense University Hospital, Odense, Denmark
c Department of Clinical Medicine, Aarhus University, Aarhus, Denmark
d Department of Pediatrics, Aarhus University Hospital, Aarhus, Denmark
e Open Patient Data Explorative Network, Odense University Hospital, Odense, Denmark
f Department of Pediatrics, Aarhus University Hospital, Aarhus, Denmark
g Department of Psychology and Behavioral Sciences, Aarhus University, Aarhus, Denmark

A R T I C L E   I N F O
Keywords:
Grief trajectories
Latent growth mixture modelling
Prolonged grief disorder
Perinatal bereavement
Termination of pregnancy
Stillbirth

A B S T R A C T
Distinguishing patterns of grief over time in parents with a loss in pregnancy or during the neonatal period is important for identification of parents with severe grief symptoms, who may need additional support. Our aim was to describe grief in this population and to examine variations by type of loss in a large prospective cohort. We used questionnaire data from the Danish longitudinal cohort, Life After the Loss, which contains information on parents with a loss in pregnancy (from 14 weeks) or during the neonatal period. Parents completed the Prolonged Grief-13 scale at 1, 7, and 13 months after their loss. We applied Latent Growth Mixture Modelling to identify prolonged grief trajectories and used multinomial regression models to assess factors associated with class membership. Three distinct trajectories were identified in 676 parents: resilience (73.1%), recovery (16.9%), and chronic (10%). The distribution varied by type of loss, and the chronic group were overrepresented by parents with stillbirths (16.2%) and neonatal deaths (16.1%) in contrast to parents with spontaneous abortions (8.2%) and termination of pregnancy due to fetal anomalies (6.2%). Furthermore, not having a living child or being a woman was associated with following the chronic trajectory. These results underline that, while most bereaved parents are resilient, 10% experience consistently high levels of grief symptoms during the first year after the loss. Information on type of loss, gender, and whether the parent has living children are meaningful indicators of grief class membership.

1. Introduction

Loss and grief are universal human experiences. Although bereavement may foster acute responses including anxiety and depression, the majority of the bereaved will adapt adequately to the loss without significant impairment (Bonanno, 2004). A small proportion, however, will experience elevated and pervasive grief symptoms, indicative of Prolonged Grief Disorder (PGD) (WHO, 2018). The diagnostic criteria for PGD specify that the bereaved should have sustained symptoms of intense emotional pain, a profound longing for and preoccupation with the deceased to an impairing degree for a duration of at least six months. (WHO, 2018). The frequency of probable PGD has been estimated to approximately 10% in a diverse population of bereaved (Lundorff et al., 2017). Symptoms of grief, including PGD, have been investigated in several longitudinal studies, establishing distinct patterns of grief using Latent Growth Mixture Modelling (LGMM) (Bonanno et al., 2005, 2008; Bonanno and Malgaroli, 2020; Harris et al., 2021; Lundorff et al., 2020).

However, only a small subset of the studied populations were parents bereaved during pregnancy or in the neonatal period and this group may differ from other groups of bereaved in terms of the distribution within each grief pattern. In a recent systematic review of grief reactions in mothers bereaved during pregnancy, grief measured from few weeks to several years post-loss, revealed divergent rates (3.5–80%) of grief scores above the scales’ corresponding cut-offs (Mergl et al., 2022).

The global rate of stillbirths and neonatal deaths is estimated to around 30 per 1000 births affecting approximately 4.2 million families every year (UNICEF, 2020, 2021). The loss of a child during pregnancy or in the neonatal period is often unexpected and extremely distressing.
for parents, who lose not only their child but also the life they envisioned as a family. Research suggests that pregnancy and neonatal losses may be associated with elevated grief symptoms and that grief symptoms may vary according to the specific type of loss (Mergl et al., 2022). These variations could be due to differences in gestational age, as attachment to the child appears to increase with gestational age (Yarcheski et al., 2009). Furthermore, termination of pregnancy due to fetal anomalies (TOPFA) is distinct from spontaneous loss in several ways e.g., the parents must take a decision to terminate the pregnancy and may experience the loss as ambiguous.

