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# Complicated grief and related factors among nursing staff during the Covid-19 pandemic: a cross-sectional study

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## Abstract

**Background** The challenging working conditions during the Covid-19 pandemic created a perfect storm that can seriously impact nurses' physical and psychological well-being. Our study aimed to investigate complicated grief and its related factors among nursing staff during the Covid-19 pandemic.

**Methods** This is a cross-sectional study. The participants comprised 375 nurses selected by the convenience sampling method from designated wards for patients with Covid-19 in 3 hospitals in Tabriz, Iran. Participants completed a survey containing demographic and clinical questions, the Inventory of Complicated Grief, and the Multidimensional Scale of Perceived Social Support. Multiple regression analysis was used to identify the associates of nurses' grief. The STROBE guidelines were followed in reporting the study's findings.

**Results** A significant proportion of participants (57.6%) were found to be suffering from complicated grief. Gender, educational background, type of ward, type of nursing role, type of working shift, years of nursing work experience, and experience working in the Covid-19 settings remained the significant associates of nurses' grief in the regression analysis.

**Conclusion** Due to frequent exposure to patients' deaths, healthcare providers are at increased risk of suffering from complicated grief during the Covid-19 and post-pandemic. If it remains unresolved, complicated grief can result in significant health problems and the experience of burnout among nurses. Governments, health authorities, and nursing managers should support nurses who work in Covid-19 settings to reduce the adverse impact of the pandemic on nurses' health and well-being.

**Keywords** Grief, Nursing Staff, Covid-19

## Introduction

The Covid-19 pandemic presents unprecedented challenges to all sectors of societies, in particular health care systems [1]. Nurses play a critical role in care provision to patients with Covid-19. As the impact of Covid-19 on individuals and healthcare systems began to manifest, nurses found themselves in situations never seen before, frequently working long hours within uncertain circumstances, limited access to personal protective equipment, and evolving guidance on how to care for patients with coronavirus disease [2].

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Working in such conditions, being exposed to a deadly virus, working long shifts with a heavy workload, and being frequently involved in end-of-life care, can adversely affect the mental health of nurses [3, 4]. Traditionally, the nurse is either the proxy for a family that cannot be present at the patient's bedside or supports the patient and the family as they transition through the end-of-life journey [5]. While Covid-19 patients are isolated without access to visitors, nurses are frequently involved in providing emotional support to patients and their families [6]. The challenging conditions and new ways of working have created a perfect storm that can seriously impact nurses' physical and psychological well-being [7]. Results of a review study suggested that during the recent pandemic, healthcare workers experienced a high level of trauma-related stress, ranging from 7.4% to 35%. Trauma-related stress was notably higher among nurses, frontline health professionals, female healthcare workers, and those who experienced some physical symptoms [8]. In addition, a systematic review revealed that post-traumatic stress was more prevalent among young healthcare workers, those with less work experience and heavy workloads, healthcare workers working in unsafe settings, and those lacking adequate training and sufficient social support [9]. Among the factors contributing to nurses' burnout syndrome were prolonged night shifts, years of experience, and exposure to traumatic events [10].

Overall, the prevalence of mental health issues augmented during the Covid pandemic. A systematic review that focused on the prevalence of mental health issues among nurses during the Covid-19 pandemic reported that 37%, 35%, and 43% of nurses suffered from anxiety, depression, and poor sleep quality during the pandemic [11]. A large study in China reported the prevalence of anxiety, depression, and poor sleep quality to be 35.1%, 20.1%, and 18.2%, respectively, among the public during the pandemic. Compared with other occupations, healthcare workers experienced poorer sleep quality [12]. A systematic review of workplace violence during the Covid-19 pandemic concluded that nurses may be exposed to psychological workplace violence as they provide care to patients with life-threatening Covid-19 infections, which may negatively affect their mental health [13].

