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**Tengsl félagslegs stuðnings og einkenni
langvarandi sorgarröskunar**
Lýðgrunduð rannsókn á meðal kvenna

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LÆKNADEILD

Association between social support and symptoms of prolonged grief disorder

A population-based study among women

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Ágrip

Bakgrunnur: Fyrri rannsóknir hafa leitt í ljós að félagslegur stuðningur getur verið verndandi þáttur á streituvaldandi tímum, þar á meðal eftir missi ástvinar. Hins vegar hafa rannsóknir sem meta tengsl félagslegs stuðnings og langvarandi sorgarröskunar (PGD) eftir ástvinamissi gefið misvísandi niðurstöður, en sumar rannsóknir sýna að félagslegur stuðningur tengist minni hættu á langvarandi sorgarröskun en aðrar sýna engin tengsl. Rannsóknir hingað til hafa verið takmarkaðar við litlar úrtaksstærðir.

Markmið: Að meta tengsl félagslegs stuðnings og einkenni langvarandi sorgarröskunar eftir ástvinamissi á meðal kvenna.

Aðferðir: Rannsóknin er byggð á gögnum úr lýðgrunduðu þversniðsrannsókninni *Áfallasaga kvenna*, rannsókn á landsvísu á áhrifum áfalla á heilsufar kvenna. Þátttakendur voru 30,403 konur á aldrinum 18-69 ára sem búsettar voru á Íslandi. Félagslegur stuðningur var mældur með kvarðanum MSPSS (Multidimensional Scale of Perceived Social Support) og langvarandi sorgarröskun með kvarðanum PG-13 (Prolonged Grief Disorder-13). Gagnlíkindahlutfall (GH) með 95% öryggisbili (ÖB) var notað til að meta samband félagslegs stuðnings og langvarandi sorgarröskunar.

Niðurstöður: Um það bil 80% þátttakenda höfðu misst ástvin á lífsleiðinni og algengi langvarandi sorgarröskunar mældist 0,96%. Nær helmingur kvenna með langvarandi sorgarröskun, eða 48,8%, voru með lítinn félagslegan stuðning. Konur með mikinn félagslegan stuðning voru 61% ólíklegri til að vera með langvarandi sorgarröskun borið saman við konur með lítinn félagslegan stuðning ($GH=0,39$; 95% ÖB: 0,25-0,59), þegar leiðrétt var fyrir aldri, menntun, atvinnustöðu, tekjum, hjúskaparstöðu, tegund missis, dánarorsökum, hvernig dauðsfallið bar að og tímalengd frá missi.

Ályktun: Flestar konur höfðu upplifað missi ástvinar en minna en 1% þeirra voru með langvarandi sorgarröskun. Konur með lítinn félagslegan stuðning voru marktækt líklegri til að vera með einkenni langvarandi sorgarröskunar en konur með mikinn félagslegan stuðning. Þessar niðurstöður benda til þess að félagslegur stuðningur getur verið verndandi þáttur til að koma í veg fyrir eða draga úr einkennum langvarandi sorgarröskunar. Áhersla á mikilvægi félagslegs stuðnings í kjölfar ástvinamissis er nauðsynleg og ætti að vera tiltækt úrræði innan heilbrigðiskerfisins.

Abstract

Background: Prior research has found social support to be a protective factor against the development of psychological morbidity in the aftermath of stressful life events. However, studies assessing the association between social support and prolonged grief disorder (PGD) after the loss of a loved one have yielded conflicting results, with some studies finding social support to be associated with a decreased risk of PGD and others finding no association. Studies to date have been limited to small sample sizes.

Specific aims: The aim of this study is to assess the association of perceived social support and probable PGD after the loss of a loved one in a population-based cohort of women.

Methods: The study is based on cross-sectional data from the Stress- And- Gene- Analysis cohort, a nationwide study on the impact of trauma on women's health in Iceland. Participants were 30,403 females aged 18-69 years, all of whom reside in Iceland. Perceived social support was measured with the Multidimensional Scale of Perceived Social Support (MSPSS) and probable PGD with the Prolonged Grief Disorder Scale (PG-13). Odds ratios (OR) with 95% confidence intervals (CIs) were used to obtain risk of probable PGD in relation to perceived social support.

Results: Approximately 80% of the participants had lost a loved one during their lifetime and the prevalence of probable PGD was 0.96%. Nearly half of the women with probable PGD, or 48.8%, reported low perceived social support. Women with high perceived social support were 61% less likely to have probable PGD after the loss of a loved one compared to women with low perceived social support (OR=0.39; 95% CI: 0.25-0.59), when adjusting for age, education, employment status, income, marital status, type of loss, cause of death, how the death occurred and length of time since the loss occurred.

Conclusion: Most women had experienced a loss of a loved one but less than 1% of them had probable PGD. Women with low levels of perceived social support were significantly more likely to have symptoms of PGD than women with high perceived social support. These results indicate that social support may be a protective factor in preventing or decreasing symptoms of PGD. Emphasis on the importance of social support during bereavement should be highlighted and should be an available resource within the healthcare sector.

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List of abbreviations

CBT	Cognitive behavioral therapy
CG	Complicated grief
CIs	Confidence intervals
DSM-5	Diagnostic statistical manual of mental disorders, fifth edition.
DSM-5-TR	Text revised version of the DSM-5
ICD-11	International classification of diseases, 11th version.
ICG	Inventory of complicated grief
N	Sample size
N/A	Not applicable
OR	Odds ratio
PG-13	Prolonged grief disorder scale
PG-13-R	Revised version of PG-13
PGD	Prolonged grief disorder
PTSD	Post-traumatic stress disorder
SES	Socioeconomic status
US	United States

1 Introduction

1.1 Grief

Grief is an emotional response to one's loss and is an experience that most people go through at some point in their lives. There are many ways to grieve, and so the grieving process varies from person to person. Generally, grief intensity is high in the first months after loss but then decreases with time. The loss becomes less painful and more manageable and the bereaved reengage to daily life, activities, and social relationships (Jordan & Litz, 2014; Prigerson, Kakarala, et al., 2021; Shear et al., 2011). Nonetheless, a minority of bereaved people have greater difficulty adjusting to the loss. Intense grief persists and can in some cases even increase over time (Jordan & Litz, 2014; Shear et al., 2011).

Concerns have been raised about medicalizing grief and potentially stigmatizing the grieving process, making the response to loss appear abnormal. While grief is a normal reaction to loss, some bereaved individuals can develop prolonged grief disorder (PGD), which is defined as persistent symptoms of longing, yearning or intense feelings of emotional pain lasting for more than six months after the loss of a loved one, which cause functional impairment (Prigerson et al., 2009; Prigerson & Maciejewski, 2006). It's important to underscore that the diagnostic criteria for PGD are aimed at a small proportion of people who continue to suffer negative health outcomes over time following the loss of a loved one (Breen et al., 2015; Wakefield, 2011).

Grief is a universal phenomenon and is managed differently across cultures and therefore cultural awareness should be incorporated in diagnosis (Bryant, 2012; Granek & Peleg-Sagy, 2017; Killikelly & Maercker, 2017; Silverman et al., 2021). Grief and bereavement have been studied from a wide variety of disciplines, including medicine, psychology, sociology, anthropology, and epidemiology, and ranging from bio-, to psycho- to and sociological approaches (Stroebe et al., 2008). From an anthropological perspective, grief has been understood via a holistic approach that includes cultural, social, religious, economic, political, and historical context. Many factors affect the process of grief, such as social norms and roles, rituals, institutions, discourse, power and the connection between these factors (Silverman et al., 2021). Studies and theoretical formulations enable us to provide explanations about the differences in mental and physical health outcomes and most importantly, offer opportunities to develop evidence-based prevention strategies to reduce adverse health effects (Stroebe et al., 2008).

