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The Norwegian traumatic grief inventory-self report plus (TGI-SR+): a psychometric evaluation in traumatically bereaved people

Lonneke I. M. Lenferink ^{a,b,c}, Iren Johnsen ^d, Pål Kristensen ^d, Nataskja-Elena Kersting Lie ^d and Josefin Sveen ^{d,e}

^aDepartment of Psychology, Health & Technology, Faculty of Behavioural Management and Social Sciences, University of Twente, Enschede, the Netherlands; ^bDepartment of Clinical Psychology, Faculty of Social Sciences, Utrecht University, Utrecht, The Netherlands; ^cDepartment of Clinical Psychology and Experimental Psychopathology, Faculty of Behavioral and Social Sciences, University of Groningen, Groningen, the Netherlands; ^dCentre for Crisis Psychology, Faculty of Psychology, University of Bergen, Bergen, Norway; ^eDepartment of Women's and Children's Health, Uppsala University, Uppsala University Hospital, Uppsala, Sweden

ABSTRACT

Background: Prolonged grief disorder (PGD) has been added to the ICD-11 and DSM-5-TR. The Traumatic Grief Inventory-Self Report Plus (TGI-SR+) assesses self-rated PGD intensity as defined in ICD-11 and DSM-5-TR. The TGI-SR+ is available in multiple languages, but has not been validated yet in Norwegian.

Objective: The aim of this study was to evaluate the psychometric properties of the Norwegian TGI-SR+.

Method: Bereaved adults ($N = 307$) whose child or sibling died ≥ 6 months ago due to a sudden or violent loss completed the TGI-SR+ and measures for posttraumatic stress, depression, and precursor PGD symptoms. We examined the factor structure and internal consistency of the ICD-11 and DSM-5-TR PGD items. Convergent validity and known-groups validity was evaluated. Probable PGD cases, pair-wise agreement between diagnostic scoring rules for both PGD criteria-sets, and cut-off scores were calculated.

Results: The 1-factor model for ICD-11 and DSM-5-TR PGD showed the best fit and demonstrated good internal consistency. Convergent validity was supported by strong associations between summed ICD-11 and DSM-5-TR PGD scores and summed posttraumatic stress, depression, and precursor prolonged grief scores. Known-groups validity was supported by PGD intensity being related to educational level and time since loss. The perfect pair-wise agreement was reached using the ICD-11 and DSM-5-TR PGD diagnostic scoring rules. The optimal cut-off score for detecting probable PGD cases, when summing all TGI-SR+ items, was ≥ 73 .

Conclusions: The Norwegian TGI-SR+ seems a valid and reliable instrument to assess ICD-11 and DSM-5-TR PGD intensity after losing a child or sibling under traumatic circumstances.

El inventario de autoreporte Noruego de duelo traumático plus: una evaluación psicométrica en personas con duelo traumático

Antecedentes: El Trastorno de Duelo Prolongado (PGD por sus siglas en inglés) fue añadido al CIE-11 y al DSM-5-TR. El Inventario de Auto reporte de Duelo Traumático Plus (TGI-SR+) evalúa la intensidad autoevaluada del PGD, como es definido en el CIE-11 y el DSM-5-TR. El TGI-SR+ está disponible en muchos idiomas, pero no ha sido validado aún en noruego.

Objetivo: El objetivo de este estudio fue evaluar las propiedades psicométricas del TGI-SR+ noruego.

Método: Adultos en duelo ($N = 307$) cuyos hijos o hermanos murieron hace ≥ 6 meses de manera repentina o violenta, completaron el TGI-SR+ y midieron para síntomas de estrés postraumático, depresión y síntomas precursores de PGD. Examinamos el factor estructural y la consistencia interna de los ítems de PGD en la CIE-11 y el DSM-5-TR. Se evaluó la validez convergente y de grupos conocidos. Se evaluaron los casos probables de PGD, la concordancia por pares entre las reglas de puntuación para ambos conjuntos de criterios de PGD y puntajes de corte.

Resultados: El Modelo de factor 1 para PGD de la CIE-11 y DSM-5-TR mostró el mejor ajuste y demostró buena consistencia interna. La validez convergente fue apoyada por una fuerte asociación entre los puntajes sumados para PGD de la CIE-11 y el DSM-5-TR, y los puntajes sumados para estrés postraumático, depresión y síntomas precursores de duelo prolongado. La Validez de grupos conocidos fue apoyada por la relación entre la intensidad del PGD y el nivel educacional y el tiempo desde la pérdida. Se alcanzó una concordancia perfecta por pares utilizando las reglas de puntuación diagnóstica de PGD de la CIE-11 y el DSM-5-TR. El puntaje de corte óptimo para detectar casos probables de PGD, luego de sumar todos los ítems del TGI-SR+, fue de ≥ 73 .

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PALABRAS CLAVE

Duelo prolongado; instrumentos; herramienta; evaluación; detección; validación

HIGHLIGHTS

- The TGI-SR+ is a self-report instrument assessing ICD-11 and DSM-5-TR prolonged grief disorder intensity.
- The Norwegian TGI-SR+ seems to be a valid and reliable instrument to assess prolonged grief disorder intensity.
- Optimal cut-off for detecting probable prolonged grief disorder cases is ≥ 73 in this traumatically bereaved sample of parents and siblings.

CONTACT Josefin Sveen josefin.sveen@uib.no Centre for Crisis Psychology, Faculty of Psychology, University of Bergen, Postbox 7807, Bergen, Norway Department of Women's and Children's Health, Uppsala University, Uppsala University Hospital, Uppsala, Sweden

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Conclusiones: El TGI-SR+ Noruego parece un instrumento válido y confiable para evaluar la intensidad del PGD de la CIE-11 y el DSM-5-TR luego de perder un hijo o un hermano en circunstancias traumáticas.

