

Psychometric properties of the Persian version of the pandemic grief scale

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Implications for practice

- The PGS is a valid and reliable screening tool in the study of dysfunctional grief due to the loss through Covid-19 among the Persian-speaking population.
- The PGS can be performed quickly because it contains only five items likely to help clinicians in crowded clinical settings.
- Some of the content of the scale may need to be interpreted within a cultural context, particularly in the case of item 4, which evaluated 'difficulties having positive memories about the deceased'. In Iranian culture this may be because the item implies having negative memories, which may be perceived as disrespect for the deceased.
- Symptoms of dysfunctional grief related to Covid-19 may be similar to symptoms of anxiety or depression but differ in that they are direct reactions to loss.

Abstract

This study evaluated the psychometric properties of a Persian version of the pandemic grief scale (PGS) using a sample of 473 people who had experienced the death of a loved one to coronavirus (Covid-19). The results of this study demonstrated that this version of the PGS has internal consistency reliability (omega coefficient of 0.86) and test-retest reliability with an interval of three weeks (intraclass correlation coefficient of 0.89) scores in the highly reliable ranges. Confirmatory factor analysis results of a uni-dimensional model support the construct validity of this version of the PGS, while convergent and divergent validity was shown with significant correlations between the PGS and measures of depression, anxiety, functional impairment, and hope. Overall, the Persian version of the PGS showed good psychometric properties in the Iranian population.

Introduction

Coronavirus disease 2019 (Covid-19) is a contagious disease caused by a virus, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019. The disease quickly spread worldwide, resulting in the Covid-19 pandemic (Saragih *et al*, 2021). At the time of writing 500 million people have been infected with Covid-19, and more than six million individuals have died from this disease. In Iran, the first confirmed case of Covid-19 was reported in Qom on 19 February 2020. This pandemic continues to spread over Iran where there have been seven million confirmed cases and 140,000 deaths until April 2022 (American Library Association, 2022; Hadianfar *et al*, 2021).

The Covid-19 pandemic has been a disturbing experience of proximity to death. The whole experience negatively affects individuals with or without previous mental health disorders. The Covid-19 pandemic led to increased anxiety, depression, phobia, paranoia, hostility, interpersonal subjectivity, obsessive-compulsive disorder and psychoticism in individuals who presented previously psychiatric diagnostic and lost close ones due to Covid-19 (Joaquim *et al*, 2021).

Ranking the death of a loved one as one of the most stressful events of the life (Holmes & Rahe, 1967), it seems surprising that there has been no research into people bereaved by Covid-19 in spite of severe behavioral, psychological, and physical health consequences it can cause, for example the increased risk of heart attacks, disease, and death (Evren *et al*, 2022; Lee & Neimeyer, 2022; Stroebe *et al*, 2007).

The Covid-19 pandemic has caused some stressors exacerbating the pain of loss. These include social isolation, financial insecurity, concerns about health, other family members, other friends' and family's death, and anxiety about one's own death (Carr *et al*, 2020; Evren *et al*, 2022; Krikorian *et al*, 2020; World Health Organization, 2020). Moreover, other research studies have specified a number of evidence-based risk factors for complicated and prolonged grief disorder, including the social isolation of the bereaved, unexpectedness of death, challenges regarding a secure attachment to the deceased, spiritual struggles faced in grief, social harms, and lack of informational and institutional support for families

from the care centers where deaths occur (Lee & Neimeyer, 2022; Neimeyer & Burke, 2017). A remarkable point is that each of these factors describes a condition in which the death caused by Covid-19 occurs. The protocols of social isolation lead to restricting both the existing social support and the meaningful participation of family members in end-of-life care. Individuals and families feel helpless and guilty due to their inability to care for and prevent the death of their loved ones. Throughout the pandemic, places of worship were closed, while the bereaved may question God's grace and their assumptions in terms of the world can be subjected to an attack by unpredictable events which cannot be predicted and controlled (Lee & Neimeyer, 2022; Menzies *et al*, 2020).