1.2 Theories about grief

Our current definitions of grief have been strongly shaped by the psychologist Sigmund Freud (1917). Freud viewed grief as a normal process of detachment, which could be painful, and called the process grief work. Although grief is normal and healthy after the loss of a loved one, it sometimes becomes a chronic destructive state, resulting in what Freud called pathological grief. The main characteristics of pathological grief are emotional pain, extreme sadness, decreased ability to feel pleasure or interest in things in daily life and inability to perform or engage in daily tasks and activities. In addition, pathological grief entails feelings of regret, shame and blame (Freud, 1917).

The psychiatrist Erich Lindemann (1994) continued to evolve ideas of grief and bereavement based on his own clinical experience, listing five factors to describe grief: somatic distress, guilt, hostile reactions, preoccupation with the image of the deceased, and the loss of patterns of conduct. According to Lindemann, it was the intensity of these symptoms and their lack of resolution that separated pathological grief from normal grief. Although Lindemann did not lay out specific diagnostic criteria for pathological grief, he did acknowledge important facets of grief, including the fact that grief reaction could appear instantly after the loss of a loved one, or it could be delayed and appear later in life. Lindemann (1994) and Freud (1917) both thought that emotional detachment from the deceased was an important step for bereaved people and it could be achieved by cultivating social relationships.

Psychologist John Bowlby's (1980) attachment theory is among the most influential theories in bereavement. Bowlby proposed that people's attachment to one another was a part of the human evolutionary function. His ideas of pathological grief were shaped by his observational work on children who were separated from their parents. He saw that security and safety were essential parts of children's lives, and parental separation caused distress and could lead children to detach from others. However, he suggested that if these reactions were met with empathy and warmth, children's sense of security and safety would increase. Extending this line of reasoning, he concluded that pathological grief entailed unresolved feelings towards a loss and the inability to detach from deceased loved ones. He also describes that this inability involved rejection of the self, potentially preventing emotional engagement after the loss of a loved one. The resolution would ultimately require reattachment to others and establishing meaningful connections with other people.

Stage theories of grief are well recognized and have been formulated by various scholars. They indicate that psychological responses to a loss are a process that moves orderly from one stage to another. Bowlby (1980) was among the first to outline stages of grief, starting with shock–numbness, yearning and searching, disorganization–despair, and finally reorganization. The five stage theory by Elisabeth Kübler-Ross (1969) has been widely used to describe the stage-process of grief. Kübler-Ross developed her theory of grief after working with terminally ill patients confronting their own mortality. The stages of her theory are denial and dissociation, anger, bargaining, depression, and acceptance. Stage theories have been critiqued for describing grief as a linear process, rather than as a nonlinear process. Some scholars argue that the stages of grief don't follow a specific order, rather, the bereaved can move in and out of any of these stages of grief (Prigerson, Kakarala, et al., 2021).

The Yale Bereavement Study, a longitudinal examination of grief, tested the stage theory among 233 bereaved individuals following the natural death of a loved one. The aim of the study was to explore normative patterns of grief, and so individuals who met the criteria for PGD were excluded. The study measured disbelief, yearning, anger, depression, and acceptance after a loss from one to 24 months post loss. The items were assessed using the Inventory of Complicated Grief (ICG), and results showed that disbelief peaked after one month post loss, yearning after four months, anger after five months, and depression after six months. Acceptance increased throughout the study observation period. The results indicate that the manifestation of grief matches the theory that Kübler-Ross laid out. The results also indicate that those who have high levels of grief after six months post loss might

benefit from further evaluation, and an appropriate intervention strategy should be considered in these cases (Maciejewski et al., 2007).

1.3 Prolonged grief disorder

Prolonged grief disorder (PGD) is a disorder that can develop after the loss of a loved one. PGD has been acknowledged as a mental disorder since 2018 in the 11th version of the International Classification of Diseases (ICD-11) (World Health Organization, 2022) and since 2020 in the text revision of the fifth version of the Diagnostic Statistical Manual of Mental Disorders (DSM-5-TR) (American Psychiatric Association, 2022).

Essential features of PGD according to ICD-11 are a history of bereavement following the death a loved one and a persistent and pervasive grief response that consists of longing for the deceased or persistent preoccupation with the deceased along with intense emotional pain. These symptoms have to have lasted for at least six months after the loss and be association with significant functional impairment. Additional clinical features that might be present are 1) excessive preoccupation with or avoidance of the deceased; 2) problems coping without the loved one, trusting others, social withdrawal, feelings of meaningless and difficulty recalling positive memories of the deceased, and 3) increased tobacco, alcohol or other substance use, suicidal ideation, or suicidal behavior. Lastly, PGD entails a grief reaction that is not within a normative cultural and religious context (World Health Organization, 2022).

Diagnostic criteria of PGD according to DSM-5 are (a) loss of a loved one that occurred at least 12 months ago (b) and since the loss, a persistent grief response that consists of either intense yearning or preoccupation thoughts, (c) additionally, three symptoms from the following list have been present nearly daily for at least the last month: identity disruption, disbelief, avoidance, intense emotional pain, difficulty reintegrating into one's relationships and activities, emotional numbness, feelings of meaningless and intense loneliness, (d) significant distress or functional impairment, (e) bereavement reaction that exceeds cultural and contextual norms (f) and the symptoms are not explained by another mental disorder (American Psychiatric Association, 2022). The main difference between the DSM-5 and ICD-11 classification systems is that symptoms of PGD and functional impairment need to have been persistent for at least 12 months in the DSM-5 (American Psychiatric Association, 2022) but more than six months post loss according to ICD-11 (World Health Organization, 2022). According to a study the difference between them is only semantic. Results based on a longitudinal study among bereaved individuals, most of which were spouses of the deceased (84%), showed that the level of agreement among ICD-11 and DSM-5 was high: they shared similar PGD prevalence estimates (~10%), comparably high levels of diagnostic specificity and predictive validity (Maciejewski et al., 2016).

Previously, PGD was referred to as complicated grief (CG). The Inventory of Complicated Grief (ICG) questionnaire has been widely used to measure symptoms of CG (Jordan & Litz, 2014; Prigerson et al., 1995). Previous findings had shown that symptoms of CG were distinct from symptoms of depression and anxiety. Symptoms such as irritability, nervousness, tenseness, and restlessness were common symptoms of anxiety while sadness, apathy, and guilt were common

symptoms for depression. However, symptoms of CG were preoccupation with thoughts of the deceased, being stunned by the death, disbelief about the death, crying, searching, yearning for the deceased and not accepting the death. In addition, these symptoms were found to predict long-term dysfunction (Prigerson et al., 1995; Prigerson et al., 1996). The purpose of the development of the ICG questionnaire was to identify severe grief-related symptoms. The ICG questionnaire contains 19 items concerning a person's thoughts and behavior after the loss of a loved one (Prigerson et al., 1995).

In recent years researchers and clinicians have revised the ICG questionnaire to increase precision for practical use in order to formulate future treatment plans for high-risk individuals (Prigerson et al., 2009; Prigerson, Kakarala, et al., 2021). The new diagnostic tool, Prolonged Grief Disorder (PG-13), contains 13 items about the feelings, thoughts and actions following the loss of a loved one. For a person to meet criteria for PGD they must be experiencing significant functional impairment (Prigerson & Maciejewski, 2006). The core symptoms of PGD are pervasive longing or yearning for the (Prigerson & Maciejewski, 2006; Trembl et al., 2020). An updated version of PG-13 was made when the PGD was added to the DSM-5-TR. The PG-13-R is a revised version of PG-13, one of the adjustments was assessing symptoms of PGD at least 12 months after a loss of a loved one instead of six months post loss (Prigerson, Boelen, et al., 2021). A comparison between the ICG and PG-13 questionnaires has been investigated by Maciejewski and colleagues (2016), who concluded that PG-13 had a much higher predictive validity and greater specificity for diagnosing grief as a disorder (Maciejewski et al., 2016).