When a loved one dies, grief reactions usually occur, such as yearning for the loved one and difficulty accepting the loss. For most bereaved people these reactions do not last. In fact, the most common response after loss is characterized by relatively low stable grief reactions (Nielsen et al., 2019; Pociunaite et al., 2023). However, a small minority of about 3–5% of people experience long-lasting and debilitating grief reactions after losing a loved one due to a natural cause (e.g. illness) (Rosner et al., 2021; Treml et al., 2024). These rates are about four times higher after a sudden or unexpected loss, such as acute death, homicide, suicide, disaster, accident, or stillbirth (Doering et al., 2022). When grief reactions are disrupting daily life to a significant degree a prolonged grief disorder (PGD) may be considered. PGD has only recently been recognized as a mental disorder and is now included in the International Classification of Diseases eleventh edition (ICD-11; World Health Organization, 2018) and the Diagnostic and Statistical Manual of Mental Disorders fifth edition, Text Revision (DSM-5-TR, American Psychiatric Association, 2022). While the label used to describe this phenomenon is the same, there are some important differences.

First, core symptoms in both ICD-11 and DSM-5-TR are intense longing for, and preoccupation with, the deceased (also referred to as separation distress). However, the accessory symptoms for fulfilling the diagnostic criteria differ both in number (10 versus 8, respectively) and in content (for more details see Eisma et al., 2022). Second, ICD-11 PGD can be diagnosed 6 months after loss, while the time criterion for DSM-5-TR PGD is 12 months after loss in adults. Next to these differences in symptom number, symptom content, and time criterion, different diagnostic scoring rules are used to detect probable PGD cases. More specifically, at least one of the separation distress symptoms must be present in both classification systems, while at least one accessory symptom should be present when using ICD-11 PGD criteria, and at least three accessory symptoms must be present using DSM-5-TR PGD criteria. Using these diagnostic criteria results in higher prevalence rates for ICD-11 PGD compared with DSM-5-TR PGD (Boelen & Lenferink, 2020; Haneveld et al., 2022; Lenferink et al., 2023; Rosner et al., 2021; Treml et al., 2024). However, when increasing the number of accessory symptoms to at least three for ICD-11 PGD results in optimal agreement in prevalence rates between ICD-11 and DSM-5-TR PGD (Treml et al., 2024).

Because ICD-11 and DSM-5-TR PGD criteria differ from each other, but also from precursor PGD criteria-sets (Boelen & Lenferink, 2020; Eisma et al., 2022; Lenferink et al., 2019), instruments are needed that measure the newest PGD criteria. To our knowledge, three measures are currently used in research to assess ICD-11 or DSM-5-TR PGD criteria-sets. The International Prolonged Grief Disorder Scale and the International Grief Questionnaire both assess ICD-11 PGD criteria (Hyland et al., 2024; Killikelly et al., 2020). The Prolonged Grief 13-Revised (PG-13-R) is developed to assess DSM-5-TR PGD (Prigerson et al., 2021).

Only two surveys exist that assess ICD-11 and DSM-5-TR PGD criteria simultaneously, namely the Aarhus PGD scale and the Traumatic Grief Inventory-Self Report + (TGI-SR+). The Aarhus PGD scale has, to the best of our knowledge, only been psychometrically evaluated in one Danish sample (O'Connor et al., 2023), while the TGI-SR+ has been validated in Dutch, French, Swedish, and Persian language (Ashouri & Yousefi, 2023; Kokou-Kpolou et al., 2022; Lenferink et al., 2022, 2024) and validation studies in multiple other languages, such as Chinese, Spanish, and Ukrainian, are underway. Also, an interview-version of the TGI-SR+, called the Traumatic Grief Inventory-Clinician Administered, has been validated in Dutch and German language (Lenferink et al., 2023). Moreover, versions of the TGI-SR+ are available that are specifically developed for, and co-developed with, bereaved children (Van Dijk et al., 2023) and relatives of missing people (Comtesse et al., 2023).

The TGI-SR+ is currently available in more than 15 languages, and more translations are coming. Using the same instrument to assess PGD severity, allows us to overcome the limitation that currently hinders reliable comparison of outcomes across studies, countries, and cultures (Comtesse et al., 2024; Lundorff et al., 2017). The psychometric properties of the original Dutch TGI-SR+ (Lenferink et al., 2022), and translated French, Persian, and Swedish TGI-SR+ have been evaluated in prior research (Ashouri & Yousefi, 2023; Kokou-Kpolou et al., 2022; Lenferink et al., 2024). Across these languages, a one-factor model fit the data best of the items representing ICD-11 and DSM-5-TR PGD symptoms. The items representing ICD-11 and DSM-5-TR PGD showed good reliability based on strong internal consistency and temporal stability values; the latter was examined in Dutch, French, and Persian version. Convergent

validity of the TGI-SR + was demonstrated by it being positively related to summed scores of posttraumatic stress disorder (PTSD), depression, anxiety, and precursor PGD criteria assessed with PG-13. For the Dutch, French, Swedish, and Persian version, the known-groups validity was supported by showing among others that women (vs man), and people who did not obtain (vs did obtain) a university or college degree, more recently bereaved, and people whose loved one died due to unnatural cause (vs. natural cause) reported higher ICD-11 and DSM-5-TR PGD severity.

These prior validation studies indicate that the TGI-SR + is a valid and reliable instrument to assess ICD-11 and DSM-5-TR PGD severity in Dutch, French, Persian, and Swedish bereaved people. However, it is important to evaluate the psychometric properties of the TGI-SR + when used in other languages or contexts. This helps us further in harmonizing and comparing research findings in bereaved people across the world.