Hence mortality from the present and future pandemics will possibly lead to disastrous psychological, medical, and economic consequences of grief. According to some researchers, preparation for a possible 'grief pandemic' due to Covid-19 seems to be an urgent need (Weinstock *et al*, 2021). Grief refers to the way we respond to the bereavement which can take different forms. Regardless of its form, grief is inevitable (Gross, 2018). Recent research has indicated that grief over the death of a loved one from Covid-19 is deeper than that caused by other forms of loss such as a death by natural causes (Caycho-Rodríguez & Valencia *et al*, 2021; Eisma *et al*, 2021).

With regard to the sharp reactions to grief throughout the initial months as a risk factor for a long period of grief, this finding appears to be particularly disquieting. Prior to the onset of the Covid-19 pandemic, 10% of people who lost a loved one had complications in the grief process (Lundorff *et al*, 2017). Currently, the Covid-19 pandemic has increased the prevalence of dysfunctional grief worldwide. It is estimated that death of a person due to Covid-19 will affect nine family members emotionally (Eisma *et al*, 2020; Verdery *et al*, 2020). Given the death of six million individuals from Covid-19 so far, if statistical models are applied to the current state of the world, it can be estimated that there are about 50 million bereaved people around the globe (American Library Association, 2022). With a conservative rate of 9.8% (Lundorff *et al*, 2017), it can be estimated that nearly five million people may suffer from prolonged grief disorder around

the world. In Iran, with the death of 140,000 people, more than 120,000 individuals may suffer from prolonged grief disorder (6 million deaths in April 2022, according to the World Health Organization; with a conservative prevalence rate of 9.8%, prolonged grief disorder) (American Library Association, 2022).

As mentioned so far, some studies have shown that dysfunctional grief caused by death from Covid-19 can increase the risk of mental and physical problems. However, due to the lack of instruments to measure the symptoms of dysfunctional grief, there is limited information regarding how the Covid-19 pandemic affects the experience of dysfunctional grief and its prevalence (Bertuccio & Runion, 2020; Breen *et al*, 2021; Caycho-Rodríguez & Vilca *et al*, 2021; Lenferink *et al*, 2020; Zisook *et al*, 2014). Also, the lack of a valid tool for assessing the dysfunctional grief, which is caused by an important person loss due to Covid-19, means that its symptoms may not be recognised or diagnosed correctly. Consequently, they fail to be treated or are treated with general or ineffective interventions (Caycho-Rodríguez & Valencia *et al*, 2021; van Eersel *et al*, 2019). To address this gap, Lee and Neimeyer (2022) the Pandemic Grief Scale (PGS) as a criteria for assessing the dysfunctional grief caused by the death of a loved one due to Covid-19. The studies that have examined the psychometric properties of this scale in different cultures have shown that this scale has good and desirable psychometric properties. (Caycho-Rodríguez & Valencia *et al*, 2021; Caycho-Rodríguez & Vilca *et al*, 2021; El Sayed *et al*, 2021; Evren *et al*, 2022; Lee & Neimeyer, 2022; Skalski *et al*, 2021).

To the best of the researchers' knowledge, to date, the PGS has not been utilised to study the grief pandemic in the context of Iran. In addition, considering the inter-cultural use of the tool to diagnose dysfunctional grief seems to be highly significant. In this regard, the social idioms used to express the dysfunctional grief may be different in various cultural contexts which, in turn, can result in differences in displaying symptoms. In a special family and community, grief is created and perpetuated through social interactions particular to that situation. Thus, with regard to the cultural background of an individual, the ways associated with grief might be different (Jakoby, 2012; Lund, 2021; Muñoz, 2020; Pablos-Méndez *et al*, 2020; Rafael de Freitas & Pitzurra, 2020; Smid *et al*, 2018).