Evidence indicates that the PGD criteria is a valid instrument for measuring symptoms of PGD (Al-Gamal et al., 2019; Balk et al., 2010; He et al., 2014; Işıklı et al., 2022; Pohlkamp et al., 2018; Prigerson, Boelen, et al., 2021; Rosner et al., 2021; Tsai et al., 2018; Varga et al., 2015). A population-based, cross-sectional study in Germany (n=2,498) measured the PGD prevalence with both the ICD-11 and DSM-5-TR diagnostic criteria and found the prevalence to be 1.5% and 1.2% respectively, 53% of participants were female with a mean age of 48 years. Among bereaved individuals (n=914) the PGD prevalence rate was 4.2% using ICD-11 and 3.3% using DSM-5-TR (Rosner et al., 2021). A population-based, cross-sectional study in China found the PGD prevalence to be 1.8% (n=445), 78% of the participants were female with a mean age of 28 years. The PGD prevalence among females was 2% (7/349) and 1.16% (1/86) among males (the gender of 10 individuals (2.2%) was unspecified) (He et al., 2014). A population-based study among university students in the United States, using stratified random sampling, found a 1.7% prevalence of PGD in the entire sample (n=118), 59% of the participants were female and age ranged from 18 to 23 years. The PGD prevalence among females was 2.9% (2/70) but no male was identified with PGD (0/48) (Balk et al., 2010).

Many studies have measured the PGD prevalence in bereaved samples. A population-based, cross-sectional study among Saudi Arabian university students after the death of a significant individual, including natural or unnatural causes of death, measured the PGD prevalence at 12% (n=226), 59% of participants were female with a mean age of 21 years (Al-Gamal et al., 2019). A cross-sectional design study was conducted on two Turkish community-based samples among

bereaved adults who had either lost a parent, spouse, or sibling due to natural or unnatural causes of death. The PGD prevalence in the first sample was measured at 10% (n=271), 67% of participants were female while the other sample measured PGD to be 11.5% (n=306), 77% of those participants were female (Işıklı et al., 2022). Another cross-sectional study among Swedish parents who had lost a child to cancer one to five years prior measured PGD prevalence at 16% (n=225), 59% of participants were female with a mean age of 46 years (Pohlkamp et al., 2018). Finally, a cross-sectional study among female undergraduate students from the United Arab Emirates and the United States who experienced a loss (n=181), including natural or unnatural causes of death, showed the prevalence of PGD to be 5.5% (10/181) (Varga et al., 2015).

A longitudinal study on family caregivers of cancer patients showed that PGD prevalence was 6.7% (n=163) at six months post loss, 77% of the participants were female. At 13 months post loss the PGD prevalence was 11.3% (n=142) (Thomas et al., 2014). Another longitudinal study among bereaved Taiwanese caregivers of terminally ill cancer patients found PGD prevalence to be 5.2% (n=388) at six months post loss, 65% of participants were female with a mean age of 48 years. At 13 months post loss the PGD prevalence was 2.4% (n=354) (Tsai et al., 2018). Lastly, a longitudinal study was conducted on three independent US community-based samples among bereaved adults, which included losses due to natural and unnatural causes of death. The PGD prevalence rates in the three samples ranged from 4.5% to 16.5% (n=672), 73%-79% of participants were female and the mean age ranged from 47-62 years (Prigerson, Boelen, et al., 2021).

Overall, previous studies have found PGD prevalence to range from 1%-1.8% in general populations (Balk et al., 2010; He et al., 2014; Rosner et al., 2021) and 2.4%-16.5% in bereaved samples (Al-Gamal et al., 2019; Işıklı et al., 2022; Pohlkamp et al., 2018; Prigerson, Boelen, et al., 2021; Thomas et al., 2014; Tsai et al., 2018; Varga et al., 2015). Studies have been conducted in different countries to measure grief based on PGD criteria and their results indicate that it can be used cross-culturally to examine similarities and differences in people's experiences of grief and to detect at-risk bereaved individuals (Killikelly & Maercker, 2017).

1.4 Potential risk factors for PGD

1.4.1 Lack of social support

Bereavement can be a stressful and life-changing experience. The vast majority of people manage to adjust to it with sufficient internal resources and external support (Prigerson et al., 2009). Social support has been defined as the amount of assistance a person gets through interactions with other people; supportive resources can be emotional, practical, and informational (Dambi et al., 2018). Such social support has been acknowledged as a protective factor in times of stressful events (Peirce et al., 2000; Rando, 1993). Moreover, studies have concluded that social support can be a protective factor in the process of bereavement (Lobb et al., 2010). A systematic review of predictors of PGD showed that social support played a key role in the process of bereavement (Lobb et al., 2010).

A cross-sectional study among parents in China who had lost their only child was conducted with 405 participants. Results showed that low social support was associated with PGD symptoms. Parents

who received more social support had fewer PGD symptoms, including objective support, which refers to the practical support in a person's social network, and subjective support, which reflects a person's level of satisfaction with feeling validated and supported in their social relationships. Thirdly, the availability of support refers to the accessibility and effectiveness of social support when stressful life events occur (Song et al., 2021). Research among 156 bereaved individuals who had lost a loved one due to suicide showed that perceived social support negatively predicted CG (Levi-Belz & Lev-Ari, 2019). Findings from a cohort study of 120 adults who have lost a spouse reported worse overall health outcomes among those who met the criteria for CG, and they were measured with less perceived social support from their immediate environment compared to those who didn't have CG (Ott, 2003). Another community-based cohort study among 293 bereaved individuals also showed that perceived social support was a protective factor against CG symptoms (Vanderwerker & Prigerson, 2004).

A longitudinal cohort study of 89 individuals who had lost a spouse showed that attendance at grief support groups was associated with approximately three times greater reduction in grief severity compared to no grief support (Ghesquiere et al., 2013). Studies have also shown that social support can play a role in reducing symptoms of PGD alongside other treatment resources. A longitudinal cohort study of 107 psychiatric outpatients showed that perceived support from a friend was significantly associated with reduced grief symptoms but support from family did not show a significant association. This result indicates that the source of social support must be considered when evaluating social support (Ogrodniczuk et al., 2003). A randomized trial study performed in South Korea on 80 seniors who had lost a loved one showed that those who received treatment for complicated grief (CGT) and had a supportive person alongside them had more beneficial results in reducing CG symptoms than those who didn't have a supportive person (Nam, 2016).

Previous studies have looked at risk factors for symptoms of PGD after a natural disaster. A cross-sectional study on 189 Norwegians who had lost a loved one after the tsunami in south-east Asia in 2004 revealed that perceived social support was a significant protective factor in reducing levels of CG (Kristensen et al., 2010). However, another cross-sectional survey made among 803 bereaved survivors after the Sichuan earthquake in China did not show a significant association between social support and symptoms of PGD (Li et al., 2015).

Lastly, a cross-sectional design study that specifically examined the association between PGD and perceived social support after the death of a significant individual among 226 Saudi Arabian university students showed that students with the highest PGD scores were those who perceived the least social support (Al-Gamal et al., 2019). Overall, previous research indicates that perceived social support is associated with lower levels of PGD symptoms and seeking social support during bereavement and alongside other treatment resources can reduce symptoms of PGD.

