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Research Article

The examination of stress symptoms and posttraumatic growth in the patients diagnosed with Covid-19

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ABSTRACT

Objective: COVID-19 infection can profoundly affect patients’ lives. Coping with difficult life crises can also lead to increased stress or positive psychological change called post-traumatic growth. This research was conducted to examine the symptoms of stress and post-traumatic growth symptoms in the patients diagnosed with COVID-19 (Coronavirus).

Method: The present study, which is in a descriptive design, was conducted with 175 patients who were discharged after being treated in the intensive care units with the diagnosis of COVID-19. The personal information form, the Posttraumatic Diagnostic Scale (PTDS), and the Posttraumatic Growth Inventory (PTGI) were used to collect data.

Results: The mean score for Posttraumatic Stress Symptoms of the participants was 19.18 ± 9.53, and the mean score for Posttraumatic Growth Inventory was 0.86 ± 0.47. In addition, a significant positive correlation was found between PTDS and PTGI mean scores (p < 0.001). As the degree of being affected by covid 19 increases, posttraumatic growth and traumatic stress symptom levels increase (p < 0.05). The posttraumatic growth levels increase as the time elapsed after the treatment of COVID-19 increases (p < 0.001).

Conclusion: It was determined that after the traumatic experience (COVID-19), the participants had moderate traumatic stress symptoms, and they overcame this situation by experiencing growth. It is recommended to take preventive measures against the symptoms of stress and support the patients in terms of overcoming this process by getting stronger.

Implications for clinical practice

• Cognitive behavioural therapy interventions should be applied to the traumatic experiences of the patients after the intensive care treatment process.
• Nurses should recognise the traumatic symptoms of the patient in the early period during the intensive care treatment process, take the necessary precautions and reduce the patient’s stress level by giving the patient the ability to cope with stress.
• It is recommended that nurses plan appropriate interventions for the patient, use the right psychotherapy techniques so that patients can more easily overcome the traumatic effects of the intensive care process and grow out of this negative experience.

The World Health Organization declared the COVID-19 (Coronavirus) epidemic as a public health emergency of international importance in 2020 (Media Briefing, 2020). In people with a positive Coronavirus test, it can progress from asymptomatic or mild pneumonia to acute respiratory failure and death, which can be severe, and fatal (Wu &
Severe symptoms in some cases necessitate the intensive care treatment process for the patients. Intensive care is appropriate for patients requiring or likely to require advanced respiratory support, patients requiring support of two or more organ systems, and patients with chronic impairment of one or more organ systems who also require support for an acute reversible failure of another organ (Smith & Nielsen, 1999; Wunsch et al., 2004). Especially, the progressively worsening respiratory failure outlook of patients in the risk group has made it mandatory for individuals to receive treatment based on mechanical ventilators in the intensive care unit (ICU) (Bahar & Buldak, 2020).

While the presence of any illness can cause stress in individuals, the experience of stress can become more intense in the presence of a serious illness requiring admission to the intensive care unit (McKinney & Melby, 2002). In addition, prolonged hospitalisation and sedation in the ICU negatively affect the consciousness of patients and cause stressful experiences (Samuelson et al., 2007). After the traumatic experience, the body goes into an alarm state and defensive reactions emerge. In this case, physiological preparations for the fight-or-flight response begin in the body (Sapolsky, 2004). In addition to physical symptoms, emotional symptoms such as anger, anxiety, sadness, embarrassment, and difficulty regulating emotions can be seen (Madde Bağışlımlı Tedavi, 2014). Various risk factors associated with admissions to ICU lead to higher rates of post-traumatic stress disorder (PTSD) than in other medical settings. Besides being critically unwell and fearing they may die, patients are exposed to the ICU environment with constant noise, light, frequent medical checks, pain, and sleep disruption (Murray et al., 2020). Staying in the ICU was stated as a traumatic life experience due to the loss of body functions, deterioration of comfort, environmental stress, and feeling of loneliness (Fredriksen & Helgeson, 2006; Tanser et al., 2012). It is noteworthy that the contents of scientific studies conducted during the pandemic generally have focused on the negative effects of the pandemic (Chamberlain et al., 2021; Janiri et al., 2021; Rossi et al., 2020; Tarsitani et al., 2021; Wang et al., 2020). In the present study, it was aimed to determine whether the experience of post-traumatic growth, which expresses a positive change, as well as the traumatic stress effects experienced by the patients treated in the ICU due to COVID-19 during the post-discharge follow-up period have an effect, and to investigate the relationship between them. Health professionals have important responsibilities in recognised traumatised individuals, provide the support they need, and make them come out of this process by getting stronger (Inci & Bostep, 2013). As a result, the data of this study will guide the caregivers to determine the traumatic stress levels of the patients who are in intensive care due to COVID-19 and to help the patients come out of the trauma experienced by getting stronger. In addition, the current research provides a new perspective in terms of recognising the symptoms of stress and planning interventions for preventive and therapeutic services. This research was conducted to examine the symptoms of stress and post-traumatic growth in the patients diagnosed with COVID-19 (Coronavirus).