In this study we psychometrically evaluated the Norwegian TGI-SR + in a sample of adults who experienced a sudden, unexpected, or violent loss of a child or sibling, also referred to as a potentially traumatic loss. First, the factor structure of the TGI-SR + was examined. Similar to the Dutch and Swedish (using confirmatory factor analysis (CFA)) and French and Persian (using exploratory factor analysis (EFA)) TGI-SR + validation studies (Ashouri & Yousefi, 2023; Kokou-Kpolou et al., 2022; Lenferink et al., 2022, 2024), we expected an acceptable fit for the 1-factor models of the TGI-SR + items assessing ICD-11 and DSM-5-TR PGD symptoms and no improvement of fit for the 2-factor models. Second, we anticipated that the items assessing ICD-11 and DSM-5-TR symptoms had good reliability. Third, to provide evidence for convergent validity, we expected positive associations between ICD-11 and DSM-5-TR items on the one hand and PTSD, depression, and PGD assessed with PG-13 on the other hand (Heeke et al., 2019; Komischke-Konnerup et al., 2021). Fourth, to demonstrate known-groups validity, we expected higher ICD-11 and DSM-5-TR PGD intensity for people who: (i) identify as woman (vs. man), (ii) did not obtain a university or college degree (vs. obtained a university or college degree), (iii) experienced the loss more recently (vs. more remotely), and (iv) who have lost a child (vs. sibling) (Buur et al., 2024; Doering et al., 2022; Heeke et al., 2019). Lastly, we determined optimal cut-off scores for identifying probable ICD-11 and DSM-5-TR PGD cases using the TGI-SR + summed score. We expected the optimal cut-off scores to be similar to the ones found for the Dutch and Swedish TGI-SR+, which were between 71 and 75.

1. Methods

1.1. Participants and procedures

The study is part of a larger project with the aim to increase the knowledge of what support parents and siblings are receiving from their municipality in Norway, after a child has died suddenly, unexpectedly or violently and how participants experience the support. Bereaved parents or siblings from the age of 16 living in Norway, who lost their child or sibling at least 6 months earlier due to a sudden, unexpected, or violent loss (e.g. stillbirth, sudden infant death, accident, acute illness, suicide, or homicide) were eligible to participate in this cross-sectional survey-study. Young people from the age of 16 years old can consent to participate in research on their own without caregivers' consent, hence we included individuals aged 16 years or older as an inclusion criterion. No exclusion criteria were specified. In the information that was sent to potential participants it was stated that people could participate whose loss happened from 2016 onwards and that the age of the deceased at the time of death must have been under 40. The latter was chosen in order to recruit a more homogeneous sample in terms of time since loss and age of the deceased. However, we did not exclude people whose loss happened before 2016 or whose deceased was 40 or older at the time of death.

Several recruitment strategies were used, including advertisements on the websites of bereavement organizations for bereaved parents and people bereaved by suicide or stillbirth. Social media announcements were published on accounts of bereavement organizations and the university. Lastly, snowball sampling was used to recruit participants.

The survey was conducted online using a link that was provided in our recruitment materials. The survey consisted of multiple measures and questions that were offered in the same order: Demographic data, Information about the loss and the circumstances of the death, Need for help after the loss, Experiences with the help received with crisis team and the primary health care services, Help for the family, Satisfaction with the help received and barriers for receiving help, Peer support, Reactions after the loss (grief, trauma, depression, function), Coping and self-efficacy. Data-collection took place between May 2023 and February 2024. In total, 307 parents and siblings completed at least the TGI-SR + and were therefore included in our analyses. All participants gave informed consent before completing the survey. The study was assessed by the Regional Committee for Ethics in Medical and Health Research and was concluded to be outside the Norwegian Act on Medical and Health Research (reference number: 476563). The project was approved by the Norwegian Agency for Shared Services in Education and Research (reference number: 711129).

1.2. Measures

1.2.1. Demographic and loss-related characteristics

The following demographic and loss-related characteristics were assessed: gender of participant, age of participant and deceased (in years), educational level of participant, cause of death, and time since loss (in months).

1.2.2. Traumatic grief inventory – self report plus (TGI-SR+)

The 22-item TGI-SR+, is an extension of the 18-item TGI-SR (Boelen et al., 2019; Boelen & Smid, 2017), and assesses the ICD-11 and DSM-5-TR PGD criteria as well as other, now outdated, criteria for disturbed grief. For details about how items are linked to the PGD criteria-sets see: <https://osf.io/7w562>. The TGI-SR+ was developed and validated in the Dutch language and is available for free in multiple languages see: <https://osf.io/rqn5k/> or <https://nl.global-psychotrauma.net/grief>. Bereaved people rate to what extent they have experienced each PGD symptom in the past month on Likert scales ranging from 1 = never to 5 = always. An example item is: ‘I felt emotionally numb’.

Following prior research (Mauro et al., 2019), probable ICD-11 PGD can be detected by following this liberal diagnostic rule: the presence of at least one out of two Criterion B symptoms (assessed with item 1 and 3), at least one out of ten Criterion C symptoms (assessed with items 2, 5, 8-10, 16, 19-22), and the Criterion D symptom (assessed with item 13). An item score of 4 or higher is considered the presence of that symptom.

The following diagnostic scoring rule of the DSM-5-TR was used to detect probable DSM-5-TR PGD (American Psychiatric Association, 2022): the presence of at least one out of two Criterion B symptoms (assessed with item 1 and 3), at least three out of eight Criterion C symptoms (assessed with items 6, 9-11, 19, 21, and highest score on item 2 and 8), and the Criterion D symptom (assessed with item 13).