1.4.2 Sociodemographic factors

Studies can play a vital role in laying out both theoretical and practical implications (Kristensen et al., 2010) and can be used to identify the most vulnerable groups who are at greater risk for developing symptoms of PGD (Lundorff et al., 2017). Socioeconomic status (SES) is considered the fundamental

cause of health disparities. People with a lower socioeconomic status usually have less access to educational, financial, social, and health resources than those with a higher socioeconomic status (Link & Phelan, 1995; Phelan et al., 2010). Studies have found higher rates of PGD in low- and middle-income countries than in countries with higher incomes (Djelantik et al., 2020). A cross-sectional design study by Al-Gamal and colleagues (2019) showed a significant association between increased risk of PGD and low family income among students who had lost a loved one. In addition, a longitudinal study of family caregivers of cancer patients showed that caregivers who had not completed high school had higher PGD symptom scores in comparison to caregivers who had finished high school (Thomas et al., 2014)

A systematic review and meta-analysis detected slightly lower rates of prevalence of PGD in Eastern studies ($\approx 9\%$) as opposed to Western studies ($\approx 10\%$). Different approaches in methodologies and cultural differences might be influential factors (Lundorff et al., 2017). In a multivariable analysis by Goldsmith and colleagues (2008), African Americans were found to be at 2.5 times greater risk of developing PGD symptoms compared to their white counterparts. These findings indicate that bereaved African Americans might be at greater risk of developing symptoms of PGD, but further investigation is needed to confirm. A cross-cultural study showed that female Arab students met criteria for PGD to a greater extent than female American students. It is possible that cultural factors might have affected the results, but additional investigation would be required to verify (Varga et al., 2015). By contrast, a systematic review and meta-analysis by Heeke and colleagues (2019) did not find an association between race or ethnicity and PGD diagnosis. Nonetheless, researchers have proposed that future research should include ethnically diverse and representative samples (Prigerson, Boelen, et al., 2021).

Some studies have found that losing a loved one who is young has been found to be a risk factor for PGD. A population-based study by He and colleagues (2014) showed that the age of deceased adults was a predictor of PGD, with those who died at a younger age being associated with higher rates of PGD symptoms among the bereaved. However, a study on parents who had lost a child to cancer showed a significant association between the older age of the child and higher levels of PGD symptoms. The age of the child at death ranged from 0-24 years, with a mean age of 10 years (Pohlkamp et al., 2018).

According to results of a systematic review and meta-analysis, higher age of the bereaved individual is associated with higher prevalence of PGD (Lundorff et al., 2017). There have been mixed findings on the association of gender of the bereaved and PGD symptoms. Some studies show higher risk of PGD among women than men while other studies do not (He et al., 2014; Heeke et al., 2019). A population-based study by Morina and colleagues (2010) showed that women were six times more likely to develop PGD than men. Results in a web-based survey that was conducted following the terrorist attacks on September 11, 2001 revealed that most adults who developed PGD were women. Furthermore, a study among Swedish parents who had lost a child to cancer (Pohlkamp et al., 2018) and a study among Saudi Arabian university students (Al-Gamal et al., 2019) indicate that females were more likely to develop PGD symptoms than men. By contrast, a population-based study among 445 bereaved Chinese adults, the majority female, showed that gender was not significantly

associated with severity of PGD symptoms (He et al., 2014). Furthermore, findings from population-based studies did not show a significant association between gender and PGD score (Schaal et al., 2010; Stammel et al., 2013).

1.4.3 Other factors

Findings suggest that some types of losses have a higher risk of developing PGD than others (Djelantik et al., 2020). Losses which are not due to natural causes are associated with a considerably higher reported rate of PGD (Djelantik et al., 2020; He et al., 2014; Heeke et al., 2019; Işıklı et al., 2022) and poorer health outcomes in comparison to natural causes of death (Currier et al., 2008; Heeke et al., 2019). Unnatural deaths include sudden and violent deaths (Djelantik et al., 2020; Kristensen et al., 2012), caused by e.g. accident, homicide, natural disasters, suicide, terrorism or war (Kristensen et al., 2012; Rynearson, 2006). A systematic review and meta regression analysis showed that bereaved individuals who lost a loved one following accidents, homicide, suicide, and war-related deaths were the ones most vulnerable for developing PGD, up to 30 years post loss (Djelantik et al., 2020).

Many studies have shown that losing a child is a strong predictor for developing PGD (Djelantik et al., 2020; He et al., 2014). A population-based study showed a 16% prevalence rate of PGD in a sample of Swedish parents who had lost a child to cancer one to five years post loss (Pohlkamp et al., 2018). A longitudinal study on 62 women who have had miscarriages or stillbirths showed that 13.7% of them met criteria for CG 14 months post loss (Kersting et al., 2007). A population based study among Chinese bereaved people showed that bereaved parents and the widowed had the highest risk of PGD (He et al., 2014). Studies have noted that close relationships to the deceased increased the risk of developing PGD (Heeke et al., 2019). Results from a longitudinal study of bereavement among families of cancer patients showed that caregivers of a spouse were associated with higher PGD symptom scores than caregivers of parents (Thomas et al., 2014).

1.5 Health consequences associated with PGD

According to studies, PGD is associated with poor health outcomes and reduced quality of life (Maciejewski et al., 2016; Prigerson, Boelen, et al., 2021). A longitudinal study by Prigerson, Boelen, and colleagues (2021) showed that PGD symptom scores were significantly associated with low quality of life (e.g. poor mental health, bodily pain, tiredness or lack of energy, problems with social functioning) 12-24 months post loss. In addition, results showed that PGD symptoms remained stable from baseline (ranging from 12-24 months post loss) to follow-up time (ranging from 5.3-12 months later) suggesting that symptoms of PGD might not decrease over time. A study by He and colleagues (2014) also showed that PGD symptoms persisted even many years post loss. A longitudinal community-based study revealed that individuals diagnosed with PGD have 3.40 times the risk of low quality of life compared to those without PGD at 12-24 months post loss (Maciejewski et al., 2016). Various studies indicate that social and occupational impairment is associated with a PGD diagnosis. Evidence suggests that those who are diagnosed with PGD have twice the risk of experiencing

functional disability, 12–24 months post loss, compared to those who are not diagnosed with PGD (Maciejewski et al., 2016; Prigerson et al., 2009).

Increased risk of suicidal ideation has also been associated with PGD (Latham & Prigerson, 2004; Maciejewski et al., 2016). A study based of 309 bereaved adults showed that symptoms of PGD were associated with a 6.6 times greater likelihood of suicidality at baseline, six months post loss and 11.30 times greater risk likelihood at follow-up, 10.8 months post loss (Latham & Prigerson, 2004). The longitudinal community-based study by Maciejewski and colleagues (2016) of 317 bereaved individuals showed that individuals with PGD diagnosis have three times the risk of suicidal ideation in comparison to those without PGD diagnosis, 12-24 months post loss. Previous studies have also found that PGD symptoms are associated with elevated rates of poor health behaviors, sleep disturbance, hypertension, cancer, cardiac events (Prigerson et al., 1997), heart attack and hospitalization (Chen et al., 1999).

Research has shown that bereaved caregivers of cancer patients are especially associated with poorer health-related quality of life (Lichtenthal et al., 2011). A cross-sectional study shows that parents who have lost a child to cancer are at a higher risk of developing psychological distress, including PGD (Lichtenthal et al., 2015). Moreover, a study showed that parents who lost a child as a result of cancer four to nine years ago and had unresolved grief symptoms, reported increased physician visits and a greater likelihood of taking sick leave compared with those who had worked through their grief (Lannen et al., 2008). Studies have also shown that caregivers of those with dementia have higher levels of burden than other caregivers (Brodaty & Donkin, 2009). A prospective cohort study showed that family caregivers of people with dementia who lived together prior to the entry of a nursing home had higher levels of PGD. The pattern of family members who lose a loved one following dementia is prolonged, as they often begin to experience symptoms of grief in the pre-loss period and the symptoms tend to persist post loss (Givens et al., 2011).

As has been stated here, bereaved individuals who develop PGD may experience adverse health outcomes that require specific intervention strategies aimed at reducing negative health consequences associated with PGD symptoms (Djelantik et al., 2020; Goldsmith et al., 2008; Heeke et al., 2019; Jordan & Litz, 2014; Lundorff et al., 2017; Prigerson, Boelen, et al., 2021; Prigerson, Kakarala, et al., 2021).

1.6 Treatment for PGD

Diagnostic assessment for PGD aims to identify those who are considered at high risk for PGD and to implement effective intervention strategies to reduce negative health outcomes (Killikelly & Maercker, 2017). In the past it has been a challenge to identify bereaved individuals who are at high risk. Intervention can be essential for individuals who don't manage to cope with grief after a long period of time and are confronted with debilitating effects as a consequence. By using PGD diagnostic criteria, bereaved people at risk can be identified and appropriate treatment can be provided for the most vulnerable individuals (Prigerson et al., 2009).