As pregnancy and neonatal losses include divergent constructs, type of loss may account for variations in individual risk of grief symptom pattern. Furthermore, repeated pregnancy loss and not having experienced a successful pregnancy before the loss may exacerbate grief symptom levels (Johnson and Johnston, 2021; Schwerdtfeger and Shreffler, 2009). The gender of the bereaved has also been discussed as a possible predictor of grief pattern, but results have been conflicting and gender has rarely been explored within dyads e.g., partners from the same household (Lenerfink et al., 2020; Lundorff et al., 2020; Nielsen et al., 2019). Identifying early indicators of grief trajectories within the framework of PGD is essential to the field as it will enable identification of bereaved who may need specialized care.

The current study utilized the Danish nationwide longitudinal data set, Life After the Loss (Hvidtjørn et al., 2018), with two primary aims. First, we sought to describe trajectories of grief among parents bereaved during pregnancy, birth, or within 28 days after birth, and to examine variations in these by type of loss. Second, we aimed to explore gender, previous losses in pregnancy, and having living children as possible correlates of the grief trajectories.

2. Materials and methods

2.1. Clarification of concepts

For simplicity, the terms “child”, “parent” and “birth” are used throughout the manuscript to encompass all concepts of the result of an abortion or birth and of self-identification. We recognize that other terms such as “fetus” may be preferred by some.

2.2. Data source and participants

We used data from the Danish cohort, Life After the Loss, a large longitudinal cohort of parents bereaved in pregnancy from 14 weeks of gestation, during birth, or within the first months after birth (Hvidtjørn et al., 2018). Parents were invited if they had experienced spontaneous abortion, TOPFA, stillbirth, or neonatal death. The cohort was established in 2016 and enrollment is ongoing. Parents were invited to participate at discharge from the hospital or through a bereavement support group leader and if they consented to participate, web-based questionnaires were distributed 1, 7 and 13 months after the loss. Parents primarily entered the cohort one month after their loss but were in case of non-responsiveness invited again at the 7-month follow-up. Baseline information on circumstances of the loss and sociodemographic characteristics of the parents were included in the questionnaire at entry to the cohort. Furthermore, all questionnaires held validated psychometric measures of grief. In the present study, all parents with a birth from January 1, 2016 to September 22, 2021 and a minimum of two datapoints were included. We excluded losses that occurred later than 28 days after birth. Multiple pregnancies where one child survived were also excluded. From clinical experience we know that the experiences of these parents differ substantially from other types of loss and there were too few (n = 6) in the cohort to comprise a specific subcategory. All data were self-reported, however, in one of Denmark’s five regions, the Region of Southern Denmark, baseline characteristics of the parents and their loss, including gestational age, live-or stillborn, parity, and type of loss, were also entered by the support group leaders.

From January 1, 2016 to September 22, 2021, 1034 parents were included in the Life After the Loss cohort. Of those, 988 had experienced a loss between 14 weeks of pregnancy and 28 days after birth, and 676 had minimum two data points on the PGD symptom measure (Fig. 1). Within the final study population, 192 parents were identified as parents from the same household (96 dyads).

The study was conducted in Denmark, where hospital care is free of charge for all citizens. Psychological therapy is not offered routinely to bereaved parents, but the general practitioner can refer patients if prompted on reduced cost. Medication including antidepressants or other mood-stabilizers are not offered routinely for bereavement care in Denmark.

The investigation was carried out in accordance with the latest version of the Declaration of Helsinki as mandatory from our institutions. The study was approved by and registered on the Region of Southern Denmark’s record for data processing activities (record no 18/15664) to compliance with ethical standards for observational research. Informed consent of the participants was obtained after the nature of the procedures had been fully explained. Data were collected and stored using REDCap (Research Electronic Data Capture) hosted by OPEN (Open Patient Data Explorative Network) at Odense University Hospital (Harris et al., 2009, 2019).