The validation of a mental health scale specific to Covid-19 is vital for health professionals in Iran. The aim of this study was to examine the psychometric properties of the Persian version of the pandemic grief scale using a large sample of bereaved adults who had experienced the death of a significant other, either a relative or a close friend, due to the Covid-19 pandemic. The question of the present study is whether the Persian version of the pandemic grief scale has desirable psychometric properties.

Method

Participants and procedure

In this psychometric study, the population examined was bereaved (the loss of a loved one due to the coronavirus disease [Covid-19]), Persian-speaking adults (ie 18 years of age and older). The sample was selected using the convenience sampling method. Considering that Comrey and Lee (1992) suggested a sample size of 300 individuals to study exploratory factor analysis (EFA) and taking into account Myers *et al*'s (2011) suggestion of a sample size of 200 individuals for confirmatory factor analysis (CFA), we selected a sample size of 500 bereaved adults. However, 473 individuals (173 males and 300 females) fully completed the scales. The five-minute online survey, disseminated through social media (WhatsApp, Instagram) and websites, targeted Persian-speaking bereaved adults who had experienced the death of a significant other, either a relative or a close friend, due to the coronavirus disease (Covid-19). We collected data from 15 March 15 to 11 April 2022. After receiving the consent of one of the original scale's authors, the pandemic grief scale was separately translated into Persian by two Ph.D. students in clinical psychology. Afterward, a PhD professor in clinical psychology rectified discrepancies in the translations. Two English language experts were asked to translate them back into the original language in the next step. The translated texts were compared with the original text, and any problems were investigated, including the structures of translated sentences. After agreeing (easily and without any problems) on the final English version and the Persian content of the questionnaire, the final Persian version of the questionnaire was prepared. In the next step, the scale was administered to a sample of 30 participants, and problems such as ambiguity and

incomprehensibility of a few Persian sentences were rectified. An audiobook (novel) produced by one of the authors was given to people as a gift for taking part in the research. The inclusion criteria were: participants had to be over 18 years of age, have a loss of a significant person (such as parents, children, siblings, spouse, friend, grandparents) due to Covid-19, and be able to read and write in Persian. Exclusion criteria were: inconsistent responses to the questionnaires. Before data collection the study was approved by research ethics committee of Iran University of Medical Sciences (IR.IUMS.REC.1400.1191). A written informed consent that described the objectives and procedures of the study was obtained from all participants, and anonymity was assured. Participants were asked to fill out the battery of four self-report measures, pandemic grief scale, patient health questionnaire-4, work and social adjustment scale, and adult hope scale.

Sociodemographic information

Participants were asked to report their age, gender, education status, employment status, relationship with a significant person in their life who died from Covid-19, and how long ago this person died.

Measures

Pandemic grief scale (PGS)

The PGS is a five-item English language scale with solid reliability ($\alpha = .86$), factorial validity (CFA support), and construct validity with solid correlations with suicidal ideation and substance use coping, based on a study conducted with 831 adults who lost someone to Covid-19 (Lee & Neimeyer, 2022). The PGS measures Covid-19 grief across demographic groups and discriminates well between persons with and without dysfunctional grief using an optimized cut score of > 7 (87% sensitivity and 71% specificity). An alarming 66% of the sample scored in the clinical range. The PGS also demonstrates incremental validity by explaining an 18% additional variance in functional impairment due to a Covid-19 loss beyond depression and generalised anxiety measures. Thus, the PGS was suggested as an efficient and valid screening tool for clinical research and practice during a pandemic.

Patient health questionnaire-4 (PHQ-4)

This self-report scale (Kroenke *et al*, 2009) has four items to evaluate anxiety (two items) and depressive symptoms (two items) over the previous week. Participants respond to items based on a 4-point Likert scale ranging from 0 (not at all) to 3 (almost every day). The Persian version of the PHQ-4 has good psychometric properties (Ahmadi *et al*, 2020). In this study, Cronbach's alpha was 0.88.

