

## PAPER

# Preloss grief in family caregivers during end-of-life cancer care: A nationwide population-based cohort study

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## Abstract

**Objective:** Severe grief symptoms in family caregivers during end-of-life cancer trajectories are associated with complicated grief and depression after the loss. Nevertheless, severe grief symptoms during end-of-life caregiving in caregivers to cancer patients have been scarcely studied. We aimed to explore associations between severe preloss grief symptoms in caregivers and modifiable factors such as depressive symptoms, caregiver burden, preparedness for death, and end-of-life communication.

**Methods:** We conducted a population-based prospective study of caregivers to 9512 patients registered with drug reimbursement due to terminal illness, and 3635 caregivers responded. Of these, 2865 caregivers to cancer patients completed a preloss grief scale (Prolonged Grief 13, preloss version). Associations with factors measured during end-of-life caregiving were analyzed using logistic regression.

**Results:** Severe preloss grief symptoms were reported by 432 caregivers (15.2%). These symptoms were associated with depressive symptoms (adjusted odds ratio [OR] = 12.4; 95% CI, 9.5-16.3), high caregiver burden (adjusted OR = 8.3; 95% CI, 6.3-11.1), low preparedness for death (adjusted OR = 3.3; 95% CI, 2.5-4.4), low level of communication about dying (adjusted OR = 3.2; 95% CI, 2.2-4.4), and “too much” prognostic information (adjusted OR = 2.8; 95%, 1.7-4.6).

**Conclusions:** Severe preloss grief symptoms were significantly associated with distress, low preparedness, and little communication during caregiving. Thus, severe preloss grief symptoms may be a key indicator for complications in caregivers of cancer patients in an end-of-life trajectory. Targeted interventions are needed to support family caregivers with severe preloss grief symptoms. Development of preloss grief assessment tools and interventions should be a priority target in future research.

## KEYWORDS

cancer care, caregivers, caregiver burden, depression, end-of-life, end-of-life communication, grief, oncology, preloss grief, preparedness

## 1 | BACKGROUND

The role of grief symptoms in family caregivers before the death of a close relative has been debated in the literature for years.<sup>1-3</sup> Recent studies have found severe preloss grief symptoms (PGS) in 1 of 7 caregivers,<sup>4,5</sup> and severe PGS have shown to be a risk factor for complicated grief (CG) in longitudinal studies.<sup>4,6,7</sup> Grief symptoms in caregivers before death have been termed both “preloss grief” and “anticipatory grief.” These concepts can be described as a grief

reaction due to multiple losses during end-of-life caregiving.<sup>1,3,8,9</sup> The caregiver may experience losses when the patient gets seriously ill, when disease causes inevitable changes in daily life, and when the possibilities for the future are limited due to the approaching death.<sup>8</sup>

End-of-life caregiving may have similarities to other non-bereavement multiple loss situations. Papa et al have shown that the level of severe grief symptoms in persons experiencing a nonbereavement loss, such as divorce-related loss, was comparable with the level of severe grief symptoms during bereavement.<sup>10</sup> In the

same way, being a caregiver to a terminally ill patient may potentially facilitate severe grief symptoms.

Earlier studies on PGS in caregivers to terminally ill cancer patients are few and have predominantly been conducted in small-scale setups.<sup>4,6,7,11,12</sup> Severe PGS have been associated with being partner to the patient,<sup>4,7</sup> female gender,<sup>4,7</sup> low education,<sup>12</sup> young patient age,<sup>12</sup> and living with the patient.<sup>4,7,12</sup> Furthermore, prior stressful life events<sup>11</sup> and depression before the loss<sup>11,12</sup> have also been associated with severe PGS. However, to the best of our knowledge, associations between severe PGS and several modifiable factors related to family caregivers of terminally ill cancer patients have not previously been studied, but such associations may provide important knowledge for health professionals during encounters with family caregiver in end-of-life care. Previously, high caregiver burden,<sup>13,14</sup> low preparedness for the patient's death,<sup>15-18</sup> little communication in the family about dying,<sup>19,20</sup> and prognostic information from health professionals<sup>21</sup> have been associated with complications for caregivers.