The translation procedure of the Norwegian TGI-SR+ consisted of the following steps. First, the English TGI-SR+ was translated to Norwegian independently by three senior grief researchers fluent in Norwegian and English. Second, the translations were compared. Third, any differences in translations were discussed by consulting a fourth researcher. These three steps led to the final Norwegian TGI-SR+.

1.2.3. Posttraumatic stress disorder checklist for DSM-5 (PCL-5)

The 20-item PCL-5 assesses symptom severity of all 20 PTSD symptoms as described in DSM-5 (Blevins et al., 2015; Heir et al., 2019). Bereaved parents and sibling

rated to what extent they were bothered by each symptom in the past month on 5-point Likert scales ranging from 0 = not at all to 4 = extremely. An example item is: ‘In the past month, how much were you bothered by having difficulty concentrating?’ We adapted the instruction of the PCL-5 by replacing wording related to ‘the stressful event’ to ‘the death of your loved one’. A cut-off score of ≥ 31 is indicative of probable PTSD (Blevins et al., 2015). The PCL-5 has shown to be a valid and reliable screening tool for PTSD, but has not been validated yet in the Norwegian language (Blevins et al., 2015). Cronbach’s alpha in the current study was .94.

1.2.4. Patient health questionnaire (PHQ-9)

Depression severity in the past two weeks was assessed with the Patient Health Questionnaire 9 (Kroenke et al., 2001). The PHQ-9 includes 9 items rated on a 4-point scale ranging from 0 = not at all to 3 = nearly every day, yielding a total score of 0-27. An example item is: ‘Feeling tired or having little energy’. A cut-off score of ≥ 10 is indicative of probable depression (Gilbody et al., 2007; Kroenke et al., 2001). Both the original and Norwegian PHQ-9 have acceptable psychometric properties (Kroenke et al., 2001; Wisting et al., 2021). Cronbach’s alpha in the current study was .91.

1.2.5. Prolonged grief disorder-13 (PG-13)

The PG-13 was used to assess precursor PGD symptoms proposed by Prigerson et al. (2009). This self-report measure includes 11 items assessing cognitive, behavioural, and emotional symptoms (items 1-2, 4-12), rated on a 5-point scale ranging from 1 = not at all to 5 = several times a day/overwhelmingly, with a total score of 11-55. In addition, the PG-13 includes one duration item (yes/no) and one impairment (yes/no) (Prigerson et al., 2009). In the present study, items 1-2 (*How often have you felt yourself longing or yearning for the person you lost* and *How often have you had intense feelings of emotional pain, sorrow, or pangs of grief related to the lost relationship*) were omitted due to a technical error, thus the sum score of items 4-12 was used. The Norwegian version has not been validated yet, however, the Swedish version has shown satisfactory psychometric properties (Pohlkamp et al., 2018; Sveen et al., 2020). Cronbach’s alpha level of the Norwegian PG-13 was high in prior research ($\alpha = 0.89$) (Titlestad et al., 2022). Cronbach’s alpha in the current study was .91.

1.3. Statistical analyses

SPSS was used for data-analyses (IBM Corp, 2017), except for the confirmatory factor analyses (CFAs), which were conducted using Mplus 7.4 (Muthén & Muthén, 1998).

1.3.1. Factor structure of ICD-11 and DSM-5-TR prolonged grief items

Separate CFAs were performed for the items assessing ICD-11 and DSM-5-TR PGD. We first checked whether items were univariately normal distributed, which was true when kurtosis values < 10 and skewness values < 3 . (Kline, 2011). Kurtosis and skewness values for each PGD item were below 2. We therefore used the maximum likelihood estimator. There was no missing data on TGI-SR+ items.

For both ICD-11 and DSM-5-TR PGD, we first estimated a model with all items loading on one factor. Next, a two-factor model was estimated, including two separation distress items represented the first factor, while the other items represented the second factor. We compared the fit of the one-factor model with the two-factor model using these fit statistics (Kline, 2011): comparative fit and Tucker-Lewis index (CFI and TLI; $> .90$ means acceptable fit and $> .95$ means excellent fit), Root Mean Square Error of Approximation (RMSEA) and Standardized Root-Mean-Square Residual (SRMR) ($< .10$ means acceptable fit and $< .05$ excellent fit), and Akaike Information and the Bayesian Information Criterion (AIC and BIC; lower values show improvement of

fit). The one – and two-factor model were statistically compared using Chi-square tests, whereby $p < .05$ suggests an improvement in fit favouring the two-factor model over the one-factor model. Lastly, we also took parsimony into account when comparing the models, meaning that we preferred models with fewer parameters. If needed, modification indices were evaluated to improve the fit of our models.

1.3.2. Internal consistency of ICD-11 and DSM-5-TR prolonged grief items

Internal consistency of the items assessing ICD-11 and DSM-5-TR PGD symptoms was assessed by calculating McDonald's Omega values. A value of $\omega > 0.70$ was considered acceptable (Hayes & Coutts, 2020).

1.3.3. Convergent validity

To examine the associations between summed ICD-11 and DSM-5-TR items on the one hand and summed PTSD, depression, and PGD assessed with the PG-13 on the other hand correlational analyses were performed. Spearman's Rho correlations were computed, because summed ICD-11 and DSM-5-TR PGD scores were not normally distributed as evidenced by significant Kolmogorov–Smirnov tests ($p < .05$). Correlation estimates of ≤ 0.29 were considered weak, $\geq 0.30 \leq 0.49$ moderate, and ≥ 0.50 strong.

1.3.4. Known-groups validity

To determine possible differences in ICD-11 and DSM-5-TR PGD intensity in terms of gender (male vs female), educational level (university vs other), time since loss (in years), and relationship to the deceased (sibling vs parent) Mann–Whitney U tests and Spearman's correlations were performed.