Work and social adjustment scale (WSAS)

An adapted version of Mundt *et al's* (2002) work and social adjustment scale (WSAS) was used to measure functional impairment due to a Covid-19 loss. Participants were asked to rate, using a 9-point severity scale (0 = not at all to 8 = very severely), how much impairment they experienced because of their Covid-19 loss (eg 'Because of this loss, my ability to work is impaired. 0 means not at all impaired and 8 means very severely impaired to the point I cannot work.'). Based on a WSAS cut-score of > 21.00 (Mundt *et al*, 2002), 64.5% of the sample were classified as functionally impaired due to a Covid-19 death in a previous study (Lee & Neimeyer, 2022). A Persian version of this scale was not available. Thus a similar process was conducted to translate WSAS to Persian as was done for the PGS. In the present study, the unidimensional 5-item WSAS indicated a good fit to the data ($\chi^2/df = 1.055$, RMSEA = .011, CFI = 1.000, GFI = .997) and had good internal consistency ($\alpha = .91$). The correlations between the WSAS and the PGS ($r = .77$, $p < .001$), and the PHQ-4 ($r = .66$, $p < .001$) were statistically significant, providing evidence of the convergent validity of the scale.

Adult hope scale

The AHS by Snyder was applied to test hope among participants. The scale contains 12 statements – four items are related to the agency subscale, four to the pathways subscale, and the remaining four are the buffers. Respondents mark their answers on an 8-point scale, where 1 signifies a completely false statement, and 8 describes a completely true statement. The higher the general result (results from two subscales), the greater the hope level. The AHS displays an acceptable internal consistency rate in the original (Cronbach's $\alpha = 0.74$ – 0.84) and the Persian version (Cronbach's $\alpha = 0.82$), which is estimated based on research conducted in college. The original scale

display correlation with related constructs such as basic hope, self-esteem, ability to cope with difficult situations, optimism (research among a group of the unemployed, Spearman's $\rho = 0.39$), self-efficacy (studies among high school students, Spearman's $\rho = 0.36$) (Kermani *et al.*, 2011). In this study, Cronbach's alpha was 0.73.

Data analysis

Data was collected using Google Forms. Data was analysed using SPSS software V. 26 and Mplus software V 8.3. The unidimensionality of the Persian PGS was then assessed via CFA with robust maximum likelihood estimator (MLR) (Yuan & Bentler, 2000). The fit of a CFA was evaluated following widely used indices that complemented the chi-square (χ^2) test: the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root-mean-square error of approximation (RMSEA), as well as the standardized root-mean-square residual (SRMR). A non-significant χ^2 test, CFI > .95, TLI > .95, RMSEA < .06, and SRMR < .08 were considered evidence of good fit (Hu & Bentler, 1999). To assess reliability by the intraclass correlation coefficient (ICC) and the internal consistency method, Cronbach's alpha and the omega coefficient were used, where values of α and $\omega > 0.80$ are adequate (Raykov & Hancock, 2005). Factor loadings (λ) greater than 0.50 were considered adequate (Dominguez-Lara, 2018). The correlation between the PGS and the work and social adjustment scale (WSAS), patient health questionnaire-4 (PHQ-4) and adult hope scale were analysed to determine validity.

Results

The study was conducted on 473 people with an average age of 33.87 (SD = 11.87) years. 300 (63.4%) were women, 173 men (36.6%), 220 were single (46.5%), 236 were married (49.9%), and 17 were divorced (3.6%). At the level of education, 145 people (30.6%) had undergraduate and diploma education, 156 (33.1%) had higher education and professional knowledge, and 172 (36.3%) had higher and higher professional education. The mean time since loss was 9.13 (SD=6.45) months. In terms of employment, 96 people were unemployed (20.3%), 125 students (26.4%), 151 full-time (31.9%), 88 part-time (18.6%) and 13 retired (2.7%). Of these individuals, 26.2% had lost first-degree relatives (father, mother, sister, brother), 38.2% lost second-

degree relatives (grandfather, grandmother, uncle, aunt, cousin, children, cousins), 17.8% lost a spouse/partner, 11% lost a close friend, and 6.8% lost their children due to Covid-19.