Methods

This research, which was carried out in a descriptive design, was conducted between the dates December 2020 and January 2021 with patients who were discharged after being treated for the diagnosis of COVID-19 in the intensive care unit of a training and research hospital operating as a pandemic hospital in Gaziantep/Turkey.

Research population and sample

The population of the study consisted of patients who were hospitalised due to COVID-19 in the intensive care unit where the research was conducted. G Power program was used to calculate the sample size. Previous studies were reviewed (Cınarbas & Doğan, 2019; Kardas & Tanhan, 2018), and the expected confidence intervals of the “Post Traumatic Growth Inventory” were determined as 81 patients, while the confidence interval was α = 0.05, the power of the test (1-β) was 0.95, the effect size d = 0.4060995. Accordingly, the sample of the study consisted of 175 (74 female, 101 male) patients who met the inclusion criteria.

Inclusion Criteria: Patients who have been discharged from intensive care unit treatment for at least three months due to COVID-19, volunteered to participate in the study, being over 18 years old, and not having a cognitive disability (patients with intellectual disability or dementia that makes cooperation impossible).

Exclusion Criteria: Patients who were discharged from the ICU after inpatient treatment due to COVID-19 yet (less than three months ago), refused to participate in the study.
Data collection

The data were collected in a single step, after informing the patients about the purpose of the study by telephone and then obtaining their verbal consent. Data were collected by telephone interviews with patients who met the inclusion criteria in a pandemic hospital. First of all, the patients were informed about the study by the researchers. Afterward, questionnaire forms were applied to the patients who agreed to participate in the study. In data collection, the “Personal Information Form” was used to determine the descriptive characteristics of the patients and information about the trauma, the “Posttraumatic Diagnostic Scale” was utilised to determine the level of posttraumatic stress, and the “Posttraumatic Growth Inventory” was applied to determine posttraumatic growth. Data collection took an average of 20–25 min.

Data collection tools

The Personal Information Form: This form, prepared by the researchers, includes questions about the socio-demographic characteristics of the patients and their knowledge of the disease.

The Posttraumatic Diagnostic Scale (PTDS): Was developed by Foa et al. (1997) and its Turkish adaptation was made by Dikmen-Yıldız et al., (2017). The scale, which consists of 51 items in total, has four parts. The first part determines the “type of traumatic event” experienced by the person. In the second part, there are questions to determine the “severity of the traumatic event”. The questions to determine the severity of the traumatic event are called the “Event Severity Sub-Scale” in the Turkish validity and reliability study of the scale (Dikmen-Yıldız et al., 2017). The high number of “yes” answers of the persons indicates that the severity of the event is high. In the third part of the scale, there is the “Posttraumatic Stress Symptoms Sub-Scale” which evaluates posttraumatic symptoms. This subscale is a Likert-type scale scored between 0 and 3. The range of scores that can be obtained from the subscale is 0–51. A stress symptom score of 10 or less is considered mild, between 11 and 20 considered moderate, between 21 and 35 considered moderate-severe, and above 35 considered severe stress. In addition to the total symptom score, this subscale also explains the dimensions of “re-experiencing/intrusive thoughts”, “avoidance/emotional bluntness” and “hyperarousal”. An increase in the score indicates an increase in posttraumatic stress symptoms. In the Turkish validity and reliability study of this subscale, the internal consistency coefficient was 0.89 (Dikmen-Yıldız et al., 2017). In this study, the Cronbach’s alpha reliability coefficient of the subscale was determined as 0.74.