1.3.5. Rates of probable ICD-11 and DSM-5-TR PGD cases using diagnostic scoring rules

Using the diagnostic scoring rules, percentages were calculated of parents and sibling meeting ICD-11 and DSM-5-TR PGD criteria. These rates were compared using Fisher's exact test. Pairwise agreement between both diagnostic criteria-sets was evaluated using Kappa statistics. Prior research has indicated that the diagnostic scoring rule for ICD-11 might be too lenient, resulting in an overestimation of probable PGD cases (Boelen et al., 2019; Boelen & Lenferink, 2020; Trembl et al., 2024). It has been shown that increasing the number of accessory symptoms of ICD-11 PGD increased pairwise agreement between both diagnostic criteria-sets (Boelen & Lenferink, 2020; Trembl et al., 2024). We therefore also examined when optimal pairwise agreement was reached when increasing the number of accessory symptoms for ICD-11 PGD using Kappa statistics. Kappa values between 0.61–0.80 can be considered substantial

Table 1. Demographic and loss-related characteristics and psychopathology intensity ($N = 307$).

Background characteristics	
Gender n (%)	
Female	277 (90.2)
Male	29 (9.4)
Other	1 (0.3)
Age (in years) (M (SD); range)	41.97 (11.65); 19–79
Education level	
$<$ University n (%)	93 (30.3)
\geq University n (%)	214 (69.7)
Loss-related characteristics	
Age of the deceased (in years) (M (SD); range)	13.48 (13.95); 0–64
Time since loss (in months) (M (SD); range)	54.57 (53.15); 6–287
Child is n (%)	
Child	243 (79.2)
Step-child	1 (0.3)
Sibling	61 (19.9)
Step-sibling	2 (0.7)
Cause of death n (%)	
Suicide	107 (34.9)
Stillbirth	76 (24.8)
Acute disease	35 (11.4)
Infant death	29 (9.4)
Accident	29 (9.4)
Homicide	20 (6.5)
Sudden death with unknown cause	11 (3.6)
Psychopathology levels	
ICD-11 PGD symptoms (TGI-SR+) (M (SD); range)	38.96 (10.32); 12–59
DSM-5-TR PGD symptoms (TGI-SR+) (M (SD); range)	33.72 (8.63); 10–49
PTSD severity (PCL-5) (M (SD); range) ^a	30.60 (17.10); 0–73
Depression symptoms (PHQ-9) (M (SD); range) ^b	10.79 (6.70); 0–27

Note. DSM-5-TR = 5th text revised edition of the Diagnostic and Statistical Manual of Mental Disorders. ICD-11 = 11th edition of the International Classification of Diseases; TGI-SR+ = Traumatic Grief Inventory – Self Report Plus; PTSD = posttraumatic stress disorder; PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5; PGD = Prolonged Grief Disorder; PHQ-9 = Patient Health Questionnaire 9. ^a One person had missing data on all PTSD items. ^b Five people had missing data on all depression items.

agreement and 0.81–1.00 as almost perfect agreement (McHugh, 2012).

1.3.6. Optimal cut-off

An optimal cut-off score of summed TGI-SR + items was determined to detect people with and without probable ICD-11 and DSM-5-TR PGD using Receiver Operating Characteristic (ROC) analyses. Additionally, we also determined the optimal cut-off score using the summed score of ICD-11 and DSM-5-TR PGD items. Youden's indices were calculated. We considered values <0.70 as poor accuracy of the specific score for distinguishing people with from without probable PGD. Values between 0.70 and 0.80 are considered fair, between 0.80 and 0.90 good, and between 0.90 and 1 excellent (Ferraris, 2019).

2. Results

2.1. Characteristics of the sample

See Table 1 for characteristics of the sample. Nine out of ten participants identified as female. Four out of five lost a child and the others experienced sibling loss. In 57% of the cases, the deceased was a minor (aged <18) at time of death. The most reported cause of death was suicide (35%) followed by stillbirth (25%). The mean time since loss was 5 years. In total, 143 parents and siblings (47%) scored above the cut-off for PTSD and 154 (51%) for depression.

2.2. Factor structure of ICD-11 prolonged grief disorder items

For ICD-11 PGD, both the one-factor and two-factor model did not show an acceptable fit based on the fit indices. The two-factor model showed a significant improvement in fit over the one-factor model ($\Delta\chi^2$ (Δdf) = 7.35 (1), $p < .01$). However, the association between the two factors was very high ($r = .94$, $p < .001$), pointing to no meaningful differences between the two factors. We therefore retained the 1-factor model and examined modification indices of this unidimensional model.

The modification indices showed strong associations between some item-pairs, we therefore allowed the error-terms of these item-pairs to correlate (cf. Lenferink et al., 2022, 2024). We started with allowing error-terms to correlate between the item-pair with the highest modification index (i.e. C5 with C3). Because this did not lead to sufficient improvement in fit, we proceeded with correlating error-terms of the item-pair which had the second-highest modification index (i.e. C8 with C10). This resulted in an acceptable fit. Table 2 shows indices of model fit indices. Table 3 shows the factor loadings of the one-factor model with correlated error-terms.

2.3. Factor structure of DSM-5-TR prolonged grief disorder items

For DSM-5-TR PGD, both the one – and two-factor model did not show an acceptable fit across all indices. While the two-factor model had a significantly better than the one-factor model ($\Delta\chi^2$ (Δdf) = 17.91 (1), $p < .001$), again, the association between the two factors was high ($r = .89$, $p < .001$). We therefore selected the more parsimonious one-factor model. Again, we explored whether correlating error-terms based on the item-pairs with the highest modification index improved the fit. After correlating the error-terms of three item-pairs (i.e. C5-C8, B2-C4, and B1-C2) the factor model showed an acceptable fit. Table 2 shows indices of model fit indices. Table 3 shows the factor loadings of the one-factor model with correlated error-terms.