2.3. Measures

2.3.1. Grief symptoms

PGD symptoms were investigated within the framework of PGD as set forth by Priegerson et al. (2009). The criteria for PGD were captured by the instrument PG-13 (Priegerson et al., 2009). The PG-13 has previously been translated into Danish (Harris et al., 2021; Lundorff et al., 2021), and, for the purpose of this study, the wording was adjusted to bereaved parents, i.e., changing “your loss” to “the loss of your child” (Supplementary Table 1). The PG-13 contains 13 items of which item 1–11 can be used as continuous measures resulting in a total score of 11–55 (Priegerson et al., 2009). Items 1–11 assess separation anxiety and cognitive, emotional, and behavioral symptoms rated on a 5-point Likert scale ranging from “not at all” to “several times a day” and from “not at all” to “extremely” for items 1–4 and items 5–11 respectively. Items 12 and 13 contain information on duration and impairment and are answered “yes” or “no”.

2.3.2. Type of loss

In Denmark, spontaneous abortion and stillbirth is defined as fetal death before 22 weeks and at 22 weeks of gestation or later, respectively. Abortion until 12 weeks of pregnancy is legal and does not require permission. Thereafter, TOPFA can be applied for and may be granted by a regional counsel (Health, 2019), and although there is no formal upper gestational age limit, TOPFA is rarely granted after 24 weeks. All TOPFA abortions are assumed medically induced as surgical abortions are not charge for all citizens. Psychological therapy is not offered routinely to bereaved parents, but the general practitioner can refer patients if prompted on reduced cost. Medication including antidepressants or other mood-stabilizers are not offered routinely for bereavement care in Denmark.

The legal definition of neonatal death in Denmark encompasses all liveborn children with a death within 28 days regardless of gestational age. Therefore, this categorization of loss type was used in a sensitivity analysis.

2.3.3. Population characteristics and covariates

Variables to describe the population included age (continuous), civil
status (married or cohabitating/single), and education. Education was defined as the highest completed ISCED (International Standard Classification of Education) level of education and was categorized in three: Primary or secondary (ISCED Level 0–4), Bachelor’s (ISCED Level 5–6), Master’s (ISCED Level 7–8). Covariates for inclusion in the models included gender (man/woman), previous losses in pregnancy (yes/no), and having any living children (yes/no). Data on previous losses and births were derived from the questions “Have you previously experienced a loss? (In pregnancy after 14 weeks of gestation or within three months after birth)” and “Do you have any living children?” Information on covariates were derived from either the 1 or the 7-month questionnaire depending on timepoint for entering the cohort. However, in the Region of Southern Denmark if information was missing, baseline data entered by a support group leader was used.

2.4. Statistical analyses

The distribution of population characteristics and covariates are presented as counts and frequencies for categorical variables. Continuous measures are presented as means with corresponding standard deviations for normally distributed data and as medians with interquartile range for non-normally distributed data.

To identify longitudinal patterns of grief, LGMM was applied to continuous data on PGD symptoms using the total score of items 1–11 from the PG-13. Data from items 12 and 13 could not be included as these data were not numerical. LGMM is a robust computational method, that can differentiate heterogenous data into latent classes of longitudinal trajectories (Muthén and Muthén, 2017). It has been used in multiple studies on grief and depression and shows high levels of replication and consistency (Tijelaatik et al., 2022; Galatzer-Levy et al., 2018; Lundorff et al., 2020; Sveen et al., 2018). We identified the best-fitting trajectories of grief symptoms across the three-time points.