Several factors may interplay, as also reflected in the “integrative risk factor framework for the prediction of bereavement outcome” (IRFF) by Stroebe et al.<sup>22</sup> The IRFF builds on empirical studies and bereavement theories such as the dual process model by Stroebe et al and the cognitive stress, appraisal, and coping theory by Lazarus and Folkman.<sup>22</sup> The model integrates situational, intrapersonal, and interpersonal factors, which are mediated by caregiver's coping style and emotion regulation.

We investigated the role of PGS in caregivers to patients in end-of-life cancer care to reveal factors that may improve clinical care for family caregivers. We hypothesized that a complexity of factors may affect caregiver's grief process already during caregiving. This process, although brought on by other losses, resembles the grief process during bereavement. Specifically, we hypothesized that severe PGS would be associated with high levels of depressive symptoms and caregiver burden and low levels of preparedness and communication.

The IRFF served as a model of grief during caregiving and as a framework to explore several factors (Figure 1). Hence, in a population-based caregiver cohort, we aimed to investigate PGS and the associations with situational, intrapersonal, and interpersonal factors in family caregivers of end-of-life cancer patients.

## 2 | METHODS

We conducted a nationwide, population-based study of Danish caregivers to cancer patients with physician-assessed terminal illness.

### 2.1 | Setting

In Denmark, terminally ill patients are entitled to drug reimbursement, which is formally registered with a time lag of only a few days after receipt of the application at the Danish Medicines Agency.<sup>23</sup> Approximately 90% of patients granted with drug reimbursement has a cancer diagnosis.<sup>24</sup>

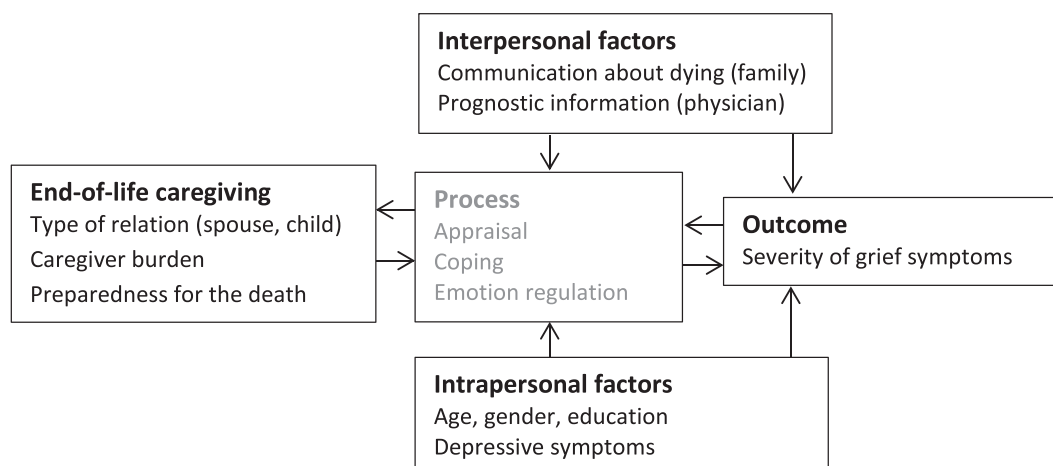
### 2.2 | Sampling and data collection

In 2012, letters were consecutively sent to all eligible patients registered with drug reimbursement due to terminal illness ( $n = 9512$ ) with a request to forward an enclosed questionnaire to their closest relative. In total, 3635 caregivers (38%) responded by completing a baseline questionnaire including a consent form. Data were analyzed for a total of 2865 caregivers to patients with a cancer diagnosis who completed a PGS assessment prior to the patient's death (Figure 2).