2.4. Reliability

For both ICD-11 and DSM-5-TR PGD items, McDonald's Omega was .92. These values indicate excellent internal consistency.

2.5. Convergent validity

Summed ICD-11 PGD scores were significantly, positively, and strongly related to summed PTSD ($\rho = .75$, $p < .001$), depression scores ($\rho = .60$, $p < .001$), and PG assessed with part of the PG-13 ($\rho = .83$, $p < .001$).

Similarly strong associations were also found for summed DSM-5-TR PGD scores and PTSD ($\rho = .76$, $p < .001$), depression ($\rho = .63$, $p < .001$), and part of the PG-13 ($\rho = .84$, $p < .001$).

2.6. Known-groups validity

We did not find differences in ICD-11 PGD intensity between males and females ($U = 4865.0$, $p = .061$). However, DSM-5-TR PGD intensity was higher in females than males ($U = 4959.5$, $p = .037$). The one person whose gender identity was 'other' was excluded from this analysis. Significantly lower PGD intensity was found for people who completed university compared with people who completed other than university education ($U = 13226.0$, $p < .001$ for ICD-11 PGD; $U = 13132.5$, $p < .001$ for DSM-5-TR PGD). PGD intensity did not differ between bereaved parents and sibling ($U = 7742.0$, $p = .929$ for ICD-11 PGD; $U = 7725.0$, $p = .950$ for DSM-5-TR PGD). Times since loss was, as expected, significantly and negatively related to PGD intensity ($\rho = -.25$, $p < .001$ for ICD-11 PGD; $\rho = -.28$, $p < .001$ for DSM-5-TR PGD).

Table 2. Fit indices of confirmatory factor models ($N = 307$).

	χ^2 (df)	p -value	CFI	TLI	RMSEA (90% CI)	SRMR	AIC	BIC
ICD-11 PGD items								
1-factor model	287.16 (54)	< .001	0.90	0.87	0.119 (0.105–0.132)	0.054	9513.81	9647.98
2-factor model	279.81 (53)	< .001	0.90	0.88	0.118 (0.106–0.132)	0.054	9508.47	9646.36
1-factor model with correlated error terms ^a	202.31 (52)	< .001	0.93	0.92	0.083 (0.83–0.111)	0.043	9432.96	9574.58
DSM-5-TR PGD symptoms								
1-factor model	187.59 (35)	< .001	0.92	0.89	0.119 (0.103–0.136)	0.047	7756.78	7868.58
2-factor model	169.68 (34)	< .001	0.93	0.90	0.114 (0.097–0.131)	0.045	7740.86	7856.40
1-factor model with correlated error terms ^b	118.32 (32)	< .001	0.95	0.93	0.094 (0.076–0.112)	0.039	7693.50	7816.49

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; CFI = Comparative Fit Index; CI = Confidence Interval; DSM-5-TR = 5th text revised edition of the Diagnostic and Statistical Manual of Mental Disorders. ICD-11 = 11th edition of the International Classification of Diseases; PGD = Prolonged Grief Disorder; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; SS-BIC = Sample-Size adjusted Bayesian information criterion; TLI = Tucker Lewis Index. ^a Error terms of item pairs C3-C5 and C8-C10 were correlated. ^b Error terms of item pairs C5-C8, B2-C4, and B1-C2 were correlated.

2.7. Rates of probable ICD-11 and DSM-5-TR PGD cases using diagnostic scoring rules

When using the diagnostic scoring rule for ICD-11 PGD with at least 1 accessory symptom, 132 parents and sibling (43%) met criteria for probable caseness. This rate was significantly higher than the rate for probable DSM-5-TR PGD caseness, which was 41% (Fisher’s exact test, $p < .001$). The pairwise agreement between ICD-11 and DSM-5-TR PGD was almost perfect ($\kappa = 0.96$). Optimal pairwise agreement with DSM-5-TR PGD probable cases was reached when increasing the accessory symptoms for ICD-11 PGD to 2+ (see Table 4 for details).

2.8. Optimal cut-off for detecting probable ICD-11 and DSM-5-TR PGD cases

When summing all 22 TGI-SR + items, the optimal cut-off for detecting probable ICD-11 PGD cases was ≥ 73 (AUC = 0.877 (95% CI: 0.839–0.914)).

Table 3. Standardized factor loadings for the 1-factor models of ICD-11 and DSM-5-TR PGD symptoms ($N = 307$).

Brief item content	Factor loading	SE
ICD-11 PGD item		
Longing for the deceased	.793	.024
Intrusive thoughts or images	.747	.028
Intense emotional pain, i.e. sadness	.808	.022
Self-blame	.657	.035
Anger	.577	.040
It felt unreal	.751	.027
I put blame on others	.431	.049
Trouble accepting the loss	.837	.020
Part of me has died	.795	.023
Difficulty experiencing positive emotions	.744	.028
I felt emotionally numb	.706	.031
Difficulty moving on	.735	.029
DSM-5-TR PGD symptoms		
Longing for the deceased	.730	.030
Intrusive thoughts or images	.683	.034
Part of me has died	.808	.023
It felt unreal	.730	.030
I avoided places, objects, or thoughts	.555	.042
Intense emotional pain, i.e. sadness or anger	.764	.027
Difficulty moving on	.790	.025
I felt emotionally numb	.734	.029
Life is meaningless	.858	.019
I felt alone	.639	.037

Note. DSM-5-TR = Diagnostic and Statistical Manual of Mental Disorders fifth edition text revised; ICD-11 = International Classification of Diseases 11th edition; PGD = Prolonged Grief Disorder; SE = standard error.