Best-fitting class solutions were determined by testing successive models of increasing numbers of trajectories with variations in the estimation of intercept and slope parameters using the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and sample-size-adjusted Bayesian Information Criterion (SSA-BIC), entropy values, and, for comparing k vs. k-1 model-fit, the Lo-Mendell-Rubin likelihood ratio test (LMR-LRT). To assess if model convergence could be improved, we reran the models with fixed slope or intercept. Interpretability, model parsimony, and theoretical coherence were also considered in the selection of the optimal unconditional model (Bonanno, 2004; Muthén, 2003). Following identification of the final unconditional model for grief symptoms, we examined a set of baseline covariates for inclusion in a conditional trajectory model. Covariates were first examined for predictive utility in univariate analyses independent of the conditional model. Covariates evaluated within the conditional model were type of loss (spontaneous losses/TOPFA), gender (man/woman), previous losses in pregnancy (yes/no), and any living children (yes/no).

To further investigate the association between type of loss and grief class membership, stratification by the four loss types was explored outside the model using multinomial regression. The dataset included mothers and partners from the same household, whose grief symptoms may not be independent of each other. We identified these dyads using day of birth, gestational age, and type of loss as unique identifiers. Accordingly, all analyses accounted for non-independence of observations by clustered standard errors (Huber, 1967). Maximum likelihood estimation was used to accommodate missing data.

Additionally, a sensitivity analysis restricted to those with complete responses at all three datapoints was carried out to investigate the impact of loss to follow-up.

Stata 17 (StataCorp, College Station, TX, USA) and Mplus version 8.7 were used to perform all analyses.
3. Results

3.1. Sample characteristics

The majority of the study population were women (73.8%), married or cohabitating (97.2%), educated beyond primary and secondary (73.3%), and had a mean age of 31.7 years. A small minority had a history of minimum one previous pregnancy loss (4.9%) and a little more than half the population had living children (54.9%) (Table 1). The characteristics were distributed evenly across type of loss with minor differences on previous loss and living children. Response rates on the PGD symptom measure varied across data points with 583 (89.9%), 609 (92.9%), and 456 (71.7%) responses to the 1-month-, 7-month, and 13-month questionnaires, respectively.

3.2. Grief trajectories

Fit statistics for unconditional models comparing one to five classes are available in Table 2. The information criteria (AIC, BIC, and SA-BIC) decreased consistently with increased class number suggesting an increasingly better fit. Entropy was highest for the two-class model (0.88) and just below 0.8 for the other classes, suggesting high classification accuracy on all models (Clark and Muthén, 2009). The p-value of the LMR-LRT was marginally significant for the two-class model and statistically significant for the three-class model (<0.001) but did not approach significance for the four- and five-class models. Rerunning the models with fixed slope and/or intercept improved model convergence. Considering all indices, model convergence and parsimony as well as interpretability and theoretical coherence, the three-class model with fixed slope and free intercept was chosen as the optimal solution.

The three-class model showed distinct patterns of prolonged grief symptoms (Fig. 2). The majority of the parents (73.1%) exhibited a resilient trajectory of continuous low levels of PGD symptoms with a small decline over time. A smaller proportion (16.9%) showed a recovery trajectory of high initial PGD symptoms that decreased steadily over time, while 10.0% followed a chronic trajectory characterized by consistently high levels of PGD symptoms throughout the study. When restricting the cohort to parents with complete follow-up (n = 362 (54%)), proportions within each grief class were comparable to those of the full cohort.

3.3. Variations by loss type

Type of loss was dichotomized (TOPFA and spontaneous losses) in order to explore as a conditional three-class model. Spontaneous losses included spontaneous abortions, stillbirths, and neonatal deaths. The resilient class was used as reference. Using multinomial regression, parents with a spontaneous loss were 2.3 times more likely to be in the recovery class and 2.8 times more likely to be in the chronic class, than parents with TOPFA (Table 3). These associations were statistically significant.