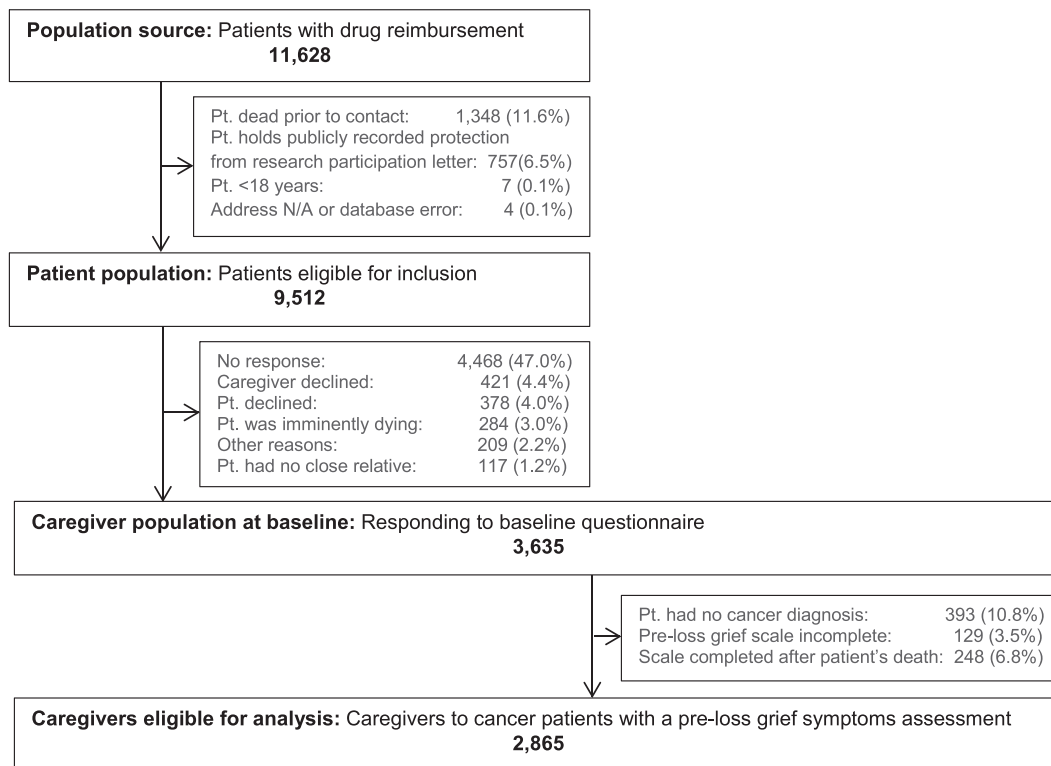
### 2.3 | Data

#### 2.3.1 | Register-based data

All Danish citizens are registered with a personal ID number (CPR number). Register data were retrieved from Danish national health registers and linked with questionnaire data through CPR numbers at Statistics Denmark.<sup>25,26</sup> Dates of death were obtained from the Danish Civil Registration System<sup>27</sup> and used to calculate both the patient's survival time (number of days) from the date of drug reimbursement and from completion of the questionnaire. Socioeconomic variables were retrieved from Statistics Denmark. These included cohabitation status (married/cohabiting and living alone) and educational level (<10, 10-15, and  $\geq 15$  years) according to the ISCED.<sup>28</sup> ICD-10 codes for cancer diagnoses were obtained from the Danish Cancer Registry<sup>29</sup>



**FIGURE 1** Model of investigated factors associated with caregiver's severe grief symptoms based on “the integrative risk factor framework for the prediction of bereavement outcome” by Stroebe et al.<sup>22</sup> Grey text indicates unmeasured factors in this study



**FIGURE 2** Flow diagram of the investigated population of caregivers to patients (pt.) formally registered with drug reimbursement due to terminal illness in 2012

and categorized (colorectal, lung, breast, prostate, hematological, and other cancers).