Using this cut-off score results in correctly identifying 77% of probable ICD-11 PGD cases and 19% incorrectly identifying these cases. This indicates a poor Younde’s Index ($J = 0.58$). When summing all 22 TGI-SR + items, the optimal cut-off for detecting probable DSM-5-TR PGD cases was also ≥ 73 (AUC = 0.897 (95% CI: 0.863–0.931)). Using this cut-off score results in correctly identifying 81% of probable DSM-5-TR PGD cases and 18% incorrectly identifying these cases ($J = 0.63$).

When summing only the 12 ICD-11 PGD items of the TGI-SR+, we found that a score of ≥ 40 optimally distinguished probable ICD-11 PGD cases from non-cases (AUC = 0.849 (95% CI: 0.807–0.891)). Using this cut-off score resulted in correctly identifying 83% of probable ICD-11 PGD cases and 27% incorrectly identifying these cases ($J = 0.56$). When summing only the 10 DSM-5-TR PGD items of the TGI-SR+, we found that a score of ≥ 36 optimally distinguished probable DSM-5-TR PGD cases from non-cases (AUC = 0.884 (95% CI: 0.849–0.920)). Using this cut-off score resulted in correctly identifying 84% of probable ICD-11 PGD cases and 22% incorrectly identifying these cases ($J = 0.62$).

3. Discussion

The TGI-SR + is a self-report measure to assess the newest PGD symptoms as defined in ICD-11 and DSM-5-TR (Lenferink et al., 2022). The psychometric

Table 4. Number and rates of probable cases for ICD-11 PGD sets with different numbers of accessory symptoms and pairwise agreement (Kappa) between ICD-11 sets and DSM-5-TR ($N = 307$).

	N (%)	Pairwise agreement with DSM-5-TR PGD, κ
ICD-11 PGD (1+)	132 (43)	.96
ICD-11 PGD (2+)	129 (42)	.97
ICD-11 PGD (3+)	124 (40)	.96
ICD-11 PGD (4+)	117 (38)	.93
ICD-11 PGD (5+)	106 (35)	.86
ICD-11 PGD (6+)	94 (31)	.78
ICD-11 PGD (7+)	79 (26)	.67

Note. DSM-5-TR = Diagnostic and Statistical Manual of Mental Disorders fifth edition text revised; ICD-11 = International Classification of Diseases 11th edition; PGD = Prolonged grief disorder.

properties of the TGI-SR+ have been validated in various samples, such as bereaved parents, young adults, and people bereaved by traffic accidents (Kokou-Kpolou et al., 2022; Lenferink et al., 2022, 2024), and across various languages, including Dutch, French, Persian, and Swedish (Ashouri & Yousefi, 2023; Kokou-Kpolou et al., 2022; Lenferink et al., 2022, 2024). In the current study, we aimed to evaluate the psychometric properties of the Norwegian TGI-SR+ in a sample of traumatically bereaved parents and sibling of whom half of them reported clinically relevant PTSD and depression levels.

Our first finding showed that a one-factor model for the items assessing ICD-11 and DSM-5-TR PGD symptoms fit the data best. A two-factor model, as defined by ICD-11 and DSM-5-TR, in which separation distress are distinct from accessory symptoms, did not yield an improvement of fit. Earlier validation studies of the TGI-SR+ also indicated that the one-factor model provided a good fit (Ashouri & Yousefi, 2023; Kokou-Kpolou et al., 2022; Lenferink et al., 2024). Our findings offer again support for the construct validity of the TGI-SR+ items assessing the newest PGD criteria. Similar to prior validation studies of the Dutch and Swedish TGI-SR+ (Lenferink et al., 2022, 2024), we found high McDonald's Omega values of the items assessing ICD-11 and DSM-5-TR PGD symptoms, which offers support for the internal validity of the TGI-SR+ assessing both diagnostic criteria-sets.

In terms of external validity of the TGI-SR+, we examined the associations between summed ICD-11 and DSM-5-TR PGD scores on the one hand and summed PTSD and depression scores on the other hand. In line with systematic reviews indicating that PGD often co-occurs with PTSD and depression, in particular after traumatic loss (Heeke et al., 2019, 2023; Komischke-Konnerup et al., 2021), we found that these constructs are also strongly related in our traumatic loss sample. As expected, we found even stronger associations between summed ICD-11 and DSM-5-TR PGD scores assessed with TGI-SR+ and PGD assessed with nine out of 11 items of the PG-13. These findings, together with findings from prior validation studies (Lenferink et al., 2022, 2024), offer support for convergent validity of the TGI-SR+ in assessing ICD-11 and DSM-5-TR PGD intensity.

In addition, we also offered support for known-groups validity of the TGI-SR+ by showing that PGD intensity differed by educational level for both ICD-11 and DSM-5-TR PGD. Being lower educated has consistently been found to be related to higher PGD intensity and is one of the most commonly examined risk factor for PGD (Buur et al., 2024). Another commonly examined and known risk factor for PGD is female gender. PGD intensity only differed by gender for DSM-5-TR PGD, and not ICD-11.

Differences in ICD-11 PGD intensity between males and females failed to reach significance. This null-finding is likely explained by the limited number of males in our sample ($N = 29$), which makes it difficult to detect group differences. As expected, we found that time since loss was inversely related to ICD-11 and DSM-5-TR PGD intensity. In contrary to prior research (Buur et al., 2024; Doering et al., 2022), we did not find that PGD intensity differed between people who lost their child versus sibling. This might be explained by our sample composition. People were recruited who lost their child or sibling due to a sudden, unexpected or violent death and whose loved one died aged 40 or younger and not more than eight years ago. The majority of siblings in our sample experienced a suicidal loss. Consequently, it is very likely that our sample included an overrepresentation of bereaved siblings with high PGD intensity, which precluded us to find differences in PGD intensity between siblings and parents.