Loss type was then analyzed outside the three-class model with loss type stratified in four categories (TOPFA, spontaneous abortion, stillbirth, and neonatal death) using multinomial regression. The distribution of parents within the three classes varied by type of loss. Only a small percentage of each loss type was characterized by a chronic trajectory: 6.2% of those who experienced TOPFA, 8.2% of those who experienced spontaneous abortions, 16.2% of those who experienced stillbirths, and 16.1% of those who experienced neonatal deaths (Table 4). The resilient trajectory was the most common in all loss types: 80.3% of those who experienced TOPFA, 75.3% of those who experienced spontaneous abortions, 63.6% of those who experienced stillbirths, and 62.9% of those who experienced neonatal deaths. Compared to the resilient class, parents with either a stillbirth or neonatal death were more likely to follow a chronic trajectory than parents with TOPFA, (RRR 6.4 [95%CI: 1.5–27]) and (RRR 7.5 [95%CI: 1.2–75]) (Table 5).

However, in a sensitivity analysis where neonatal death was defined regardless of gestational age, the results for neonatal death became insignificant (Supplementary Table 2).

3.4. Variations by other covariates

The possible association between class membership and gender, a history of previous pregnancy losses, and having any living children was explored within the conditional three-class model with the resilient class as the reference (Table 3). Women were 17.1 times more likely to be in the recovery class and 4.7 times more likely to be in the chronic class when compared to men. Parents without living children prior to the loss were also more likely to be in the recovery class and the chronic class compared to parents with living children. We found no other significant associations.

---

Table 1

<table>
<thead>
<tr>
<th>Characteristics of 676 parents in the Life After the Loss cohort.</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>n</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
</tr>
<tr>
<td>Gender, n (%)</td>
</tr>
<tr>
<td>Man 177 (26.2%)</td>
</tr>
<tr>
<td>Education, completed, n (%)</td>
</tr>
<tr>
<td>Bachelor’s</td>
</tr>
<tr>
<td>Civil status, n (%)</td>
</tr>
<tr>
<td>Single 19 (2.8%)</td>
</tr>
<tr>
<td>Previous losses, n (%)</td>
</tr>
<tr>
<td>Yes 37 (5.5%)</td>
</tr>
<tr>
<td>Living children, n (%)</td>
</tr>
<tr>
<td>Yes 374 (55.3%)</td>
</tr>
<tr>
<td>PGD symptoms, median (IQR)</td>
</tr>
<tr>
<td>7 months 19 (15–26)</td>
</tr>
<tr>
<td>13 months 17 (13–22)</td>
</tr>
<tr>
<td>Probable PGD, 5 symp., n (%)</td>
</tr>
<tr>
<td>13 months 12 (2.5%)</td>
</tr>
<tr>
<td>Probable PGD, 3 symp., n (%)</td>
</tr>
<tr>
<td>13 months 23 (4.7%)</td>
</tr>
</tbody>
</table>

Abbreviations: IQR interquartile range, PGD prolonged grief disorder, SD standard deviation, TOPFA termination of pregnancy due to fetal anomalies

Besides the PGD symptoms and probable PGD, all variables had <1% missing values.

---

Table 2

<table>
<thead>
<tr>
<th>Fit statistic of one to five classes of prolonged grief symptom trajectories using data from 676 parents in the Life After the Loss cohort.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1 class</td>
</tr>
<tr>
<td>2 classes</td>
</tr>
<tr>
<td>3 classes</td>
</tr>
<tr>
<td>4 classes</td>
</tr>
<tr>
<td>5 classes</td>
</tr>
</tbody>
</table>

Abbreviations: AIC Akaike information criterion, BIC bayesian information criterion, LMR-LRT Lo-Mendell Rubin adjusted likelihood ratio test, p p-value, SA-BIC sample-size adjusted BIC.
4. Discussion

4.1. Summary of findings

In this longitudinal cohort of 676 bereaved parents with a pregnancy or neonatal loss, three distinct trajectories of PGD symptoms were present, resilience (73.1%), recovery (16.9%), and chronic (10%). However, the distribution within each class varied by type of loss with 6.2% of those who experienced TOPFA, 8.2% with spontaneous abortions, 16.2% with stillbirths, and 16.1% with neonatal deaths in the chronic class. Type of loss was thus a meaningful indicator of class membership.