The Posttraumatic Growth Inventory (PTGI): The inventory was developed by Tedeschi and Calhou (1996) to determine the positive changes that occur as a result of the traumatic events experienced by individuals. The scale consists of 21 items in total. The Turkish adaptation of the inventory was made by Kılıç (2005) according to the translation of Dirik (2006). Dirik (2006), on the other hand, made a comparison with Kılıç’s translation in the study conducted with rheumatoid arthritis patients. Dirik (2006) determined 3 factors explaining 59% of the variance as a result of the factor analysis performed on the “Posttraumatic Growth Inventory”. These factors are named “Change in the Relationships with Others”, “Change in the Philosophy of Life” and “Change in the Self”. The scale is graded between 0 and 5 points. In this study, the PTGI score was evaluated based on item averages and total averages. High scores obtained from the PTGI indicate the positive changes in the person after the trauma. In the Turkish validity and reliability study of the inventory, the reliability coefficient was found to be 0.94 (Dirik, 2006). In this study, the Cronbach’s alpha reliability coefficient of the scale was determined as 0.86.

Data analysis

SPSS (Statistical Package for Social Sciences) 22.0 package program was used for coding and evaluating the data. Percentage, arithmetic mean, standard deviation, Pearson correlation, regression analysis, and analysis of variance were used in the evaluation of the data. The p < 0.05 level was accepted as significant.

Ethical considerations of the research

The study has been performed by the Declaration of Helsinki. Approval was obtained from a state university of Clinical Research Ethics Committee to conduct the study (2020/372). Verbal consents were obtained from the individuals included in the study by explaining the purpose of the study and the content of the forms. It was stated that the participants were free to participate in the research and to leave at any time after participating in the research, the principle of “Respect for Autonomy” was followed, and the principle of “Confidentiality and Protection of Confidentiality” was adhered to by stating that their information would be kept confidential.

Findings

57.7% of the participants included in the study were male, 86.3% of them were married, 43.4% of them were between the ages of 41–60, 76.6% of them had nuclear families (consisting of a father, a mother and their children), 24.6% of them were working, 57.1% of them had an income level equal to their expenses, % 34.3 of them were primary school graduates, 78.3% of them were living in the city center. In addition, 4–7 months have passed since 68% of them were diagnosed with Covid19, and 94.9% did not receive psychiatric support. 33.1% of the participants received treatment for >21 days in the clinics and/or ICU. 33.1% of the individuals participating in the research stated that they were very affected by the pandemic process.

When the mean scores of the posttraumatic stress symptoms of the participants were examined, it was seen that they experienced mostly the avoidance symptoms, and the re-experiencing symptoms at least (Table 1).

When the posttraumatic growth score averages of the participants were examined, it was seen that the participants experienced growth mostly in the field of change in the self, followed by a change in the relationships with others, and change in the philosophy of life (Table 2).

When the relationship between the PTDS total score and its sub-dimensions was examined, a significant positive correlation was found between the severity of the traumatic event and the stress symptom level sub-dimensions of the traumatic event, re-experiencing, avoidance, and hyperarousal (p < 0.001). A significant positive correlation was found between the effect of the traumatic event sub-dimension of the PTDS and the stress symptom level sub-dimensions of the traumatic event, re-experiencing, avoidance, and hyperarousal (p < 0.001). When the relationship between PTDS sub-dimensions total score and PTGI was

### Table 1

Mean scores of the participants’ posttraumatic diagnostic scale’s sub-dimensions (n = 175).

| The Posttraumatic Diagnostic Scale | Minimum and Maximum Scores That Can Be Obtained from the Scale | Minimum and Maximum Scores Taken from the Scale |
|-----------------------------------|---------------------------------------------------------------|-----------------------------------------------|
| Severity of the Traumatic Event   | 0–6                                                           | 2.83 ± 1.43                                   |
| Impact of the Traumatic Event     | 0–9                                                           | 5.12 ± 1.94                                   |
| Total Score of the Traumatic Event’s Stress Symptom Level | 0–51 | 19.18 ± 9.53 |
| 1. Re-experiencing               | 0–15                                                      | 5.08 ± 3.83                                  |
| 2. Avoidance                     | 0–21                                                      | 8.97 ± 4.40                                 |
| 3. Hyperarousal                  | 0–15                                                      | 5.12 ± 3.80                                 |
examined, a positive and significant correlation was found between all sub-dimensions of PTGI except the severity of the event and the PTGI total score (p < 0.05) (Table 3).

