# Beyond Frontlines: The Post-Traumatic Stress Disorder and Coping Mechanisms among Sudanese Nurses during Military War

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## ABSTRACT

**Background:** During times of stress, nurses often employ various coping mechanisms to manage the emotional and psychological challenges they face in their demanding roles. The study aimed to assess post-traumatic stress disorder and coping mechanisms among Sudanese nurses during the military war in Khartoum state, Sudan, 2023. **Material and method:** A cross-sectional design was used to conduct this study. The convenience sample was used to include 318 nurses. A questionnaire composed of three parts: socio-demographic, impact of events scale, and coping orientation to problem experience was used to collect the data. **Results:** Regarding the levels of post-traumatic disorders, the results showed that there were nearly one-quarter of the sample exhibited mild levels, more than one-quarters had moderate levels, and more than half had severe levels. Regarding coping mechanisms among the sample, only more than one-quarters were satisfactory. The results indicated a negative association between age, experience years, and effective use of coping strategies with the total score of post-traumatic stress. **Conclusions:** The findings of this study highlight significant levels of post-traumatic disorders among the studied sample, with a notable proportion experiencing severe levels of trauma. A minority of participants demonstrated satisfactory coping skills**.** **Recommendations:** Implement psycho-education programs to increase awareness about post-traumatic stress and coping strategies among healthcare workers.

**Keywords:** post-traumatic, Nurses, the military war in Khartoum, Sudan**.**

## Introduction

"Post-traumatic stress disorder (PTSD) is an anxiety disorder that occurs in response to the experience of accidents and events that are accompanied by fear, frustration, and terror. Critical symptoms of PTSD include distressing and unpleasant images and flashbacks of the accident and avoidance of cues that remind a person of the event **(Mealer, Jones, and Meek, 2017& Zerach and Shalev, 2015).** It is a disorder that interferes with a person's normal occupational functioning. Stress can be defined as the body's biopsychological response to physical and psychological situations that threaten health or life. Earlier evidence indicated that experiencing stressful situations may be a contributing factor to the onset of PTSD **(Jayatunge and Pokorski, 2019).**

Initially, PTSD was identified in those who had recently been traumatized, such as soldiers returning from war, nurses during the war, and victims of rape, kidnapping, and hostage. PTSD can also develop in those who witness disastrous events in the workplace, as nurses and all health care providers. Nurses working in war zones often experience significant levels of post-traumatic stress due to the challenging and traumatic nature of their work environment. The constant exposure to violence, injuries, and high-stress situations can take a toll on their mental health and well-being. Witnessing the direct impact of war, such as treating severe injuries and dealing with casualties, can lead to emotional distress and psychological trauma among nurses **(Lancaster et al.,.2016).**

Additionally, the long hours and unpredictable nature of war settings contribute to the development of post-traumatic stress symptoms. Nurses may face sleep disturbances, nightmares, intrusive thoughts, and hypervigilance as they navigate through their daily responsibilities in chaotic and high-pressure environments. The lack of resources, including adequate staffing and support services further exacerbates the stress and trauma experienced by nurses during the war **(Sekely et al., 2024).**

Moreover, the emotional burden of caring for critically injured patients, witnessing death, and dealing with moral dilemmas can lead to moral injury among nurses. The cumulative effect of these experiences can contribute to the development of post-traumatic stress disorder (PTSD) and other mental health challenges among nurses in war zones. It is essential to recognize and address the mental health needs of nurses working in war settings by providing adequate support, access to mental health resources, and opportunities for debriefing and self-care. Creating a supportive work environment, promoting resilience-building strategies, and fostering open communication can help mitigate the impact of post-traumatic stress and promote the well-being of nurses serving in war-affected areas **(Kenny and Kelley, 2019).**

During times of stress, nurses often employ various coping mechanisms to manage the emotional and

psychological challenges they face in their demanding roles. One common coping strategy is seeking social support from colleagues, friends, or family **(Lai et al., 2020).** By sharing their experiences, concerns, and feelings with others who understand their work environment, nurses can gain validation, empathy, and practical advice, which can help alleviate stress and promote mental well-being. Additionally, engaging in meaningful interactions and building supportive relationships can create a sense of camaraderie and solidarity among nurses, fostering a supportive work culture **(Engelbrecht, Heunis, and Kigozi, 2021).**

**Aim of the study**

The study aimed to assess the post-traumatic stress disorder and coping mechanisms among Sudanese nurses during the military war.

**Research objectives**

1. Assess the levels of post-traumatic stress disorder among the studied nurses in Sudan.
2. Evaluate the use of coping mechanisms among Sudanese nurses during the military war.

**Methods**

**Design**

The study employed a cross-sectional design to assess post-traumatic stress disorder (PTSD) levels and coping mechanisms among Sudanese nurses during the military war. A cross-sectional design involves collecting data at a single point in time from a sample representative of the target population. This design allows researchers to examine relationships between variables and assess prevalence rates without following participants over time.

**Setting**

The study was conducted in Khartoum state to assess post-traumatic stress disorder among Sudanese nurses during the military war. The study area in Khartoum state is one of the eighteen states of Sudan. Although it is the smallest state by area (22,142 $km^2$), it is the most populous (5,274,321 in 2008 census). It contains the country's largest cities by population, Omdurman and Khartoum. The capital city contains state offices, governmental and non-governmental organizations, cultural institutions, and the airport. The state lies between longitudes 31.5 to 34 °E and latitudes 15 to 16 °N.

**Sample size**

The sample size was 318 based on the following criteria: confidence level 95%, margin of error 5%, population proportion 50%, and the total population was 1800 nurses from three hospitals randomly selected from 7 hospitals in the state.