Frequent exposure to patients' deaths leads to feelings of helplessness and despair among nurses [6]. The novelty of Covid-19 and nurses' inability to prevent patients' death negatively impact their mental health [14]. Healthcare professionals may be saddened by the deaths of young patients or patients who could not be treated with medical interventions [15, 16]. Working with severely ill patients and frequent exposure to patients' deaths can

increase work-related stress among nurses and lead to a profound sense of grief [17, 18]. Nurses may need to be alone and withdraw from daily activities for short periods to recover from stressful situations they experience at work [19].

Grief is a healthy process that helps an individual to adapt to loss. However, the response of healthcare providers, especially nurses, to patients' deaths during the Covid-19 pandemic may be different due to their multiple exposures to patients' deaths. Some healthcare workers may ignore the feeling of grief and use strategies, such as avoidance or submission, to continue to work [20, 21]. An inappropriate or incomplete grief process can result in pathologic or complicated grief leading to maladaptive symptoms [22, 23]. The grieving process takes time and needs the support of friends and colleagues [24]. During the covid-19 pandemic, nurses may not have enough time to process their grief leading to unresolved grief, mental health disorders, and burnout [25]. Feeling a sense of responsibility and obligation to protect patients' lives can also increase nurses' risk of complicated grief [26].

In the era of the Covid-19 pandemic, nurses are expected to work long hours, accept additional shifts, and bear heavy workloads due to the increased number of hospitalizations and staff shortages. Consequently, they may not have enough time to vent their emotions and express their psychological reactions to patients' deaths [26]. This situation can be more complicated when patients quickly transition from "being ill" to "dead" [27]. Although nurses are more vulnerable to grief in the era of the pandemic, referred to as the 'tsunami of death' [19], little work has been done to understand nurses' grief process and the factors that contribute to it [20, 28]. This study aimed to investigate grief patterns in healthcare providers working in Covid-19 wards and its related factors. This understanding is vital to provide evidence to inform supportive interventions to maintain the health and well-being of nurses during the recent pandemic and other possible future pandemics.

## Methods

### Design

We used a descriptive correlational study design to investigate grief patterns and related factors among nurses working in designated Covid-19 wards.

### Participants and settings

The target population for the current study was nurses working full-time at 3 centers designated for Covid-19 patients in Tabriz, Iran. The sample size estimation was calculated using the results of a pilot study on 30 nurses using the results of the pilot study (Confidence Interval (CI) of 95%, test power of 80%,  $\alpha=0.05$ ,  $r=0.36$ ),

but given the availability of subjects and the possible non-response rate of 15%, the required sample size was ultimately raised to 425. The sampling was conducted between February 2022 and July 2022.

The survey link was distributed via social platforms, including WhatsApp, Telegram, and Instagram applications, and nurses who met the following criteria were invited to participate in the study: 1) nurses who were working at a Covid-19 ward, and 2) who had faced a patient's death due to Covid-19 more than six months ago, 3) having no history of psychiatric illness, according to self-reports. Participants who missed answering more than 50% of the questions on each scale were excluded.

### Instruments

The data were collected using the Inventory of Complicated Grief (ICG) [29] and the Multidimensional Scale of Perceived Social Support (MSPSS) [30]. These scales are free for public access. The ICG was developed by Prigerson et al. (1995) to assess the symptoms of complicated or pathological grief. It is a 19-item self-report measure, which uses a five-point Likert-type scale, with response options ranging from 0 (never) to 4 (always). The developers recommended a cutoff score of  $>25$  to distinguish between uncomplicated and complicated grief patterns [29]. The scale has proven transcultural validity, with internal reliability (as measured by Cronbach's alpha) ranging between 0.87 and 0.94 [31, 32]. In the current study, the researchers prepared a Persian version of the scale by adopting the translation and back-translation procedure [33]. The translated scale was pilot-tested concerning its relevance and clarity with 30 nurses who experienced the loss of a patient with Covid-19 more than six months ago. The reliability of ICG (Persian form) was confirmed using test-retest ( $r=0.81$ ).