A statistically significant correlation was found in the regression analysis performed to determine how the posttraumatic growth of the patients in the model predicted the levels of posttraumatic stress symptoms (F = 19.541, p < 0.001). According to the model, it was determined that posttraumatic growth levels explained 10% of posttraumatic stress symptoms (R = 0.319, R² = 0.101) (Table 4).

There was a significant difference between the patients’ time elapsed after being discharged from intensive care treatment due to COVID-19 increased, and the mean scores of PTGI and all sub-dimensions (p < 0.05). As the time elapsed after being discharged from intensive care treatment due to COVID-19 increased, individuals’ post-traumatic growth levels increased. While there was a significant difference between the PTDS sub-dimensions, the stress symptom level of the traumatic event, and the mean score of the effect of the traumatic event (p < 0.05), there was no significant difference in the severity of the traumatic event (p > 0.05). It was observed that the stress symptom levels and traumatic effects of those who stated that they were very much affected by Covid-19 were at the highest level (Table 5).

A significant difference was found between the time the patients were discharged from the intensive care unit due to COVID-19 and the effect of the traumatic event on the patients were high. The fact that the effect of the traumatic event is still high even though it has been at least 3 months after being discharged from the intensive care unit due to COVID-19 may be associated with the continuation of the pandemic process and the increase in the number of deaths due to COVID-19. In addition, it was determined that the traumatic stress symptoms of the patients were moderate. In line with this information, COVID-19 can be characterised as a traumatic experience requiring hospitalisation, especially in severe cases (Tarsitani et al., 2021). In the research that Tarsitani et al. (2021) conducted, it was determined that 10.4% of the patients who were hospitalised for COVID-19 infection were diagnosed with PTSD as a result of a 3-month follow-up, and 8.6% were diagnosed with sub-threshold PTSD, which causes significant distress and impairment. As a result of another study, PTSD symptoms were reported in 12.2% of the patients diagnosed with COVID-19 (Qi et al., 2020). Similarly, Mazza et al. (2020) reported that PTSD was seen in 28% of the patients in their follow-up study conducted one month after discharge with 402 patients who survived COVID-19 (Mazza et al., 2020). When the international literature is examined, it has been determined that the prevalence of PTSD is quite high in studies conducted with healthcare professionals and students during the COVID-19 pandemic, and in studies conducted with patients receiving ventilation support and patients receiving intensive care treatment (Chamberlain et al., 2021; Li et al., 2021; Liu et al., 2020; Zhao et al., 2020). Considering the data of this study and other studies, it can be said that the patients receiving intensive care treatment due to COVID-19 are in the risk group for PTSD. In a study examining PTSD symptoms in COVID-19 survivors, it was

| Table 4 |
|-----------------|------------|--------|-----|-----|-----|-----|-----|-----|-----|
| Scales | B | Standardized error | Beta | t | P |
|**PTDS** | 33,007 | 3,055 | .319 | 10,804 | p<0.001 |
|**PTGI** | .161 | .036 | .441 | 4,421 | p<0.001 |
|R | 0.319 |
|R² | 0.101 |
|F | 19.541 | (p<0.001) | **Discussion** |