Reliability

To assess reliability by the intraclass correlation coefficient (ICC) and the internal consistency method, Cronbach's alpha coefficient (α ; Cronbach, 1951) and the omega coefficient (McDonald, 1999) were used. To test-retest reliability of the PGS, we used data from 45 volunteers who completed the follow-up survey for this purpose, with an interval of three weeks. The intraclass correlation coefficient was good (ICC = .893, $p < .0001$). Moreover, item-total correlations for the PGS were equally robust, ranging between 0.54 (item 4) and 0.74 (item 5). The Cronbach's alpha coefficient (0.86) and the omega coefficient (0.86) of the current Persian PGS were satisfactory.

Validity

The literature defines convergent validity as the extent to which items of a psychometric test appear to be indicators of a single underlying construct (Lee *et al.*, 2015; Evren *et al.*, 2022). Convergent validity is deemed adequate when the average variance extracted (AVE) of the latent variable is ≥ 0.50 and composite reliability (CR) is ≥ 0.70 (Fornell & Larcker, 1981; Wu *et al.*, 2015; Evren *et al.*, 2022). In this study the AVE value for the PGS was adequate (0.64), and the CR coefficient was beyond the desired threshold (0.90). Convergent validity was also assessed by correlating the PGS scores with the scores of two related scales (ie the WSAS and PHQ-4). The correlations between the PGS and the WSAS ($r = 0.77$, $p < 0.001$), and the PHQ-4 ($r = 0.64$, $p < 0.001$) were statistically significant. Overall, these results demonstrate positive correlations among the variables of interest in the expected direction according to the underlying theory, thus supporting the validity of the PGS. The PGS also had a significant negative correlation ($r = -0.46$, $p < 0.001$) with the adult hope scale which indicates the desirable divergent validity of the pandemic grief scale.

Factor analysis

Initial data screening indicated that the PGS items were suitable for factor analysis (Tabachnick & Fidell, 2001). In particular, the sample size data

was not missing, anomalous, and multilinear, and the KMO sizes and Bartlett's sphericity test results were estimated. Results showed the adequacy of the sample size. ($KMO = 0 / 864$), Bartlett's test showed that the assumption of zero integration between the questions was rejected, and the conditions of functional analysis were maintained $P < 0/0001$ and $df = 10$ and Bartlett's $= 1021/35$). The unidimensionality of the Persian PGS was then assessed via CFA with robust maximum likelihood estimator (MLR) (Yuan & Bentler, 2000). The fit of a CFA was evaluated following widely used indices that complemented the chi-square (χ^2) test: the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root-mean-square error of approximation (RMSEA), as well as the standardized root-mean-square residual (SRMR). A non-significant χ^2 test, $CFI > .95$, $TLI > .95$, $RMSEA < .06$, and $SRMR < .08$ were considered evidence of good fit (Hu & Bentler, 1999). However, it should be noted that the RMSEA tends to perform poorly in models with small degrees of freedom (Kenny *et al*, 2015). Thus, this index should be interpreted with caution in the present study. The CFI, TLI, and RMSEA values were computed using specialized formulae developed for situations in which a robust estimator is used (Brosseau-Liard *et al*, 2012; Brosseau-Liard & Savalei, 2014). The unidimensional model presents adequate fit indices in the total sample of participants ($\chi^2 = 23.30$; $df = 5$; $p = 0.000$; $RMSEA = 0.000$; $SRMR = 0.011$; $CFI = 1.000$; $TLI = 1.001$). As seen in Table 1, all item-component loadings were statistically significant (ranged from .69 to .85) and within the acceptable conventional threshold of $> .50$. Thus, results from the CFA suggest that the PGS assesses a unidimensional construct.

Table 1 Summary of the results from the CFA on the pandemic grief scale (PGS) and item-total correlations obtained from the five items of the PGS.

Item	Factor loadings correlation	Item-total
1	0.775	0.643
2	0.835	0.720
3	0.845	0.735
4	0.690	0.548
5	0.848	0.737

All factor loadings and item-item Pearson correlations were statistically significant ($p < .001$).