The MSPSS is a 12-item measure of perceived adequacy of social 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). The tool uses a seven-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). A higher score indicates greater social support perceived by an individual; the total score can range between 12 and 84. The MSPSS has been used widely in different settings [34–36]. In the present study, Cronbach's alpha coefficient and the intra-class correlation coefficient (ICC) for the MSPSS were 0.89 and 0.92, respectively.

In addition, we collected data on the socio-demographics of participants, including age, gender, educational level, marital status, and income, as well as work-related factors, including the type of nursing role, nursing work experience, work experience in Covid-19 wards, type of work shift, and type of ward. An expert panel, including

12 faculty members from Tabriz University of Medical Sciences, confirmed the face and content validity of the survey package.

### Data analysis

Data were analyzed using the Statistical Program for the Social Sciences (SPSS) version 13.0 for Windows. Descriptive statistics were computed for all variables, including frequencies, means, and standard deviations (SD). The Kolmogorov-Smirnov test was used to examine data distribution. The variables of grief and social support were normally distributed with skewness and kurtosis indices less than  $\pm 2$  [37]. Relationships between grief and social support and other socio-demographic and work-related variables were assessed using the Pearson correlation coefficient, independent t-tests, ANOVA tests, and multiple regression analysis. Statistical significance for all tests was set at  $p < 0.05$ .

## Results

### Demographic characteristics

Of 425 participants, 50 respondents (11.7%) did not answer more than 50% of the questions on each scale and were excluded from the analysis (a response rate of 88.3%). Participants were primarily women (65.8%), with a mean age of  $31.9 \pm 8.3$  years. They had a mean nursing work experience of  $9.7 \pm 3.1$  years and experience in COVID-19 wards of  $2.3 \pm 0.7$  years. The sample characteristics are presented in Table 1.

The mean (SD) of grief scores was  $29.4 \pm 7.1$ , and 57.6% of participants experienced complicated grief. The mean (SD) of social support scores was  $23.7 \pm 6.2$ . The mean (SD) of social support categories is presented in Table 2.

The Pearson  $r$  correlation coefficient showed a statistically significant negative moderate correlation between scores of grief and social support ( $r = -0.49$ ,  $p < 0.001$ ) and its different dimensions (friends support:  $r = -0.41$ ,  $p < 0.001$ ; family support:  $r = -0.47$ ,  $p < 0.001$ ; and significant others ( $r = -0.43$ ,  $p < 0.001$ ), Table 3.

The mean of grief scores was higher among females ( $29.4 \pm 8.7$ ,  $p < 0.001$ ), single ( $27.2 \pm 6.1$ ,  $p < 0.001$ ), and floor nurses ( $38.3 \pm 10.6$ ,  $p < 0.001$ ), and those who had bachelor's degree ( $29.7 \pm 6.8$ ,  $p < 0.001$ ) and lower income than expenditure ( $31.6 \pm 8.4$ ,  $p < 0.001$ ). Nurses who were working in a Covid-19 intensive care unit (ICU) ( $34.2 \pm 9.1$ ,  $p < 0.001$ ), had nursing work experience  $> 10$  years ( $29.4 \pm 6.7$ ,  $p < 0.001$ ), work experience in Covid-19 wards  $> 2$  years ( $35.7 \pm 9.6$ ,  $p < 0.001$ ) were more likely to experience pathologic/ complicated grief (Table 4).