Previous studies have pointed out that caregivers often did not receive appropriate support service during bereavement (Lichtenthal et al., 2015). Evidence has also shown that caregivers with PGD

symptoms seek health care less often than caregivers with depression, anxiety, or PTSD and many caregivers do not have access to mental health services. These results suggest that mental health services are underutilized in the context of bereavement-related health issues (Lichtenthal et al., 2011). Caregivers who have lost a loved one due to dementia also reported limited access to bereavement support services. Moreover, research suggests that specialized interventions need to be applied to different cases. For example, caregivers often experience grief symptoms in the pre-loss period, so early intervention could be an effective way to reduce negative health outcomes at post-loss (Givens et al., 2011).

It is worth pointing out that historically, physicians have been uncertain about what treatments are most effective for bereavement-related mental health problems (Prigerson & Jacobs, 2001). Studies have argued that pharmacotherapy should not be the core element in the intervention. For example, research has shown that antidepressant medications are not as effective when it comes to decreasing symptoms of grief, despite their effectiveness in treating depression (Prigerson, Kakarala, et al., 2021). Furthermore, findings show that bereavement-related depression tends to differ from depression unrelated to bereavement and that the same treatment should not be implemented as prescribing antidepressants is not as effective for bereavement-related depression (Mojtabai, 2011).

PGD diagnostic criteria has led to the development of effective treatment strategies. Several randomized clinical trials have been performed to test treatments for PGD by using grief-focused cognitive behavioral therapy (CBT) strategies (Killikelly & Maercker, 2017) and have shown effective results in reducing symptoms of PGD (Bryant et al., 2014; Kersting et al., 2013; Litz et al., 2014; Rosner et al., 2014). Exposure techniques that include emotional processing can alleviate distress and improve the patient's ability to modify maladaptive thoughts concerning the loss (Bryant et al., 2014). When professionals adopt an ideological position that grief reactions should not be categorized as a psychiatric disorder, bereaved people with severe and enduring health problems after the loss of a loved one may not get the help they need. The purpose of a diagnosis is to identify the individuals most at risk, so PGD symptoms can be alleviated with treatment interventions (Bryant, 2012).

2 Specific aims

The specific aim of this study is to assess the association of perceived social support and probable PGD after the loss of a loved one. Based on the literature to date, the hypothesis is that high perceived social support is associated with a decreased risk of probable PGD after the loss of a loved one.

3 Methods

3.1 Design and study population

The study is based on cross-sectional data from the ongoing Stress- And- Gene Analysis cohort, a nationwide study on the impact of trauma on women’s health in Iceland. The targeted population was women aged 18-69 years, all of whom reside in Iceland. Approximately 110,000 women were invited to participate in the study from February 2018 through June 2019. A total of 30,403 women participated in the study, 30% of the Icelandic female population. Participants answered extensive web-based questionnaires on trauma history and health response (Dánielsdóttir et al., 2022). Women who had not lost a loved one were excluded from this study. The final number of participants in the analysis in the current study was comprised of 24,409 women with a mean age of 44 years (Figure 1).

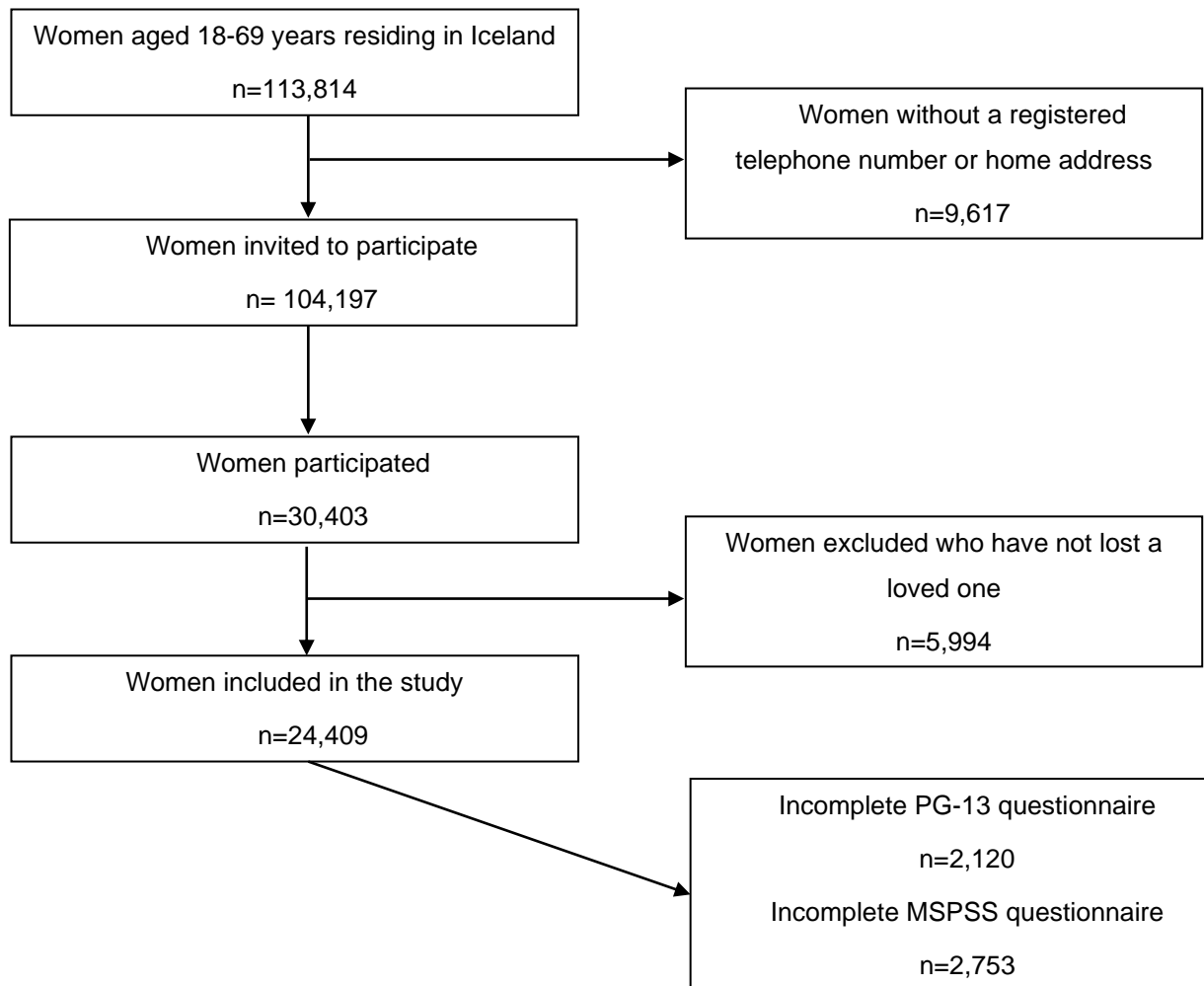


Figure 1. Study profile.

3.2 Measurement of exposure and outcome

The exposure is perceived social support and it is measured using the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1990). The MSPSS is one of the most widely used instruments to assess social support (Dambi et al., 2018). MSPSS measures respondents' perceived support from three sources: family (items 3,4,8, and 11), friends (items 6, 7, 9, and 12), and significant other (items 1, 2, 5, and 10) (Appendix A). Two examples of items include "There is a special person who is around when I am in need" and "There is a special person with whom I can share joys and sorrows". It is a self-report questionnaire that contains 12 items that are rated on a seven-point Likert-type scale ranging from "very strongly disagree" (1) to "very strongly agree" (7) (Zimet et al., 1990). The total score ranges from 12 to 84. The total score was categorized with quartiles. The first 25% of the scores was defined as low social support, 25–50% as low-moderate, 50-75% as high-moderate and 75-100% as high support. The scale has been found to have high internal reliability and validity (Zimet et al., 1990).