Discussion

At the time of this study, the Covid-19 pandemic continues as a significant public health problem with thousands of deaths across the globe and significant effects on individuals' health and mental health (Caycho-Rodríguez & Vilcs *et al*, 2021; Satici *et al*, 2021). Researchers and practitioners may frequently face assessment situations, in which restrictions on time and financial resources are in place. For these settings, short scales can be a reasonable option, given their profile of psychometric properties fits the demands of the assessment situation (Kemper *et al*, 2019). Therefore, having assessment tools to examine the effects of Covid-19 on mental health is very important. The pandemic grief scale is a short and simple and easy tool for screening the grief caused by the Covid-19 pandemic, making it helpful for assessing mental health indicators. The crucial question to be asked when considering the use of a short scale in psychological assessment is whether the psychometric evidence supports the intended use of the scale (Kemper *et al*, 2019). For this purpose, factor structure, convergent and divergent validity and reliability this scale was examined in the Iranian population.

The internal consistency reliability for the Persian version of the PGS was found to be very good when assessed by Cronbach's alpha (0.86). This is in line with studies from other countries (Caycho-Rodríguez & Vilca *et al*, 2021; Evren *et al*, 2022; Lee & Neimeyer, 2022). Although omega alpha total is often regarded as a better alternative than Cronbach's alpha (because it is based on factorial loads and is not influenced by sample size or number of items on the scale) (Revelle & Condon, 2018), it produced the same results in the present study (0.86). It should be noted that although the items are ordinal, they were treated as continuous variables in the reliability analyses, as this is probably most appropriate when assessing the reliability of simple unweighted sum scores (Gustafsson & Aberg-Bengtsson, 2010; Revelle & Condon, 2018). The intraclass correlation coefficient (ICC) method was used to obtain the stability of the scores over time. Theoretically, the Pearson's product-moment correlation is the correlation between two different variables and it is inappropriate to be used in the reliability analysis. Furthermore, the Pearson's product-moment correlation coefficient cannot detect the existence of systematic errors. Therefore, the ICC coefficient

would be the appropriate approach to evaluate the test and retest reliability (Yen & Lo, 2002). The results showed that the ICC with an interval of three weeks was 0.89, which was good and significant ($p < 0.01$). Consequently, the Persian version of the grief pandemic scale is desirable from the test and retest reliability.

The results related to constructing validity also showed that the one-factor structure has a good fit. This finding was identical to other versions of the scale, such as the original, Turkish, Polish, and Peru versions (Caycho-Rodríguez & Vilca *et al*, 2021; Evren *et al*, 2022; Lee & Neimeyer, 2022; Skalski *et al*, 2021). On the other hand, although the factorial structure was the same in the USA, Turkey, Poland and Peru, additional studies are needed before it is safe to assume the comparability of measurements between different countries, since the cultural context of each country can influence the expression of emotions (Caycho-Rodríguez & Vilca *et al*, 2021). To investigate the convergent validity of this study, the patient health questionnaire-4 (PHQ-4) and the social and occupational adjustment scale (WSAS) were used. The results showed that the pandemic grief scale had a positive and significant correlation with PHQ-4 and WSAS; these results are consistent with previous findings (Evren *et al*, 2022; Lee & Neimeyer, 2022). The relationships between dysfunctional grief and depressive symptoms can be explained by the restrictions of social interaction due to the pandemic, which have all but eliminated social support and the made performing funeral ceremonies impossible or highly limited, which in turn has caused people to experience their grief in isolation (Mortazavi *et al*, 2020; Caycho-Rodríguez, Vilca *et al*, 2021). Furthermore, the loss of a loved one can also generate anxiety that, in turn, lead the mourner to experience a more prolonged grief, especially when a loss has been very difficult (Shear, & Skritskaya, 2012; Caycho-Rodríguez, Vilca *et al*, 2021). Although bereavement symptoms often co-occur with symptoms of depression and anxiety (Kokou-Kpolou *et al*, 2020; Caycho-Rodríguez, Vilca *et al*, 2021), the correlations between them reported in the present study demonstrate that these three symptom clusters represent different but related constructs (Boelen, & van den Bout, 2005; Dillen *et al*, 2009). Thus, symptoms of dysfunctional grief related to Covid-19 may be similar to symptoms of anxiety or depression, but differ in that they are direct reactions to loss (Bertuccio & Runion, 2020;