### 2.3.2 | Questionnaire-based data

Scales were chosen based on prior studies and the psychometric properties of the scale. Preloss grief symptoms were measured on a 12-item preloss version (preloss PG)<sup>5,8</sup> of the Prolonged Grief 13 scale (PG-13),<sup>30</sup> which has been translated into Danish according to the WHO recommendations<sup>31</sup> and has shown good psychometric properties (unpublished material). In line with earlier research, the original scale was changed and adapted into a preloss context.<sup>4,7</sup> Thus, an original item regarding 6-month duration of grief symptoms was not included as symptom duration was not applicable. Because of the preloss context, the PG-13 item 10 about “moving on” was changed into an item about “hard to concentrate” inspired by a previous PGS study.<sup>11</sup> A PGS sum score for items 1 to 11 and a PGS criteria score (mild or severe) were calculated on the basis of the criteria for CG, in line with prior studies.<sup>4,7</sup>

Depressive symptoms were measured at baseline by the 21-item Beck Depression Inventory-II.<sup>32</sup> A sum score was calculated according to the manual<sup>32</sup> and dichotomized (none-mild or moderate-severe). The scale has been used previously in palliative care research, and item 21 on sexuality was then considered offensive, and an additional category (does not apply) was added.<sup>33</sup> The Burden Scale for Family Caregivers measured caregiver burden as a sum score and was dichotomized according to the manual (none-mild or moderate-very severe).<sup>34</sup> The scale has been translated into Danish and validated in

a palliative care context.<sup>34</sup> Communication about dying was measured by the Couples' Communication about Illness and Death scale,<sup>21</sup> which was translated into Danish according to the WHO recommendations.<sup>31</sup> The sum score was dichotomized with a cutoff of 2 (low or high). Preparedness for death was measured by the question: “To which extent do you feel prepared that your relative might die from the illness?,” in line with prior studies<sup>16,18</sup> and presented as a dichotomous variable divided into *to a low degree* and *to some/high degree* (low and high). The ad hoc item: “How much information did you and your relative receive from the doctors about the future outlook for your relative's illness?” (too much, adequate, not enough, and none) measured the caregiver's perceived level of information about the patient's prognosis. Background questions were relation (partner, adult child, and other), employment status (working, compassionate leave, and retired/unemployed), and caregiving time (0-2, 3-8, 9-17, and 18-24 h/d).

### 2.4 | Statistical methods

Variables were presented as proportions for categorical variables, as means with 95% confidence interval (95% CI) for continuous variables and as medians with an interquartile interval (IQI) for survival time measures. Associations between severe PGS and the selected variables were estimated with odds ratios (ORs) with 95% CIs from univariable analyses and multivariable logistic regression analyses adjusting for caregiver's age and gender and the patient's survival time from date of data collection. All statistical analyses were performed using Stata version 14.0.

### 3 | RESULTS

Caregivers had a mean age of 61 years, 69% were female and 64% were partners (Table 1). Patients had a mean age of 70 years. The questionnaires were completed with a median of 74 days (IQR: 29-176) before the patient's death and the median survival time from drug reimbursement was 97 (IQR: 47-199). Patients without a participating caregiver had a mean age of 72 years and a median time from drug reimbursement to death of 47 (IQR: 15-144).

Severe PGS were reported by 435 caregivers (15.2%). The median time from completion of the questionnaire was 65 days (IQR 24-174) among family caregivers with severe PGS and 76 days (IQR 29-176) among caregivers with mild PGS. Severe PGS were significantly associated with situational factors: high caregiver burden (adjusted OR = 8.3; 95% CI, 6.3-11.1) and low level of preparedness (adjusted OR = 3.3; 95% CI, 2.5-4.4), intrapersonal factors: depressive symptoms (adjusted OR = 12.4; 95% CI, 9.5-16.3), and interpersonal factors: low level of communication about dying (adjusted OR = 3.2; 95% CI, 2.2-4.4) and prognostic information perceived as "too much" (adjusted OR = 2.8; 95% CI, 1.7-4.6) or "not enough" (adjusted OR = 1.7; 95% CI, 1.3-2.4) compared to "adequate" (Table 2).