The outcome is probable PGD, measured using the Prolonged Grief Disorder scale 13 item (PG-13). PG-13 is a self-report questionnaire used to evaluate whether a respondent meets the criteria for PGD (Prigerson & Maciejewski, 2006). The respondent must have experienced the loss of a loved one (criteria A) in order to answer the questionnaire. The list contains 13 items that include questions about feelings, thoughts, and actions following a loss of a loved one (Appendix B). Two examples of items from the first part include "In the past month, how often have you felt yourself longing or yearning for the person you lost?" and "In the past month, how often have you had intense feelings of emotional pain, sorrow, or pangs of grief related to the lost relationship?". Items in the first part are measured on a 4-point Likert scale with the following response options: "Never" (0), "At least once" (1), "At least once a week" (2), "Daily or many times a day" (3). Two items from the second part include "Have you had trouble accepting the loss?" and "Do you feel that life is unfulfilling, empty, or meaningless since your loss?". The second part is measured on a 5-point severity scale with the following response options: "Not at all" (0), "Slightly" (1), "Somewhat" (2), "Quite a bit" (3), "Overwhelmingly" (4). The third part is a question that concerns reduction in social, occupational, or other important areas of functioning and is answered with "No" (0) or "Yes" (1) (Prigerson & Maciejewski, 2006).

In order for the respondent to meet criteria for PGD s/he must experience symptoms of longing or yearning in question #1 or strong painful feelings of sadness in question #2 at least daily (Criteria B) and these feelings must have lasted at least six months after the loss (Criteria C). Also, the respondent must experience 5 of the symptoms in the second part at least "quite a bit" (Criteria D). Lastly, s/he must have experienced a significant reduction in functioning in social life, work or other important areas and therefore the answer has to be "Yes" (Criteria E). According to the instructions of PG-13, a respondent that meets criteria for PGD is advised to seek a further thorough in-person evaluation by a mental health professional and is given appropriate treatment recommendations (Prigerson & Maciejewski, 2006). The psychometric properties of the measurement tool have been

tested and PG-13 is considered to be a reliable and valid measurement tool (Prigerson et al., 2009). The PG-13 questionnaire was translated into Icelandic by Edda Björk Þórðardóttir.

3.3 Covariates

Covariates in this study were age, education, employment status, income, marital status, type of loss, cause of death, how the death occurred, length of time since the loss occurred and number of losses. Age was classified into five groups: 18–25 years, 26–35 years, 36–45 years and 55–69 years. Education was categorized as primary education, secondary education, tertiary education A (BSc or BA) and tertiary education B (MSc or above). Employment was categorized as employment or a student (parental leave included) and retirement, disability or sick leave. Monthly income was divided into the following three groups: <300 thousand ISK, 301-700 thousand ISK, >701 thousand ISK. Marital status was a categorical variable divided into married or in a relationship, single or widowed.

Other categorical variables concerning the loss were also included: type of loss (spouse/lover, child, parent, sibling, other relative and close friend), cause of death (natural causes, illness/disease, accident or disaster, stillbirth/cot death, suicide, violence and other cause), how the death occurred (very suddenly, fairly suddenly, with some anticipation, with long anticipation and not applicable), and length of time since the loss occurred (less than 6 months, 6-12 months, 13 months-5 years, 6-10 years, more than 10 years).

3.4 Statistical analysis

Chi-square tests were conducted to determine if women with and without probable PGD differed with respect to socio-demographic characteristics. Logistic regression models were used to obtain odds ratios (OR) with 95% confidence intervals (CIs) for risk of probable PGD in relation to perceived social support. Statistical analyses were performed in RStudio.

3.5 Ethical considerations

The SAGA cohort has been approved by the National Bioethics Committee in Iceland (NBC number: 17-238), and all participants gave informed consent before participation.

4 Results

4.1 Probable PGD: Prevalence and associated factors

Most study participants, or 24,409 of 30,403 women (80.3%), had lost a loved one. The prevalence of probable PGD was 0.96% (291/30,403) in the entire sample and 1.19% (291/24,409) among women who had lost a loved one. Table 1 shows the background characteristics among 24,409 women regarding whether they met criteria for probable PGD.

Table 1. The association of background characteristics and probable PGD among women who have lost a loved one.

	Probable PGD			P-value
	Overall	Yes	No	
N	24,409	291	24,118	
Age (n, %)				<0.001
18-25	2,343 (9.6%)	51 (17.5%)	2,292 (9.5%)	
26-35	4,375 (17.9%)	56 (19.2%)	4,319 (17.9%)	
36-45	5,187 (21.3%)	61 (21.0%)	5,126 (21.3%)	
46-55	5,822 (23.9%)	56 (19.2%)	5,766 (23.9%)	
56-69	6,682 (27.4%)	67 (23.0%)	6,615 (27.4%)	
Marital status (n, %)				<0.001
Married or in a relationship	18,382 (75.3%)	156 (53.6%)	18,226 (75.6%)	
Single or widowed	5,893 (24.1%)	129 (44.3%)	5,764 (23.9%)	
Unknown	134 (0.5%)	6 (2.1%)	128 (0.5%)	
Education (n, %)				<0.001
Primary education	3,873 (15.9%)	109 (37.5%)	3,764 (15.6%)	
Secondary education	7,710 (31.6%)	110 (37.8%)	7,600 (31.5%)	
Tertiary education A (BSc or BA)	7,612 (31.2%)	40 (13.7%)	7,572 (31.4%)	
Tertiary education B (MSc or above)	5,099 (20.9%)	25 (8.6%)	5,074 (21.0%)	
Unknown	115 (0.5%)	7 (2.4%)	108 (0.4%)	
Income (n, %)				<0.001
<300 thousand ISK	7,257 (29.7%)	173 (59.5%)	7,084 (29.4%)	
301-700 thousand ISK	13,027 (53.4%)	99 (34.0%)	12,928 (53.6%)	
>701 thousand ISK	3,097 (12.7%)	7 (2.4%)	3,090 (12.8%)	
Unknown	1,028 (4.2%)	12 (4.1%)	1,016 (4.2%)	
Employment status (n, %)				<0.001
Employment or a student	20,231 (82.9%)	154 (52.9%)	20,077 (83.2%)	
Retirement, disability or sick leave	39,96 (16.4%)	130 (44.7%)	3,866 (16.0%)	
Unknown	182 (0.7%)	7 (2.4%)	175 (0.7%)	

Younger women were significantly more likely than older women to have probable PGD. Single or widowed women were significantly more likely than women who were married or in a relationship to have probable PGD. Women with lower education levels were significantly more likely than women with higher education levels to have probable PGD. Women with a lower income were significantly more likely than women with a higher income to have probable PGD. Lastly, women who were retired, disabled or on a sick leave were significantly more likely to have probable PGD than women who were employed or studying (Table 1).

Table 2. The association of factors related to the loss of a loved one and probable PGD among women.