Variables with  $p < 0.05$  in univariate analysis were entered into the multiple linear regression model

**Table 1** Distribution of socio-demographic characteristics and work-related factors

| Variables                            |  | n (%)      |
|--------------------------------------|--|------------|
| Age (years)                          | Mean (SD)  | 31.9 ± 8.3 |
|                                      | ≤ 35   | 228 (60.1) |
|                                      | > 35   | 147 (39.9) |
| Gender                               | Male   | 137 (36.5) |
|                                      | Female   | 238 (63.5) |
| Marital Status                       | Married  | 203 (54.1) |
|                                      | Single   | 172 (45.9) |
| Income                               | Income less than expenditure                         | 22 (5.8)   |
|                                      | Income equivalent to expenditure                     | 274 (73.1) |
|                                      | Income more than expenditure                         | 79 (21.1)  |
| Educational background               | Bachelor's degree                                    | 273 (72.8) |
|                                      | Master's degree                                      | 102 (27.2) |
| Type of ward                         | Covid-19 ICU   | 144 (38.4) |
|                                      | General ward for Covid-19                            | 231 (61.6) |
| Nursing work experience              | < 10 years   | 196 (52.7) |
|                                      | ≥ 10 years   | 179 (47.3) |
| Work experience in COVID-19 settings | < 2 years  | 143 (38.1) |
|                                      | ≥ 2 years  | 232 (61.9) |
| Type of nursing role                 | A floor nurse  | 293 (78.1) |
|                                      | Nurse manager (head nurse/clinical nurse supervisor) | 82 (21.9)  |
| Type of shift                        | Fixed  | 160 (43.2) |
|                                      | Rotating   | 215 (57.3) |

**Table 2** Distribution of pattern of grief and perceived social support among participants

| Variables  |               | n (%)      |
|--|---------------|------------|
| The pattern of grief (total score) [Range: 0–76] | Mean (SD)     | 29.4 ± 7.1 |
| The pattern of grief (categories)                | Uncomplicated | 159 (42.4) |
|  | Complicated   | 216 (57.6) |
| Social support (total score) [Range: 12–84]      | Mean (SD)     | 23.7 ± 6.2 |
| Social support (categories) [Range score: 7–28]  |               |            |
| Family support                                   |               | 10.3 ± 3.1 |
| Friends support                                  |               | 12.6 ± 3.4 |
| Significant others support                       |               | 12.9 ± 3.5 |

(gender, marital status, income, type of ward, years of nursing work experience, years of experience in Covid-19 wards, type of nursing role) and their relationship with grief, while controlling for the effect of other variables, was determined. The results of multiple linear regression analysis showed that considering the confounding variables, the relationship between the social support score and the grief score was significant ( $\beta = -3.473$ ,  $P < 0.001$ ), (Table 5). Based on this result, with a one-point increase in the nurses' social support score, their grief score

decreased by 3.473. Female nurses (vs. male) had a higher grief score ( $\beta = 3.372$ ;  $P = 0.029$ ). Regarding the educational background, nurses who studied up to bachelor's degrees had higher grief scores than nurses who studied up to master's degrees ( $\beta = -3.743$ ;  $P = 0.031$ ). Those who worked in Covid-19 ICU (vs. those who worked in the general ward for Covid-19) had a higher grief score ( $\beta = 4.624$ ;  $P < 0.001$ ). There was a higher grief score among nurses with 10 or more years of experience than other nurses ( $\beta = 2.328$ ;  $P < 0.001$ ). Also, nurses whose work experiences in Covid-19 wards were more than two years had a higher grief score than other nurses ( $\beta = 3.231$ ,  $P < 0.001$ ). Floor nurses (compared to nurse managers) and nurses with a fixed shift type (compared to rotating shifts) had higher scores for grief ( $\beta = 2.311$ ;  $P < 0.001$  and  $\beta = 3.273$ ;  $P < 0.001$ , respectively). These variables were determinants of the grief score and explained 59.3% (Adjusted R-squared = 59.3%) of the variance (variability) of grief (Table 5).