### 4 | DISCUSSION

In this population-based cross-sectional study, severe PGS were reported by 15.2%. Severe PGS were associated with several factors, such as preloss depressive symptoms, high caregiver burden, low preparedness for death, little communication in the family about dying, and too much or not enough prognostic information in an analysis adjusted for age, gender, and survival time from completion of the questionnaire.

The 15.2% prevalence of severe PGS found in this study is comparable with a prior study in a specialized palliative care setting.<sup>4</sup> The substantial proportion of caregivers suffering from severe PGS<sup>1,4</sup> underlines the impact of losses encountered during end-of-life cancer trajectories. The patient's declining health, restrictions in daily life, and significant changes in the future perspectives for both patient and caregiver may cause psychological distress in caregivers.

In this cross-sectional study, severe PGS were associated with situational factors of end-of-life caregiving and with both intrapersonal and interpersonal factors (Figure 1). Interpreted in the light of the IRFF, severe PGS may interplay with several factors in a multifaceted process that is likely to be mediated by caregiver's coping strategies and emotion regulation.<sup>22</sup>

A new finding of this study was that caregivers with high caregiver burden had a ninefold higher likelihood of severe PGS compared to caregivers without caregiver burden, which indicates high physical and practical demands and impaired emotional and social functioning.<sup>13</sup> The strong association between severe PGS and high caregiver burden may reflect that severe PGS are related to caregivers' perception of the severe emotional burden caused by losses during caregiving. Another explanation could be that severe PGS might be related to impairment of the caregiver's social functioning, which is a part of high caregiver burden. Moreover, Kim et al have shown that perceived high caregiver burden is associated with an emotional

coping style in dementia caregivers.<sup>13</sup> Emotional coping might be interpreted as "inefficient" due to a constant high level of emotional expression and is a risk factor for adverse outcome according to the grief theories serving as the foundation of the IRFF.

Another new finding in our study was that severe PGS were associated with low preparedness for the impending death. Hebert et al suggested that preparedness entails emotional, cognitive, and behavioural dimensions.<sup>35</sup> High preparedness implies that caregivers are preparing by addressing both practical issues, eg, financial affairs, and emotional responses to the impending loss.<sup>35</sup> In contrast, low preparedness may be connected with caregivers' difficulties in dealing emotionally with the situation and acknowledging signs of the impending death. In this cross-sectional study, severe PGS was found to be associated with low preparedness, which may be linked with lack of emotional preparedness in the caregiver and denial of the impending death.

Depressive symptoms have been associated with severe PGS in previous small-scale studies.<sup>11,12</sup> An overlap in symptoms of depression and grief has been shown.<sup>30,36</sup> Grief is related to the loss, whereas depressive symptoms indicate lowered mood irrespective of the circumstances.<sup>36</sup> Our findings of a strong association between severe PGS and depressive symptoms point to a serious impact of severe PGS on caregivers facing an end-of-life trajectory for a close relative.

We found a connection between severe PGS and low levels of communication about dying. One explanation could be that caregivers with severe PGS might have difficulty communicating about emotions related to dying because their coping and emotion regulation is challenged. Little communication in the family about dying has previously been associated with depressive symptoms during caregiving.<sup>20</sup> A review reported a need of support in caregivers for managing communication within the family,<sup>19</sup> which is consistent with our findings.

Severe PGS were also associated with caregiver's perception of the level of provided prognostic information as either too much or not enough compared to adequate. Because of the cross-sectional study design, we do not know if caregivers might perceive prognostic information as inadequate due to severe PGS or whether the delivery of information triggered severe PGS in caregivers. However, we hypothesize that it may be because of an information mismatch involving caregivers' perception of information and health professionals' lack of adaptation of the communication to the vulnerable situation. Prior studies point at positive effects of end-of-life communication, including prognostic information, on patient and caregiver outcome.<sup>21,37</sup> Furthermore, prognostic information needs to be individualized as most family caregivers prefer precise information, whereas others appreciated avoidance of prognostic information.<sup>38</sup> Patient's coping style may play a role as a low level of depression in family caregivers was associated with acceptance coping in patients.<sup>37</sup> Still, a better understanding is necessary of preloss grief, the family's information needs and how to individualize the information according to the personal preferences and coping style of both the patient and caregiver.