No significant differences were found comparing the recovery class to the chronic class.

Table 3
Covariate patterns within class membership (n = 676 parents).

<table>
<thead>
<tr>
<th>Class</th>
<th>Gender, woman</th>
<th>Previous loss, yes</th>
<th>Living children, no</th>
<th>Spontaneous loss, yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilient</td>
<td>17.1</td>
<td>2.2</td>
<td>3.9</td>
<td>2.3</td>
</tr>
<tr>
<td>Recovery</td>
<td>4.7</td>
<td>1.2</td>
<td>2.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Chronic</td>
<td>4.7</td>
<td>1.2</td>
<td>2.9</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Abbreviations: CI confidence interval, RRR relative risk ratio.

Table 4
Distribution of loss type within class membership (n = 676).

<table>
<thead>
<tr>
<th>Class</th>
<th>TOPFA n (%)</th>
<th>SA n (%)</th>
<th>Stillbirth n (%)</th>
<th>Neonatal death n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilient</td>
<td>208 (80.3)</td>
<td>118 (75.3)</td>
<td>110 (63.6)</td>
<td>58 (62.9)</td>
</tr>
<tr>
<td>Recovery</td>
<td>35 (13.5)</td>
<td>31 (17.0)</td>
<td>35 (20.2)</td>
<td>13 (21.0)</td>
</tr>
<tr>
<td>Chronic</td>
<td>16 (6.2)</td>
<td>14 (7.7)</td>
<td>28 (16.2)</td>
<td>10 (16.1)</td>
</tr>
</tbody>
</table>

Abbreviations: CI confidence interval, RRR relative risk ratio, TOPFA termination of pregnancy due to fetal anomalies.

4.2. Interpretation of results and comparison with other studies

In agreement with previous studies on grief trajectories (Bonanno and Malgaroli, 2020; Lundorff et al., 2020; Nielsen et al., 2019), the majority of the bereaved parents in the present study followed a resilient grief trajectory. To our knowledge, however, this is the first study to examine variations by loss type in a population of parents with a loss during pregnancy or the neonatal period.

We found that type of loss was strongly associated with class membership, i.e., spontaneous losses were associated with more severe grief patterns than TOPFA. In a stratified analysis with four categories of loss type, this association was, however, only statistically significant for stillbirths and neonatal deaths and not for spontaneous abortions. Thus, whether the loss was spontaneous, may not play as important a role in grief response as hypothesized. The results for neonatal death became insignificant in a sensitivity analysis where neonatal death was defined regardless of gestational age, i.e., also including losses from 14 to 21 weeks. This suggests that gestational age may be an important factor in grief response variations. However, other inherent variations in loss type could also be of relevance, e.g., whether the child was liveborn, and whether a liveborn child was alive for only minutes or several days. These differences in loss type should be explored in future studies.
In our study, women were 17 times more likely to be in the recovery class and 4 times more likely to be in the chronic class than in the resilient class when compared to men. These differences could be explained by biological, societal, and cultural gender differences in grief, but whether the parent carried the child may be a more important factor. The parent carrying the child may be more attached to the child and therefore have a stronger grief response than the partner. In our study, a few of the women (n = 6) were partners and not the one who had carried the child. To explore if the variations in grief response is related to gender or to whether the parent carried the child a larger sample size is needed. Furthermore, gender can only be interpreted within a binary framework as the questionnaires held no other gender options than man and woman.

Parents without living children at the time of the loss were more likely to be in the recovery or chronic class than the resilient class. That is, these parents experienced more severe grief reactions than parents with living children. This suggest that clinician should be more attentive to first-time parents’ reactions to a loss. Having had previous losses in pregnancy was also associated with being in the recovery and chronic class. However, this was not statistically significant, which could be explained by the low prevalence and hence lack of power.