## Discussion

A considerable percentage of nurses (57.6%) working on Covid-19 wards experienced a complicated pattern of grief, more likely due to frequent exposure to patients' deaths. Previous studies have consistently shown that nurses who experience multiple deaths of patients under

**Table 3** Association between patterns of grief and social support

| Variables                 | Complicated grief | Uncomplicated grief | Total Greif (The ICG scores) | Friends support | Family support | Significant other support | Social Support (The MSPSS scores) |
|---------------------------|-------------------|---------------------|------------------------------|-----------------|----------------|---------------------------|-----------------------------------|
| Complicated               | -                 | -0.19*              | 0.29**                       | -0.34**         | -0.41***       | -0.47***                  | -0.48***                          |
| Uncomplicated             |                   | -                   | 0.26**                       | 0.29*           | 0.23*          | 0.34**                    | 0.32*                             |
| The grief scores          |                   |                     | -                            | -0.41***        | -0.47***       | -0.43***                  | -0.49***                          |
| Friend social support     |                   |                     |                              | -               | 0.24*          | 0.19*                     | 0.21*                             |
| Family social support     |                   |                     |                              |                 | -              | -0.12*                    | 0.21*                             |
| Significant other support |                   |                     |                              |                 |                | -                         | 0.17*                             |
| The social support scores |                   |                     |                              |                 |                |                           | -                                 |

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 4** Mean grief scores according to socio-demographic and work-related variables

| Variables                            |                                  | Complicated grief n (%) | Uncomplicated grief n (%) | Mean ± SD of the grief scores |              |
|--------------------------------------|----------------------------------|-------------------------|---------------------------|-------------------------------|--------------|
| Age (years)                          | ≤ 35                             | 161 (70.6)              | 67 (29.4)                 | 27.6 ± 6.9                    | $r = -0.07$  |
|                                      | > 35                             | 98 (66.7)               | 49 (33.3)                 | 26.2 ± 6.4                    | $p = 0.19$   |
| Gender                               | Male                             | 94 (68.6)               | 43 (31.4)                 | 25.6 ± 7.3                    | $t = 2.47$   |
|                                      | Female                           | 181 (76.1)              | 57 (23.9)                 | 29.4 ± 8.7                    | $p < 0.001$  |
| Marital Status                       | Married                          | 79 (38.9)               | 124 (61.1)                | 25.6 ± 5.7                    | $t = 2.76$   |
|                                      | Single                           | 117 (68.0)              | 55 (32.0)                 | 27.2 ± 6.1                    | $p < 0.001$  |
| Income                               | Income less than expenditure     | 15 (68.2)               | 7 (31.8)                  | 31.6 ± 8.4                    | $F = 3.44$   |
|                                      | Income equivalent to expenditure | 214 (78.1)              | 60 (1.9)                  | 27.3 ± 6.3                    | $p < 0.001$  |
|                                      | Income more than expenditure     | 23 (29.1)               | 56 (70.9)                 | 24.1 ± 5.1                    |              |
| Type of ward                         | Covid-19 ICU                     | 112 (77.8)              | 32 (22.2)                 | 34.2 ± 9.1                    | $t = 2.63$   |
|                                      | General ward for Covid-19        | 159 (68.8)              | 72 (31.2)                 | 29.3 ± 8.3                    | $p < 0.001$  |
| Educational background               | Bachelor's degree                | 186 (66.7)              | 91 (33.3)                 | 29.7 ± 6.8                    | $t = 2.36$   |
|                                      | Master's degree                  | 69 (67.6)               | 33 (32.3)                 | 26.4 ± 5.7                    | $p < 0.001$  |
| Nursing work experience              | < 10 years                       | 83 (42.4)               | 113 (57.6)                | 25.3 ± 5.4                    | $t = 3.17$   |
|                                      | > 10 years                       | 108 (60.3)              | 71 (39.7)                 | 29.4 ± 6.7                    | $p < 0.0001$ |
| Work experience in Covid-19 settings | < 2 years                        | 54 (37.8)               | 89 (62.2)                 | 25.8 ± 5.6                    | $t = 3.64$   |
|                                      | > 2 years                        | 153 (68.5)              | 79 (31.5)                 | 35.7 ± 9.6                    | $p < 0.001$  |
| Type of nursing role                 | A floor nurse                    | 217 (74.1)              | 76 (25.9)                 | 31.2 ± 8.3                    | $t = 2.33$   |
|                                      | Manager/educator                 | 47 (57.3)               | 35 (42.7)                 | 26.2 ± 6.4                    | $p < 0.0001$ |
| Type of shift                        | Fixed                            | 112 (70.0)              | 48 (30.0)                 | 27.2 ± 5.9                    | $t = 3.13$   |
|                                      | Rotating                         | 68 (31.6)               | 147 (68.4)                | 25.4 ± 5.2                    | $p < 0.0001$ |