It is known that the COVID-19 pandemic affects a large number of people, the most affected are inpatients in the ICU, and it is seen that it has features similar to traumatic events as it has many disturbing psychological effects (Horesh & Brown, 2020). It is thought that this situation may pose a serious problem in terms of community mental health in the future. In this context, it is important to recognise the symptoms of posttraumatic stress in the early period and to plan professional help activities for them. When the results of this study were examined in terms of posttraumatic stress, it was determined that the severity of the traumatic event (intensive care process due to COVID-19) and the effect of the traumatic event on the patients were high. The fact that the effect of the traumatic event is still high even though it has been at least 3 months after being discharged from the intensive care unit due to COVID-19 may be associated with the continuation of the pandemic process and the increase in the number of deaths due to COVID-19. In addition, it was determined that the traumatic stress symptoms of the patients were moderate. In line with this information, COVID-19 can be characterised as a traumatic experience requiring hospitalisation, especially in severe cases (Tarsitani et al., 2021). In the research that Tarsitani et al. (2021) conducted, it was determined that 10.4% of the patients who were hospitalised for COVID-19 infection were diagnosed with PTSD as a result of a 3-month follow-up, and 8.6% were diagnosed with sub-threshold PTSD, which causes significant distress and impairment. As a result of another study, PTSD symptoms were reported in 12.2% of the patients diagnosed with COVID-19 (Qi et al., 2020). Similarly, Mazza et al. (2020) reported that PTSD was seen in 28% of the patients in their follow-up study conducted one month after discharge with 402 patients who survived COVID-19 (Mazza et al., 2020). When the international literature is examined, it has been determined that the prevalence of PTSD is quite high in studies conducted with healthcare professionals and students during the COVID-19 pandemic, and in studies conducted with patients receiving ventilation support and patients receiving intensive care treatment (Chamberlain et al., 2021; Li et al., 2021; Liu et al., 2020; Zhao et al., 2020). Considering the data of this study and other studies, it can be said that the patients receiving intensive care treatment due to COVID-19 are in the risk group for PTSD. In a study examining PTSD symptoms in COVID-19 survivors, it was

| Table 3 |
|-----------------|------------|--------|-----|-----|-----|-----|-----|-----|
| **Scales and Sub-Dimensions** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1. PTDS-Severity of the traumatic event | 1 |
| 2. PTDS-Effect of the traumatic event | .368 | 1 |
| 3. PTDS-Stress symptom level-Experiencing | .273 | .360 | 1 |
| 4. PTDS-Stress symptom level-Avoidance | .260 | .220 | .500 | 1 |
| 5. PTDS-Stress symptom level-Hyperarousal | .266 | .260 | .389 | .408 | 1 |
| 6. PTDS total score | .340 | .351 | .793 | .630 | .744 | 1 |
| 7. PTGI-Change in the relationships with others | .113 | .108 | .309 | .177 | .113 | .251 | 1 |
| 8. PTGI-Change in the philosophy of life | .237 | .199 | .385 | .274 | .327 | .412 | .586 | 1 |
| 9. PTGI-Change in the self | .017 | .115 | .386 | .078 | .061 | .175 | .577 | .457 | 1 |
| 10. PTGI Total Score | .131 | .163 | .385 | .197 | .182 | .319 | .859 | .779 | .853 | 1 |
Table 5: Comparison of PTGI and PTDS scores according to participants’ affected status from COVID-19 and time elapsed after COVID-19 treatment (n = 175).

| Degree of Affectation by COVID-19 | PTGI Total | Change in the Life Philosophy | Change in the Self | Change in the Relationships with Others | Severity of the Traumatic Event | Effect of the Traumatic Event | Stress Symptom Level of the Traumatic Event |
|----------------------------------|------------|-------------------------------|------------------|-----------------------------------------|-------------------------------|----------------------------------|------------------------------------------|
| Little affected                  | 39.80 ± 15.30 | 9.34                          | 6.74 ± 4.60      | 5.33                                     | 11.6 ± 6.80                    | 4.00 ± 2.82                      | 4.90 ± 2.19                              |
| Affected                         | 36.63 ± 17.74 | 15.87                          | 5.55 ± 5.47      | 4.00                                     | 11.2 ± 7.44                    | 4.98 ± 4.89                      | 9.51 ± 1.99                              |
| Extremely affected               | 53.32 ± 18.47 | 33.56                          | 9.41 ± 5.95      | 16.50 ± 6.56                             | 9.90 ± 9.00                    | 12.56 ± 12.88                    | 17.33 ± 12.98                            |
| PTDS subscale                    | 40.69 ± 17.75 | 14.72                          | 6.96 ± 6.04      | 5.91                                     | 11.73 ± 10.33                  | 4.98 ± 4.89                      | 9.51 ± 1.99                              |
| PTDS subscale                    | 49.69 ± 19.60 | 33.56                          | 12.56 ± 19.60    | 17.82 ± 7.00                             | 12.56 ± 12.88                  | 17.33 ± 12.98                    | 17.92 ± 7.00                            |