4.3. Strengths and limitations

Some limitations of the study should be mentioned. A previous study from the Life After the Loss cohort estimated an overall participation rate of 39% (Eklund et al., 2020) and hence issues related to self-selection must be considered. Studies investigating selection bias have been carried out in other Danish pregnancy cohort studies and the results showed that although initial participation rates were low, bias due to selection was only modest (Nohr and Liew, 2018). As responses to the 1-month-, 7 month- and 13-month questionnaires were 89.9%, 92.9%, and 71.7%, respectively, issues related to attrition should also be considered. Loss to follow-up could be related to both type of loss and grief response and the direction of possible bias is unknown. Restricting the cohort to complete responses did not change the estimates and the risk of attrition bias is thus considered low. Important covariates were measured and included in all models, but information on pre-loss mental health and medication including antidepressants, which may have modified our findings, was unavailable. Given the analytical model, we were not able to account for covariates that occurred after study entry, e.g., use of counselling and obtained pregnancies during follow-up, as this would introduce issues of possible reverse causation. As data was self-reported, misclassification issues should be considered. Some misclassification on type of loss is expected as the categorization is based on whether the child was live- or stillborn. Legally, this is established by a health care professional and especially for births at low gestational ages the parent and health care professional may not be in agreement. Possible misclassification on this variable is considered undifferentiated and would cause bias toward the null.

Our study also has a number of strengths; the large sample size secured statistical power for analyses of variations by type of loss, and sub-analyses by gender and whether the parent had any living children. Both parents were included in the cohort, which allowed for analysis of variations in grief response by gender. The parents were followed for 13 months allowing for long-term evaluation of grief. The study results can be generalized to similar settings i.e., Scandinavian countries and most Western European countries. When generalized to other settings the context should be considered. As the Life After the Loss cohort was established in 2016, PGD symptoms were measured using the criteria set forth by Prigerson et al., in 2009 using the PG-13. While most symptoms from ICD-11 are included in the original PG-13 scale, some, such as preoccupation with the deceased, is not. In the present study we therefore used the PG-13 for a single, continuous measure of intensity of overall PGD symptoms. Consequently, our results cannot be directly translated to ICD-11 PGD.

Our study describes variations in PGD symptoms across time and PGD caseness was not measured, as it requires a formal psychiatric evaluation. We found that 10% of the parents had a chronic grief trajectory with persistent high levels of PGD symptoms, however, this should not be interpreted as a prevalence of PGD and therefore comparisons across studies warrant caution.

5. Conclusion

When a child is lost in pregnancy or early after birth, although the majority of bereaved parents are resilient, 10% experience chronic PGD symptoms in the present study. This distribution, however, depended on type of loss and 16% of parents with a stillbirth or a neonatal death were in the chronic class. Being woman and having no living children were also associated with more severe grief patterns. This knowledge can be used to identify those who are at increased risk of developing a chronic grief pattern. Still, more factors that may influence grief should be investigated including level of professional and social support, bereavement care during and after the loss, as well as the influence of future pregnancies. Furthermore, future studies should investigate if bereaved parents could benefit from targeted early interventions.

Author statement

All authors contributed substantially to the manuscript.

Sofie Mørk: conceptualization; data curation; writing – original draft; methodology; formal analysis; funding acquisition; writing – review & editing. Dorthe Hvidtjørn: conceptualization; investigation; supervision; funding acquisition; writing – review & editing. Søren Möller: conceptualization; writing - review & editing. Tine Brink Henriksen: conceptualization; writing - review & editing. Maja O’Connor: conceptualization; writing - review & editing. George A. Bonanno: methodology; formal analysis; writing - review & editing.

Funding

The study was funded by a grant from the Research and Innovations Fund under the Danish Regions awarded to Dorthe Hvidtjørn and by a grant from the Danish Association of Midwives awarded to Sofie Mørk. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Declaration of competing interest

None.

Acknowledgements

We would like to acknowledge the parents who participated in the Life After the Loss cohort, without whom this study had not been possible.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpsychires.2023.10.052.

References