N	Probable PGD			P-value
	Overall	Yes	No	
	24,409	291	24,118	
Type of loss (n, %)				<0.001
Child	1,255 (5.1%)	73 (25.1%)	1,182 (4.9%)	
Spouse/lover	1,045 (4.3%)	37 (12.7%)	1,008 (4.2%)	
Parent	8,299 (34.0%)	90 (30.9%)	8,209 (34.0%)	
Sibling	1,882 (7.7%)	32 (11.0%)	1,850 (7.7%)	
Other relative	9,101 (37.3%)	21 (7.2%)	9,080 (37.6%)	
Close friend	2,455 (10.1%)	33 (11.3%)	2,422 (10.0%)	
Unknown	372 (1.5%)	5 (1.7%)	367 (1.5%)	
Cause of death (n, %)				<0.001
Natural causes	5,785 (23.7%)	17 (5.8%)	5,768 (23.9%)	
Illness/disease	12,391 (50.8%)	127 (43.6%)	12,264 (50.9%)	
Accident or disaster	2,391 (9.8%)	40 (13.7%)	2,351 (9.7%)	
Stillbirth/cot death	643 (2.6%)	17 (5.8%)	626 (2.6%)	
Suicide	1,781 (7.3%)	43 (14.8%)	1,738 (7.2%)	
Other cause	1,262 (5.2%)	41 (14.1%)	1,221 (5.1%)	
Unknown	156 (0.6%)	6 (2.1%)	150 (0.6%)	
How the death occurred (n, %)				<0.001
Very sudden	8,785 (36.0%)	164 (56.4%)	8,621 (35.7%)	
Fairly sudden	5,204 (21.3%)	58 (19.9%)	5,146 (21.3%)	
With some anticipation	7,708 (31.6%)	38 (13.1%)	7,670 (31.8%)	
With long anticipation	2,332 (9.6%)	19 (6.5%)	2,313 (9.6%)	
Unknown	380 (1.6%)	12 (4.1%)	368 (1.5%)	
Length of time since the loss occurred (n, %)				<0.001
More than 10 years	9,865 (40.4%)	51 (17.5%)	9,814 (40.7%)	
6-10 years	4,744 (19.4%)	44 (15.1%)	4,700 (19.5%)	
13 months-5 years	7,091 (29.1%)	141 (48.5%)	6,950 (28.8%)	
6-12 months	1,301 (5.3%)	55 (18.9%)	1,246 (5.2%)	
Less than 6 months	1,302 (5.4%)	N/A ¹	1,302 (5.4%)	
Unknown	106 (0.4%)	N/A ²	106 (0.4%)	

¹ Women who had lost a loved one within six months did not meet the criteria for probable PGD. ² Women who did not supply information regarding the length of time since the loss occurred did not meet the criteria for probable PGD.

Table 2 lists several factors related to the loss of a loved one and their association with probable PGD. Most women who have probable PGD had lost a parent (30.9%) or a child (25.1%). Among those women who have death probable PGD, a loss caused by illness or disease was the most common cause of death (43.6%), and the most common occurrence of death was a very sudden loss (56.4%). Furthermore, nearly half of the women with probable PGD had lost a loved one 13 months to 5 years ago (48.5%).

Women with probable PGD were significantly more likely to have lost a child or spouse/lover than women without probable PGD. Women with probable PGD were significantly more likely to have lost a loved one due to an accident/disaster, stillbirth or SIDS, or suicide than women without probable PGD. Women with probable PGD were significantly more likely to have experienced a very sudden loss than women without probable PGD. Women with probable PGD were significantly more likely to have lost a

loved one 6 to 12 months ago or 13 months to 5 years ago than women without probable PGD (Table 2).

4.2 Social support and probable PGD

Nearly half of the women who met criteria for probable PGD, or 48.8%, had low perceived social support. Approximately one-fourth of women with probable PGD had low-moderate perceived social support (24%), 14% had high-moderate perceived social support and lastly, 13.2% had high perceived social support (Figure 2).

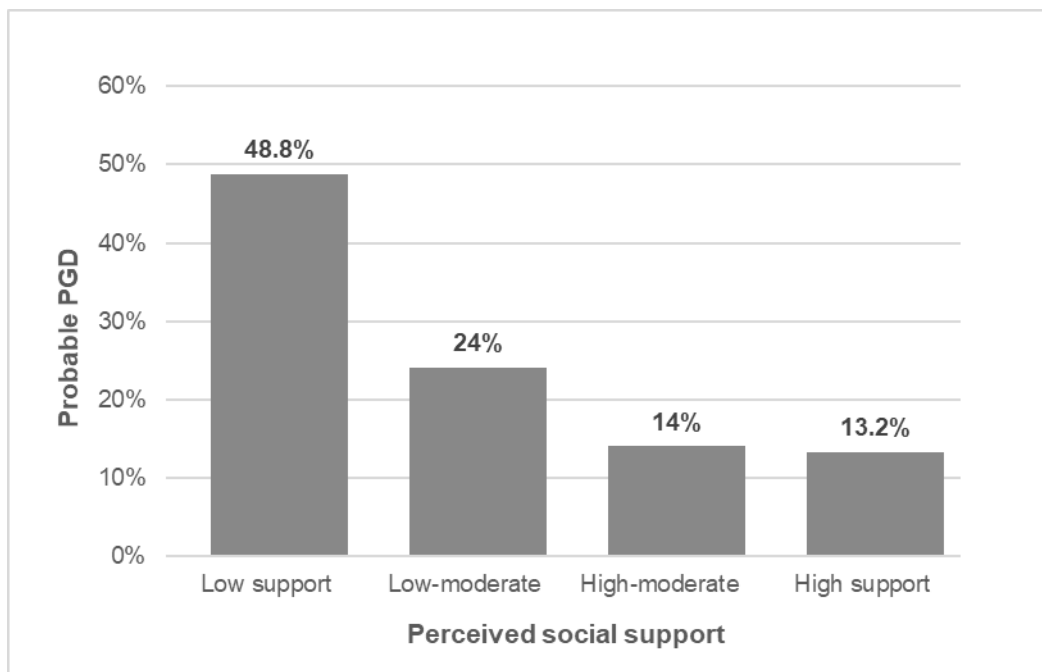


Figure 2. The percentage of women with probable PGD with regard to level of perceived social support.

Table 3. The association of perceived social support and probable PGD, expressed as odds ratio (OR) and 95% confidence interval (CI).

	Probable PGD				Crude OR	95% CI	Adj. OR*	95% CI
	Overall	Yes	No					
N	21,656	242	21,414					
Social support								
Low support	5,555 (25.7%)	118 (48.8%)	5,437 (25.4%)	1.00	Ref.	1.00	Ref.	
Low-moderate	5,031 (23.2%)	58 (24.0%)	4,973 (23.2%)	0.54	0.39-0.73	0.64	0.45-0.89	
High-moderate	5,104 (23.6%)	34 (14.0%)	5,070 (23.7%)	0.31	0.21-0.45	0.42	0.27-0.62	
High support	5,966 (27.5%)	32 (13.2%)	5,934 (27.7%)	0.25	0.17-0.36	0.39	0.25-0.59	

* Adjusted for age, education, employment status, income, marital status, type of loss, cause of death, how the death occurred and length of time since the loss occurred.

Table 3 presents the ORs and 95% CIs for the association between perceived social support and probable PGD. Adjusting for age, education, employment status, income, marital status, type of loss, cause of death, how the death occurred and length of time since the loss occurred, we found that

women with low-moderate perceived social support were 36% less likely to have probable PGD compared to women with low perceived social support (OR=0.64; 95% CI: 0.45-0.89). Women with high-moderate perceived social support were 58% less likely to have probable PGD compared to women with low perceived social support (OR=0.42; 95%CI: 0.27-0.62). Women with high perceived social support were 61% less likely to have probable PGD compared to women with low perceived social support (OR=0.39; 95% CI: 0.25-0.59).

5 Discussion

The current study is the first to examine the association between social support and symptoms of PGD among women on a national level to the best of our knowledge. Our data indicates that after adjusting for age, education, employment status, income, marital status, type of loss, cause of death, how the death occurred and length of time since the loss occurred, that women with high perceived social support were 61% less likely to have probable PGD compared to women with low perceived social support.

Our findings are consistent with previous studies suggesting that receiving social support is associated with decreased risk of PGD symptoms (Kristensen et al., 2010; Levi-Belz & Lev-Ari, 2019; Ott, 2003; Song et al., 2021; Vanderwerker & Prigerson, 2004). A previous study showed that bereaved individuals who attended grief support groups had about three times greater reduction in grief symptom severity than those who did not seek out any grief support groups (Ghesquiere et al., 2013). Another study showed a reduction in PGD symptoms among those who attended grief social support groups alongside other treatment resources compared to those who did not take part in any grief social support groups (Ogrodniczuk et al., 2003). Thirdly, a study showed that having a supportive person while going through complicated grief treatment (CGT) was more beneficial in reducing CG symptoms compared to those who didn't have a supportive person during CGT (Nam, 2016).