Caycho-Rodríguez, Vilca *et al*, 2021). In this study the AVE value for the PGS was adequate (0.64), and the CR coefficient was beyond the desired threshold (0.90). The adult hope scale was used to assess divergent validity. According to the results, hope was negatively related to grief due to the loss of Covid-19, which is similar to studies that have shown that people with lower hope experience more severe symptoms of more complicated grief (Ludwikowska-Świeboda & Lachowska, 2019; Yousefi *et al*, 2022).

The Persian version of PGS presents results similar to the original English, Turkish, Peruvian and Polish versions. The Persian version is a valid measure of dysfunctional grief due to Covid-19 loss that can be used for research and diagnosis among the general Persian-speaking population. As with other studies, this study has its limitations. First, convenience sampling was performed, which weakens the generalisability of the findings. Second, the study was conducted using self-report questionnaires online (WhatsApp, Instagram) which may have led to a bias of respondents; Third, only self-report scales were used to measure convergent validity so the results may be affected by the effect of the method. Since this study was performed on the general population, it is suggested that clinical samples be used to achieve the cut-off points of this scale in the Iranian population in future studies. Because we used a cross-sectional design in our study, we could not determine the causal relationships between the variables. Therefore, it is desirable to repeat this study using a longitudinal design to emphasise dysfunctional grief due to the loss of Covid-19 as a unique syndrome for the current pandemic and possibly similar pandemics in the future. Similar with Turkish PGS, we believe that cultural differences may have played a role in the Persian translation of the PGS, particularly in the case of item 4, which evaluated 'difficulties having positive memories about the deceased'. The contribution of this item to the scale in the present study seems to be small. In Iranian culture, similar to Turkish, this may be because the item implies having negative memories, which may be perceived as disrespect for the deceased (Evren *et al*, 2022). Therefore, some of the content of the scale may need to be interpreted within a cultural context.

The identification of symptoms of grief and bereavement during and after the Covid-19 pandemic can provide information to implement

intervention programs that allow people to cope with grief and bereavement and stress during a pandemic and have assertive responses to control measures such as social isolation or strict confinement to which people may be subjected (Duan & Zhu, 2020; Noe-Grijalva *et al*, 2022). The findings suggest the inclusion of the PGS in online mental health assessment systems. This is important in a context of improving mental health services, where technology is a means to deliver mental health services remotely and on a large scale, which is valuable in situations of social distancing.

Conclusion

The current study results revealed that the present Persian version of the PGS is a measure of a unidimensional construct. It is a valid and reliable screening tool in the study of dysfunctional grief due to the loss of Covid-19 among the Persian-speaking population. This study showed the PGS could be an effective and valid screening tool for research and clinical practice during a pandemic. Thus, the PGS is expected to generate important new empirical findings on the nature of dysfunctional grief from the Covid-19 pandemic in particular and in other future pandemics. However, future research is needed in Persian-speaking population and over a long period of time to understand more about the usefulness of the PGS in Persian, with the objective of developing prevention or intervention programs in at-risk groups, such as those who have lost a loved one to the current pandemic of Covid-19. The PGS can also be performed quickly because it contains only five items likely to help clinicians in crowded clinical settings.

Ethical considerations

The proposal of the study was approved by the Student Research Committee, Iran University of Medical Sciences. Also the Research Ethics Committee of the IUMS (IR.IUMS.REC.1400.1191) approved the study. The authors obtained the informed consent of participants to take part in this study.

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