In summary, family caregivers encounter losses during end-of-life cancer care that cause grief. Several factors are likely to interplay in a complex pattern during the process of grief. Factors of end-of-life

**TABLE 1** Characteristics of patients and caregivers and questionnaire-based assessments of caregivers (n = 2865)

Caregiver's socioeconomic factors	N	%		
Age, y <sup>a</sup> , mean (95% CI)	-		60.5	(60.1-61.0)
Gender				
Male	855	(31.0)		
Female	1900	(69.0)		
Relation				
Partner/spouse	1786	(63.6)		
Adult child	816	(29.0)		
Other	208	(7.4)		
Cohabitation status				
Married or cohabiting	2395	(87.2)		
Living alone	352	(12.8)		
Educational level				
<10 y	779	(28.7)		
10-15 y	1319	(46.6)		
>15 y	614	(22.7)		
Employment status				
Working	1026	(37.1)		
Leave (compassionate/other)	435	(15.7)		
Not working (retired/unemployed)	1302	(47.1)		
Patient-related factors	N	%		
Patient age, y <sup>a</sup> , mean (95% CI)	-	-	69.6	(69.2-70.0)
Patient gender				
Male	1494	(52.2)		
Female	1371	(47.8)		
Diagnosis				
Lung cancer	719	(25.1)		
Colorectal cancer	374	(13.1)		
Breast cancer	200	(7.0)		
Prostate cancer	215	(7.5)		
Hematological cancer	107	(3.7)		
Other cancer	1250	(43.6)		
Patient survival time				
From drug reimbursement to death, d, median (IQI)	-	-	97	(47-199)
From completion of questionnaire to death, d, median (IQI)	-	-	74	(29-176)
Caregiver assessments	N	%	Mean	(95% CI)
Time spent on caregiving				
0-2 h/d	944	(33.7)		
3-8 h/d	732	(26.2)		
9-17 h/d	412	(14.7)		
18-24 h/d	711	(25.4)		
Prognostic information <sup>b</sup>				
Too much	91	(3.4)		
Adequate	2015	(75.4)		
Not enough	397	(14.9)		
No	168	(6.3)		
Communication about dying <sup>c</sup>				
High	2502	(91.7)	3.8	(3.7-3.8)
Low	227	(8.3)		

(Continues)

TABLE 1 (Continued)

Caregiver assessments	N	%	Mean	(95% CI)
Preloss depressive symptoms <sup>d</sup>			12.3	(12.0-12.6)
None-mild	2270	(82.8)		
Moderate-severe	473	(17.2)		
Caregiver burden <sup>e</sup>			25.3	(24.8-25.8)
None-mild	2463	(88.3)		
Moderate-very severe	326	(11.7)		
Preparedness for the death <sup>f</sup>			2.0	(1.9-2.0)
High	2210	(80.6)		
Low	531	(19.4)		
Preloss grief symptoms <sup>g</sup>			29.0	(28.7-29.4)
Mild	2430	(84.8)		
Severe	435	(15.2)		

Abbreviation: IQI, interquartile interval.

<sup>a</sup>Age at inclusion.

<sup>b</sup>Information from physician about the patient's risk of dying from the illness.

<sup>c</sup>Couples' Communication about Illness and Death.<sup>20</sup>

<sup>d</sup>Beck's Depression Inventory-II.<sup>32</sup>

<sup>e</sup>Burden Scale for Family Caregivers.<sup>34</sup>

<sup>f</sup>Preparedness based on the item "To which extent do you feel prepared that your relative might die from the illness?"