F*: Test Value. F**: Significant.
Looking at the studies with different sample groups, in the study of Tannverdi et al. (2012) in which they examined posttraumatic growth in 105 cancer patients, it was determined that the patients experienced the most growth in the sub-dimension of Change in the Self (Tannverdi et al., 2012). In line with the theories of Janoff-Bulman and Berg (1998), traumatic events strike the individual’s inner world and shake the assumptions, causing the person exposed to the event to question his/her positive beliefs about the world and himself/herself and to realise his/her vulnerability (Janoff-Bulman and Berg, 1998). In support of this statement, studies showed that the degree to which our core beliefs about the world are challenged is related to the amount of posttraumatic growth (Cann et al., 2010). The person re-evaluates his/her life and priorities in life in the process of repairing himself/herself after the event. This process causes them to show more inclination toward some areas that they consider important in their life (Can Gür and Tannverdi, 2021). In the situation described as a change in the self, post-traumatic individuals’ perspectives on themselves transform. On the one hand, they see themselves as more resilient; on the other hand, they accept their vulnerabilities and limitations. The most important step for posttraumatic growth is that individuals see themselves not as victims of trauma, but as survivors after trauma (Tedeschi et al., 1998).

When the relationship between the PTDS total score and its sub-dimensions was examined, a positive and significant relationship was found between the PTDS total score of all sub-dimensions of the scale. Patients who have just passed 3 months after being discharged from the intensive care unit due to COVID-19 have higher perceptions of the severity of the traumatic event. It was determined that traumatic stress symptoms increased as the severity of the traumatic event and its effect on the person increased. A positive and significant relationship was found between posttraumatic stress levels and traumatic growth. When the literature is examined, there are studies with different samples where there is a positive relationship between PTSD symptoms and posttraumatic growth (Çinarbaş and Doğan, 2019; Cui et al., 2021; El-Gabalawy et al., 2021; Pietrzak et al., 2021). The PTG is the “anti-theosis” of posttraumatic stress disorder (PTSD) and demonstrates beneficial changes in cognitive and emotional life. Therefore, posttraumatic growth is not the same as a reduction in stress or an increase in psychological well-being. As a result, growth and emotional distress can coexist for some people. In other words, individuals can be in a stressful situation and can experience growth at the same time (Tedeschi et al., 1998).

As the degree of being affected by covid 19 increases, posttraumatic growth and traumatic stress symptom levels increase. The increase in posttraumatic growth and traumatic stress symptoms may be related to the continuation of the effect of the event, that is, the continuation of the pandemic in this process. When the cognitive assessment processes were considered, it was reported that the perception of more danger and harm revealed more growth (Linley & Joseph, 2004).

Posttraumatic growth increases as the time elapsed after the completion of the treatment of the patients. Until now, it has been stated that growth should be considered a result of trauma, but it has been raised as to whether growth is a self-improving process that helps to recover from trauma. It seems more appropriate to consider growth as a process, as the questioning and restructuring of basic assumptions after trauma can take place over time. However, “changes in some dimensions may also occur immediately after the event” (Tennen, 1998). Linley and Joseph (2004) stated that growth should be evaluated as a process that takes months or even years (Linley & Joseph, 2004).

Limitations

The most important limitation of the study is that it was studied with a relatively small sample group, which may limit the statistical power. Therefore, it is necessary to increase the sample size for the results to be more generalisable. Another limitation is the collection of data with self-report scales. For example, posttraumatic stress symptoms were not determined by a clinical evaluation by a mental health professional, but evaluating only the patient’s self-report is a limitation.

Conclusion

It was determined that the patients considered being treated in the intensive care unit due to COVID-19 as a traumatic event and experienced post-traumatic growth and stress symptoms. After the intensive care process, patients should be supported to develop coping strategies that address their traumatic stress and encourage their posttraumatic growth. PTG seems to be a promising approach to combat the traumatic effects of the pandemic. Prospective and longitudinal studies are needed to evaluate the effectiveness of psychotherapeutic interventions to increase posttraumatic growth and treat stress symptoms during the pandemic process.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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