r: Pearson correlation coefficient test; t: Independent t-test; F: AVOVA test

their care may not process their grief and move on due to a lack of time and support during the Covid -19 pandemic [38, 39]. In addition, sudden deaths, painful disease processes, hesitancy about the available medical treatment for coronavirus [40, 41], and feeling obligations to protect patients' lives increase the risk of complicated grief among nurses [42]. It is emotionally challenging for nurses when they cannot alleviate a dying patient's suffering, as it triggers feelings of professional helplessness and weaknesses [43].

Compared to previous studies [44, 45], this study suggests that nurses who work in Covid -19 wards working with patients with Covid-19 infection experienced an alarmingly higher level of complicated grief over the death of the patients. This finding may be explained more by the higher rate of deaths from Covid-19 in Iran (3.5% deaths of the overall total patients confirmed cases of Covid -19 until Mar 20 2022) [46], which could compromise the nurse's mental health due to their multiple exposures to death [21]. Although patient death is a

**Table 5** Predictors of complicated grief in multiple linear regression analysis

| Complicated grief   | Unstandardized Coefficients (β) | Std. Error | Standardized Coefficients (β) | t      | p-value | R <sup>2</sup> |
|---|---------------------------------|------------|-------------------------------|--------|---------|----------------|
| Constant  | -0.4641                         | 6.28       |                               | -0.674 | 0.712   | 0.593          |
| <b>Gender (Reference: male)</b>                                       |                                 |            |                               |        |         |                |
| Female  | 3.372                           | 2.94       | 0.181                         | 2.543  | 0.029   |                |
| <b>Marital status (Reference: married)</b>                            |                                 |            |                               |        |         |                |
| Single  | 1.391                           | 3.77       | 0.141                         | 2.432  | 0.731   |                |
| <b>Income (Reference: Income more than expenditure)</b>               |                                 |            |                               |        |         |                |
| Income less than expenditure  | 3.725                           | 4.21       | 0.179                         | 4.239  | 0.311   |                |
| Income equivalent to expenditure                                      | -3.349                          | 4.11       | 0.181                         | 4.126  | 0.429   |                |
| <b>Educational background (Reference: Master)</b>                     |                                 |            |                               |        |         |                |
| Bachelor's degree   | 3.743                           | 2.42       | 0.175                         | 2.417  | 0.031   |                |
| <b>Type of ward (Reference: General ward for Covid-19)</b>            |                                 |            |                               |        |         |                |
| Covid-19 ICU  | 4.624                           | 2.36       | 0.167                         | 2.329  | <0.001  |                |
| <b>Nursing work experience (Reference: &lt; 10 years)</b>             |                                 |            |                               |        |         |                |
| ≥ 10 years  | 2.328                           | 3.45       | 0.168                         | 2.212  | <0.001  |                |
| <b>Work experience in Covid-19 settings (Reference: &lt; 2 years)</b> |                                 |            |                               |        |         |                |
| ≥ 2 years   | 3.231                           | 4.17       | 0.154                         | 2.678  | <0.001  |                |
| <b>Type of nursing role (Reference: Master: Nurse manager)</b>        |                                 |            |                               |        |         |                |
| A floor nurse   | 2.311                           | 3.73       | 0.171                         | 4.117  | <0.001  |                |
| <b>Type of shift (Reference: Rotating)</b>                            |                                 |            |                               |        |         |                |
| Fixed   | 3.273                           | 2.74       | 0.192                         | 3.241  | <0.001  |                |
| <b>Social support</b>   | -3.473                          | 2.17       | -0.164                        | 2.417  | <0.001  |                |

common part of clinical nursing [47], frequent exposure to patients' death increase the probability of complicated or chronic grief among nurses [19] and decreases the quality of care delivered to patients [43].