We found an overrepresentation of people meeting ICD-11 PGD and DSM-5-TR PGD as evidenced by the rates of probable caseness. We found that two out of five bereaved parents and siblings met the criteria for self-rated ICD-11 PGD and DSM-5-TR PGD. While these rates are comparable to rates found in other studies among people bereaved by sudden or violent losses (Bellini et al., 2018; Lenferink et al., 2021; Nordström et al., 2022; van Denderen et al., 2016), these rates are highly likely an overestimation of PGD rates after traumatic loss. The main reason for this is the lack of a representative sample and the use of diagnostic interviews. Instead, we examined self-report data collected among a self-selected sample. Interestingly, we found almost perfect agreement between the rates of probable caseness of ICD-11 and DSM-5-TR PGD when using the scoring rule of 1+ accessory symptoms for ICD-11. By increasing this number to +2 for ICD-11 PGD, the agreement with DSM-5-TR PGD was only slightly improved. This means that both criteria-sets resulted in very comparable rates of probable cases when using the scoring rule of +1 accessory symptoms for ICD-11 PGD. This finding mirrors findings from prior research showing similar rates for probable ICD-11 and DSM-5-TR PGD caseness using the Dutch and Norwegian TGI-SR+ (34% versus 32%, 33 versus 30%, 32% versus 29% resp.) (Lenferink et al., 2022, 2024). However, in a representative German bereaved sample optimal pairwise agreement with DSM-5-TR PGD rates using the TGI-SR+ was reached when increasing the number of accessory symptoms for ICD-11 to +3 (Tremel et al., 2024). The latter study is the only study using a representative bereaved sample, which may explain why these results deviate from earlier findings. More research among representative samples, especially traumatically

bereaved samples, is needed to draw firm conclusions about the optimal agreement between the two diagnostic criteria-sets.

Instead of using the diagnostic scoring rule for ICD-11 and DSM-5-TR, an often-used method to detect probable caseness in research is by using a cut-off score. Our findings indicate that for the Norwegian summed TGI-SR+ score a cut-off score of ≥ 73 seems useful when distinguishing probable ICD-11 PGD cases from non-cases. The same cut-off score was also the optimal score to detect probable DSM-5-TR PGD cases. These scores are slightly higher than cut-off score of ≥ 71 found in Dutch and Swedish TGI-SR+ (Lenferink et al., 2022, 2024). When only assessing the ICD-11 PGD or DSM-5-TR PGD symptoms in isolation, then a cut-off score of ≥ 40 and ≥ 36 resp. seems optimal, which were also slightly higher than the ones found in prior research. It should be noted that the Youden's indices for determining cut-off scores were all below 0.70, which means a poor accuracy in distinguishing between (probable) PGD cases and non-cases. This might be explained by the relatively small sample size compared with prior research using similar methods to determine the optimal cut-off score, i.e. 307 people in our sample compared with 548 people in prior research that resulted in better accuracy in determining cut-off scores (Lenferink et al., 2022). Given the relatively poor accuracy in determining cut-off scores for Norwegian TGI-SR+ compared with Dutch and Swedish TGI-SR+, we advise to keep using the cut-off score of ≥ 71 on summed TGI-SR+ items for determining probable PGD caseness found in earlier work. However, future research should preferably determine probable ICD-11 and DSM-5-TR PGD caseness by clinicians using interviews for PGD, which have recently been developed (Lenferink et al., 2023; O'Connor et al., 2023). For instance, the Traumatic Grief Inventory-Clinician Administered can be used, which is the interview-version of the TGI-SR+ that has been validated in Dutch and German (Lenferink et al., 2023), but is also available in English for free: <https://osf.io/a6hmc/>. Moreover, a child-version is available to assess ICD-11 and DSM-5-TR PGD intensity in bereaved children aged 8–18 (Van Dijk et al., 2023).

Several limitations should be noted. First, we examined the psychometric properties of the TGI-SR+ in a non-representative sample of bereaved parents and siblings after a sudden, unexpected, or violent loss of their loved one. This limits the generalizability of our findings to people who lost other relatives and people bereaved by other causes of death. Second, because of our cross-sectional design we were unable to investigate additional indices of reliability and validity of the PGD items, such as test-retest reliability, longitudinal measurement invariance, or predictive validity.

To conclude, the Norwegian TGI-SR+ seems to be a valid and reliable instrument to assess ICD-11 and DSM-5-TR PGD intensity after losing a child or sibling due to traumatic causes. This psychometric work adds to the growing knowledgebase supporting the validity and reliability of the TGI-SR+ to assess ICD-11 and DSM-5-TR PGD intensity across people bereaved by various causes and across various languages. By validating the Norwegian TGI-SR+ and anticipating studies validating the TGI-SR+ in other languages, we are confident that harmonization in the assessment of PGD intensity is now getting closer than ever.

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Data availability statement


Data available on request due to privacy/ethical restrictions.

ORCID

Lonneke I. M. Lenferink  <http://orcid.org/0000-0003-1329-6413>

Iren Johnsen  <http://orcid.org/0000-0002-9111-0656>

Pål Kristensen  <http://orcid.org/0000-0002-8017-8495>

Nataskja-Elena Kersting Lie  <http://orcid.org/0000-0003-4010-320X>

Josefin Sveen  <http://orcid.org/0000-0002-5523-8126>

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