<sup>g</sup>Preloss version of the Prolonged Grief 13 scale.<sup>4,7,30</sup>

caregiving remained strongly associated with severe PGS, when we adjusted for survival time from data collection. Hence, severe PGS may be an overlooked key factor in palliative cancer care that expresses caregiver's difficulty with adapting to the situation.

#### 4.1 | Strengths and limitations

Strengths of this study include the systematic identification of family caregivers, which is likely to have reduced the risk of selection bias. The large number of included caregivers ensured higher statistical precision than in earlier studies. Further advantages were the low level of missing data from questionnaires (below 4.3%) and the register-based data retrieved from nationwide registries with high completeness.<sup>26</sup>

However, as the study was cross-sectional, no causal inference can be drawn. Furthermore, a limitation might be the moderate response rate; 38% of the caregivers to the contacted patients completed the questionnaire, which may impair the representativeness of the participating caregivers to patients with drug reimbursement. Patients with participating caregivers were younger than patients with nonparticipating caregivers. This might have caused an overestimation of severe PGS in participating caregivers because of an association of severe PGS with young patient age.<sup>12</sup> Furthermore, patients with participating caregivers had longer survival time than patients with nonparticipating caregivers, which might have caused an underestimation of distress.

The study was limited by the lack of validation of the preloss version of the PG-13 measuring PGS. However, the scale was similar to the instrument used in previous studies on PGS,<sup>5,8</sup> which ensured comparability. We used the validated PG-13, which has been translated into Danish according to the WHO recommendations (unpublished paper). We changed the original item 10 of the PG-13

to a preloss context, and this might have influenced the comparability. In another study of caregivers from our cohort, we compared levels of grief symptoms with and without this item, and we cannot rule out that the preloss version of the PG-13 used in this study might overestimate the prevalence of severe PGS.<sup>6</sup> Development of a validated preloss grief scale and confirmation of results are needed. Overall, the findings are considered generalizable in comparable caregiver settings.

#### 4.2 | Clinical implications

Acknowledgement of severe PGS in caregivers during end-of-life cancer care has previously received little attention in research and clinical care. We expect that grief symptoms of this magnitude may affect caregiver's quality of life, distress levels, and ability to provide care. Severe PGS call for targeted supportive interventions. Psychological intervention to facilitate coping and emotion regulation has been shown to benefit bereaved caregivers with CG<sup>39</sup> and such interventions may also alleviate severe PGS and improve the end-of-life period. Furthermore, support for caregivers during the patient's end-of-life trajectory may focus on alleviating the caregiver burden, for instance, by providing practical support and respite care,<sup>13</sup> increasing the preparedness through interventions,<sup>40</sup> facilitating the communication in the family about dying,<sup>19</sup> and ensuring that prognostic information is adapted to the needs of the family.

Our findings suggest that systematic assessment of grief symptoms in caregivers may help identify severe PGS in family caregivers and reveal specific challenges or needs during palliative cancer care.

No psychometrically tested tool directed at PGS is currently available for use in clinical practice, and no interventions targeting PGS have been reported. These issues may be subject to future research.

**TABLE 2** Associations (ORs) between severe preloss grief symptoms and each of the socioeconomic factors and the different aspects of caregiver assessment (n = 2865)