A systematic review reported that pediatric oncology nurses' level of chronic and unresolved grief and other psychological hazards is moderate to severe [44]. The high level of complicated grief in our participants calls for urgent attention from health authorities in Iran to implement effective interventions to protect the health and well-being of nurses as the largest healthcare front-line workforce.

In addition, nurses in the current study received a sub-optimal level of support from friends, family, and significant others, a factor that contributed to their complicated grief. Overall, Covid-19 quarantines, lockdowns, and social distancing reduced opportunities for socializing and, therefore, the support from families and friends [48]. Lorenzo and Carrisi (2020) reported that fears of Covid-19 transmission isolated nurses from support providers [49]. Social support helps nurses alleviate their stress and prevent burnout [50].

In the regression analysis, nurses who were female, studied up to bachelor's degree, and perceived lower social supports were more likely to experience complicated grief. Consistent with our findings, previous

studies mostly show greater grief responses to patient death among female health providers than men [51–53]. Longitudinal research has revealed that women react differently to a loss than men [54]. They suffer significantly higher levels of depression and anxiety while suddenly facing their loved one's death [51, 55]. Thus, female nurses may be more vulnerable to long-term consequences of working in high-mortality and high-stress environments such as ICU and providing care to critically ill patients such as patients with Covid-19. As such, female healthcare workers may experience the chronic impacts of crises such as the Covid -19 pandemic more than their male counterparts [55].

Nurses with a bachelor's degree were more likely to experience complicated grief than those with higher degrees. This could be because nursing with bachelor's degrees are more likely to work as floor nurses and therefore be exposed to patients' deaths than those with higher nursing degrees who often take managerial roles. Further, a higher educational level has been shown to positively affect nurses' mental health and workability [56]. Nurses with a higher education level demonstrate a better mental capacity to withstand workplace stress and better resistance to hazards at the workplace [57].

Nurses who perceived lower social support were more likely to experience complicated grief. The beneficiary

effect of social support on coping with deaths has been widely reported [58]. Loneliness and inadequate social support increase the risk of mental health issues for grievers [59].

In addition, some work-related factors were found to predict the experience of complicated grief among nurses. Nurses who worked as floor nurses and in a Covid-19 ICU were more likely to experience complicated grief. These results are expected as nurses who work directly with patients with Covid-19 or work in an ICU setting experience greater exposure to patient deaths than nurses who work in managerial positions or a medical ward with relatively stable patients. Nurses are expected to care for patients while maintaining a professional relationship, which can be challenging [60]. Nurses are not exempt from the emotional influence of death; they go through the grieving process and experience various emotions and feelings that can chronically affect their health [18]. Providing direct care to a dying patient with a less-known disease, such as Covid -19, and closely witnessing a patient's suffering can profoundly impact nurses' mental health [16]. Therefore, hospital managers and policymakers need to implement workplace health promotion activities such as spirituality-based training, fewer working hours, support, and communication with leadership in order to reduce the hazards associated with work-related stress factors on nurses' mental health caused by the Covid -19 pandemic [61].

Finally, nurses with shorter work experience and long experience in working with covid-19 patients were more likely to experience complicated grief. The studies revealed that nurses with less experience were more vulnerable and exhausted [62]. However, at the same time, nurses with more years of experience could be able to keep a distance and set boundaries in end-of-life care [63]. It seems that the higher the nurses' work experience, the better their coping skills in dealing with stressful situations such as patient deaths [64].