The findings of this study provide information of the possible long-term health effects that can follow a loss of a loved one and the association between perceived social support and symptoms of probable PGD. The study addresses a public health matter that has not been thoroughly examined in Iceland. According to the findings, it is possible that social support can lessen PGD symptoms. Future research could investigate what types of social support are most effective and appropriate for reducing PGD symptoms.

In our study, the prevalence of PGD was measured at 0.96% (291/30,403) in the entire sample, and the prevalence of PGD among women who had lost a loved one was measured at 1.19% (291/24,409), which is slightly lower than what has been measured in previous studies. The PGD prevalence rate has been estimated to be 1%-2% in previous population-based studies (Balk et al., 2010; He et al., 2014; Rosner et al., 2021). However, there were considerably fewer participants included in these aforementioned studies compared to our study. Many studies have measured the prevalence of PGD in bereaved samples and they reported higher rates, ranging from 2.5%-16.5% (Al-Gamal et al., 2019; Işıklı et al., 2022; Pohlkamp et al., 2018; Prigerson, Boelen, et al., 2021; Thomas et al., 2014; Tsai et al., 2018; Varga et al., 2015). These higher rates are understandable given that bereaved participants were more likely to endure bereavement-related distress in comparison to a population sample which also includes individuals who might not have experienced bereavement.

Our findings also indicate that background characteristics were significantly associated with the risk of probable PGD. Younger women were more likely than older women to have probable PGD, which is

inconsistent with previous studies which have found older women to be more likely to have probable PGD (Heeke et al., 2019; Lundorff et al., 2017). A possible explanation could be that losing a loved one like a parent or child may have a more severe effect on younger women than on older women. Single or widowed women were more likely than women who were married or in a relationship to have probable PGD, which is consistent with previous studies indicating that losing a spouse (He et al., 2014; Kristensen et al., 2010; Thomas et al., 2014) and having a close relationship to the deceased (Heeke et al., 2019) are risk factors for PGD.

Women with a lower level of education were more likely than women with a higher level of education to have probable PGD. Similarly, women with a lower income were more likely to have probable PGD than those with a higher income. Again, this finding is consistent with some previous studies indicating that lower SES can lead to an increased risk of PGD (Al-Gamal et al., 2019; Djelantik et al., 2020; Thomas et al., 2014). Women who were retired, disabled or on sick leave were more likely than women who were employed or studying to have probable PGD. Also, previous studies have shown that individuals with PGD have up to two times the risk of experiencing functional disability in comparison to those who do not have PGD (Maciejewski et al., 2016; Prigerson et al., 2009). Furthermore, functional impairment is one of the diagnostic criteria for PGD (Prigerson & Maciejewski, 2006).

Women with probable PGD were significantly more likely to have had lost a child and/or spouse/lover than women without probable PGD. These results are consistent with other studies, with the loss of a child (Djelantik et al., 2020; He et al., 2014; Pohlkamp et al., 2018) and spouse (He et al., 2014; Kristensen et al., 2010; Thomas et al., 2014) found to be strong predictors of PGD. Women with probable PGD were also significantly more likely to have lost a loved one due to an accident/disaster, stillbirth or SIDS, or suicide than women without probable PGD. These findings are consistent with previous studies, where so-called unnatural deaths, such as suicide and accidents (Djelantik et al., 2020; He et al., 2014; Heeke et al., 2019; Işıklı et al., 2022) and stillbirth (Kersting et al., 2007) are high risk factors for PGD. Women with probable PGD were significantly more likely to have experienced a very sudden loss than women without probable PGD, which is also consistent with previous studies (Djelantik et al., 2020; Kristensen et al., 2012). Interestingly, high rates of probable PGD were also found among women who lost a loved one due to “other causes of death”. Future research could consider exploring this further, for instance using open questions or interviews to find out more about the types of loss and their association with PGD. Regarding the length of time since the loss occurred in this study, women with probable PGD were significantly more likely to have lost a loved one six months to five years ago compared to women who had lost a loved one longer ago. Previous study results have indicated that symptoms of PGD might not decrease over time (Prigerson, Boelen, et al., 2021). This can be further examined in future research by using a longitudinal design study to follow a cohort over a period of time.

Among the strengths of this study, the most notable is its large sample size (n=30,403). The study used a population-based design consisting of 30% of the Icelandic nationwide female population, which is a representative sample in terms of distribution of age, education, income and residence. Therefore, the generalizability to the female population is reasonable. Additionally, using electronic

web-based questionnaires has many advantages: they are accessible, convenient, inexpensive and can reach many people in a short amount of time. The study also included a validated measurement tool, PG-13, to assess symptoms of PGD, which was translated into Icelandic. A final strength of the study is its use of MSPSS, one of the most prevalent instruments to assess social support.

There are also several limitations to this study. First, a cross-sectional designed study is unable to determine the relationship of cause and effect between outcome and exposure variables, it only reveals a temporal link between them so causality cannot be determined. Also, participants answered questionnaires about past events and therefore recall biases can possibly occur, which can reduce the accuracy of the information. Lastly, the results cannot be generalized to the male population since the results are exclusively based on a female sample. Future studies should also contain a more diverse sample, including men and people with various racial, ethnic, and cultural backgrounds.

6 Conclusion

In the current study, women with low perceived social support were more likely to have probable PGD than women with higher perceived social support. Among the background characteristics, young age, being single or widowed and low SES were associated with probable PGD. Among the factors related to the loss, loss of a child or spouse, unnatural losses, such as stillbirth or cot death, suicide and accidents, losses that occurred six months to five years before and sudden losses were associated with probable PGD. The implication from the study is increased knowledge on long-term health effects of trauma following a loss of a loved one with increased understanding of risks associated with PGD and the potential to reduce harm and minimize negative health outcomes among the most vulnerable with severe symptoms as well as develop prevention strategies. Social support may possibly prevent or decrease symptoms of PGD. Therefore, emphasis on the importance of social support during bereavement should be highlighted and it should be an available resource within the healthcare sector.

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Appendix A: Items in the Multidimensional Scale of Perceived Social Support (MSPSS)

1.	There is a special person who is around when I am in need.
2.	There is a special person with whom I can share joys and sorrows.
3.	My family really tries to help me.
4.	I get the emotional help and support I need from my family.
5.	I have a special person who is a real source of comfort to me.
6.	My friends really try to help me.
7.	I can count on my friends when things go wrong.
8.	I can talk about my problems with my family.
9.	I have friends with whom I can share my joys and sorrows.
10.	There is a special person in my life who cares about my feelings.
11.	My family is willing to help me make decisions.
12.	I can talk about my problems with my friends.

Appendix B: Items in the Prolonged Grief Scale (PG-13)

a.	In the past month, how often have you felt yourself longing or yearning for the person you lost?
b.	In the past month, how often have you had intense feelings of emotional pain, sorrow, or pangs of grief related to the lost relationship?
c.	For questions 1 or 2 above, have you experienced either of these symptoms at least daily and after 6 months have elapsed since the loss?
d.	In the past month, how often have you tried to avoid reminders that the person you lost is gone?
e.	In the past month, how often have you felt stunned, shocked, or dazed by your loss?
f.	Do you feel confused about your role in life or feel like you don't know who you are (i.e., feeling that a part of yourself has died)?
g.	Have you had trouble accepting the loss?
h.	Has it been hard for you to trust others since your loss?
i.	Do you feel bitter over your loss?
j.	Do you feel that moving on (e.g., making new friends, pursuing new interests) would be difficult for you now?
k.	Do you feel emotionally numb since your loss?
l.	Do you feel that life is unfulfilling, empty, or meaningless since your loss?
m.	Have you experienced a significant reduction in social, occupational, or other important areas of functioning (e.g., domestic responsibilities)?