	Preloss Grief Symptoms <sup>a</sup>				OR	95% CI	Adjusted OR*	95% CI
	Severe		Mild					
	n	%	N	%				
<i>Socioeconomic factors in caregiver</i>								
<i>Age<sup>b</sup>, y</i>								
<55	143	(34.7)	765	(32.6)	1.2	(0.9-1.5)	0.6	(0.4-1.1)
55-65	115	(27.9)	622	(26.6)	1.1	(0.9-1.5)	0.9	(0.6-1.3)
>65	154	(37.4)	956	(40.8)	Ref		Ref	
<i>Gender</i>								
Female	325	(78.9)	1575	(67.2)	1.8	(1.4-2.3)**	1.8	(1.4-2.4)**
Male	87	(21.1)	768	(32.8)	Ref		Ref	
<i>Relation</i>								
Partner/spouse	305	(72.1)	1481	(62.0)	1.6	(1.3-2.0)**	2.8	(2.0-3.7)**
Adult child/other	118	(27.9)	906	(38.0)	Ref		Ref	
<i>Education</i>								
<10 y	138	(33.5)	641	(27.8)	1.8	(1.3-2.4)**	2.1	(1.5-3.0)**
10-15 y	200	(48.5)	1119	(48.5)	1.5	(1.1-2.0)**	1.5	(1.1-2.0)**
>15 y	67	(16.3)	547	(23.7)	Ref		Ref	
<i>Caregiver assessments</i>								
<i>Preloss depressive symptoms<sup>c</sup></i>								
None-mild	171	(41.9)	2099	(89.9)	Ref		Ref	
Moderate-severe	237	(58.1)	236	(10.1)	12.3	(9.7-15.6)**	12.4	(9.5-16.3)**
<i>Caregiver burden<sup>d</sup></i>								
None-mild	257	(61.1)	2206	(93.2)	Ref		Ref	
Moderate-very severe	164	(38.9)	162	(6.8)	8.7	(6.7-11.2)**	8.3	(6.3-11.1)**
<i>Preparedness<sup>e</sup></i>								
High	271	(64.4)	1939	(83.6)	Ref		Ref	
Low	150	(35.6)	381	(16.4)	2.8	(2.2-3.5)**	3.3	(2.5-4.4)**
<i>Communication about dying<sup>f</sup></i>								
High	340	(82.5)	2163	(93.3)	Ref		Ref	
Low	72	(17.5)	156	(6.7)	3.0	(2.2-4.0)**	3.2	(2.2-4.4)**
<i>Prognostic information<sup>g</sup></i>								
Too much	27	(6.7)	64	(2.8)	2.7	(1.7-4.4)**	2.8	(1.7-4.6)**
Adequate	270	(67.2)	1745	(76.9)	Ref		Ref	
Not enough	85	(21.1)	312	(13.8)	1.8	(1.3-2.3)**	1.7	(1.3-2.4)**
No	20	(5.0)	148	(6.5)	0.9	(0.5-1.4)	0.7	(0.4-1.3)

Abbreviation: OR, odds ratio.

<sup>a</sup>Preloss version of the Prolonged Grief 13 scale.<sup>4,7,30</sup>

<sup>b</sup>Age at inclusion.

<sup>c</sup>Beck's Depression Inventory-II.<sup>32</sup>

<sup>d</sup>Burden Scale for Family Caregivers.<sup>34</sup>

<sup>e</sup>Preparedness based on the item "To which extent do you feel prepared that your relative might die from the illness?".

<sup>f</sup>Couples' Communication about Illness and Death.<sup>20</sup>

<sup>g</sup>Information from physician about the patient's risk of dying from the illness.

\*Adjusted for caregiver's age and gender and patient's survival time from data collection.

\*\*P value < .05.

## 5 | CONCLUSION

One in 7 family caregivers reported severe PGS during caregiving. This is the first study to show associations between severe PGS and factors related to end-of-life caregiving, such as high caregiver burden, low

preparedness, and little communication. These factors interplay in a complex manner through coping and emotion regulation. Severe PGS could be a key indicator for complications in caregivers during the cancer patient's end-of-life trajectory. These findings call for alleviation of severe preloss grief symptoms and reduction of complications, such as

perceived high caregiver burden and depressive symptoms in caregivers. Hence, development of PGS measurement tools and tailored interventions should be a priority target for future research.

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## CONFLICTS OF INTEREST

None to declare.

## ETHICAL APPROVAL

The Committee on Health Research Ethics of the Central Denmark Region confirmed that this questionnaire study did not require ethical clearance according to the Danish Act on Research Ethics Review of Health Research Projects. The study was approved by the Danish Data Protection Agency (file no. 2013-41-2603).

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