Nurses caring for Covid-19 patients for more than two years reported a high level of complicated grief. The type and volume of losses a person experiences could impact the grieving process and the likelihood of complicated grief [62, 65]. These findings are expected as nurses who work in covid-19 wards for longer periods are exposed to frequent patient deaths and the subsequent grieving processes, which may remain incomplete due to lack of time, support, and staff shortage [26].

In our study, nurses who worked fixed shifts were more likely to experience complications than nurses who worked rotating shifts. This could be because nurses who worked rotating shifts had better opportunities to interact with colleagues and share their experience of the

patient's death with several colleagues. This factor can help them process their grief [66].

The study results have significant implications for nurses, nurse managers, and health authorities. The findings demonstrate some negative health impacts of working with Covid-19 patients for nurses. The findings of this study and other similar studies provide a robust platform to promote the health and well-being of healthcare providers, particularly nurses, during the Covid-19 pandemic and post-pandemic. Nurse Managers and health authorities should consider reducing the working hours of nurses in Covid-19 settings and encourage them to take frequent breaks to allow them time to recover from work-related stresses. Nurses, who work in Covid-19 designated wards, in particular Covid-19 ICUs, should be rotated regularly to have opportunities to recover from stressful experiences, such as frequent exposure to patients' deaths. Having free or subsidized access to mental health care providers may also help these nurses process their grief after a patient's death positively. A supportive work environment could protect nurses in the face of the high mortality rate of patients with the Covid -19 pandemic [67].

#### **Study strengths and limitations**

Because of the criticality of the pandemic, the special conditions at clinical centers, and the necessity for nurses to work long hours during Covid-19, the grief of nurses may not be given much attention. Therefore, a strength of the study was its consideration of nurses' grief patterns in the face of repeated encounters with patient death. Another strength of the study is its analysis of the factors associated with nurses' complicated grief.

The study was a descriptive correlational study, which produced correlational data that did not support cause-and-effect conclusions. Self-reporting nature of the data was the other limitation of our study, which may affect the accuracy of the collected data. The convenience sampling method, collecting data through social media platforms, and obtaining samples from only 3 centers could be methodological limitations of the study. Therefore, future studies should address these issues.

#### **Conclusion**

This study found that a significant proportion of nurses who worked in Covid-19 settings experienced complicated grief. This can negatively affect nurses' physical and mental health and productivity in the workplace. Subgroups of nurses may be at higher risk, including female nurses, floor nurses, those with a lower nursing degree, and those who work extended periods in covid-19 settings, in particular, Covid-19 ICUs. Governments, health policymakers, and nursing managers should be aware of

the deleterious effects of the recent pandemic on nurses' health and well-being. They should seek to reduce the impact by employing strategies such as providing support, reducing working hours, rotating nurses between Covid-19 wards and other wards, and providing support, such as bereavement counseling for those who require this service.

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#### Authors' contributions

FR has contributed to the conception, design, data analysis, manuscript preparation, editing, and review. MH has made contributions to the conception, design, acquisition, analysis, and interpretation of data and prepared the first draft. LGH revised the final draft of the manuscript. All Authors have read and approved the final manuscript.

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#### Availability of data and materials

The datasets generated/analyzed during the current study are not publicly available due to ethical concerns but are available from the corresponding author upon reasonable request. (Ethical committee of Tabriz University of Medical Science has restrictions about the availability of data).

#### Declarations

##### Ethics approval and consent to participate

The present research project has been approved by the Vice-Chancellor for Research and the Ethics Committee of Tabriz University of Medical Sciences with the code (IR.TBZMED.REC.1400.505). The research goals, anonymity of participants, their voluntary participation, and the study information, were first verbally explained, then read and signed on a written informed consent and the research method followed the Helsinki Declaration.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare no competing interests.

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