**Sample technique**

A convenience sample included 318 nurses who work in emergency rooms, operation rooms, intensive care units (ICU), surgical departments, and burn units**.** All nurses who had more than one year of experience were included.

**Data collection methods**

The questionnaire consisted of the following sections:

**Section one:** demographic data of respondents (gender, age, qualification, and experience years).

**Section two**: IMPACT OF EVENTS SCALE (IES): It is composed of 20 items to measure the severity of post-traumatic disorders. The authors reworded it after reviewing the following study (Beck et al., 2008 &). It is a 5-point Likert scale (0 = "Not at all" to 4 = "Extremely"). A total symptom severity score (range - 0-88) can be obtained by summing the scores for each of the 22 items. It was classified as mild if the score ranged from 0-28. Mild if ranged from 29-55 and severe if the score was more than 55. The score of $\alpha = .81$.

**Section three**: The Coping Orientation to Problems Experience (COPE) inventory was adapted from **(Halcomb et al., 2022).** It included a number of items related to coping strategies and styles. The researchers shortened it to the following items: active coping (I take direct action to solve problems; when faced with difficulties, I try to do something about it), planning (I make a plan of action when dealing with stress, I think about steps I can take to improve the situation), positive reframing (I try to see the positive side of things, even in difficult situations, I look for something good that might come out of the situation), and acceptance (I accept the reality of the situation, even if it's not ideal, I come to terms with things I can't change).Scoring: Participants rate each item on a Likert scale ranging from 1 (Not at all) to 4 (Very often). If the total score was less than 11, it was considered unsatisfactory; an average of 11-22, and a score of more than 22 was considered satisfactory. The internal consistency of the total Brief COPE was high ($\alpha = .903$, $M = 38.2$).

**Validity**

The questionnaire was reviewed and approved by five professors specializing in community health nursing and mental health nursing. These experts evaluated the questionnaire's content, relevance to the study objectives, clarity of questions, and overall appropriateness for assessing post-traumatic stress disorder (PTSD) and coping mechanisms among Sudanese nurses during the military war in Khartoum State.

**Field of the work**

The data collection methods for assessing post-traumatic stress disorder (PTSD) and coping mechanisms among Sudanese nurses during the military war in Khartoum State typically involve several key components:

1. **Pilot study**

A pilot study of 4 nurses was conducted to evaluate the questionnaire's content and time requirements for data collection. Nurses who participated in the pilot trial were excluded.

2. **Data Collection Tools:**

Before the interviews, standardized questionnaires or scales were validated to assess PTSD symptoms and coping mechanisms among Sudanese nurses.

3. **Interviews:**
   - Conducting structured or semi-structured interviews with Sudanese nurses to gather qualitative data regarding their experiences with PTSD symptoms and coping strategies.
4. **Time Frame:**
   - The interviews were conducted from 8-2023 to 11-2023 to allow for in-depth data collection and analysis.

5. **Place:**
   - Interviews can occur in various settings, including all nurses in emergency rooms, operation rooms, intensive care units (ICU), surgical departments, and burn units**.**
6. **Ethical Considerations:**
   - Researchers adhered to ethical guidelines throughout the data collection process, including obtaining informed consent from participants, ensuring voluntary participation, maintaining confidentiality and anonymity, and providing support or referrals for participants experiencing distress or mental health concerns.

**Data Analysis:**

All accessible data was structured into bar charts and cross-tables to create a comprehensive and cohesive representation and explanation of the data. Statistical data analysis was performed using the Statistical Package for the Social Sciences (SPSS 24.0), a software program specifically designed for data analysis. The Chi-square Spearman correlation test was utilized to ascertain variances between variables, with a significance level set at a p-value of <0.05, indicating statistical significance.

**Results**

Table 1 shows the frequency distribution of the studied sample in terms of their demographic characteristics. The table reveals that the majority were female, 234 (73.6%), and about fifty percent of the age group 30 – 39, married 222 ( 69.8). Most of the participants 186 ( 58.5%), hold a bachelor's degree, Diploma 96(30.2%), master 24 (7.5%), while only 12(3.8%) of them have a doctoral degree and their working experience more than seven years 156(49.1%).

Table 2 shows the mean scores of post-traumatic symptoms as experienced by the participants. The table shows that the mean score for statement 7, "I felt like it didn't happen or wasn't real," is 3.4151. This is followed by statement 2, "I had trouble sleeping," where the mean score is 3.2830. The mean for Statement 15: "I had waves of strong feelings about it" is 3.1906. The mean for Statement 1: "Every reminder brought back feelings about it," is 3.1325, while the lowest mean scores are for Statement 5: "I avoided getting upset when I thought about it or was reminded of it" (mean = 2. 3774), statement 6: "I thought about it when I didn't want to" (mean = 2.3962), statement 8: "I stayed away from reminders of it" (mean = 2.4340), and statement 14: "I had trouble falling asleep" (mean = 2.4528).

Figure 1 shows the distribution of the studied sample according to levels of post-traumatic disorders. The figure reveals that 22% have mild levels, 26% moderate, and 52% severe.

Figure 2 shows the frequency distribution of the studied sample regarding their use of coping mechanisms. The table categorizes their use of coping strategies into three groups: Satisfactory, Average, and Unsatisfactory. The results show that 91 participants, or 28.6% of the sample, are classified under the satisfactory level, and 37 participants, or 11.7%, are average. The largest group comprises 190 participants, 59.7% of the sample, which could be better. These individuals feel that their coping mechanisms are inadequate or ineffective in dealing with stressors, indicating a negative perception of their coping skills.

Table 3 shows the correlation between post-traumatic stress score with age, experience, and use of coping mechanisms. The results indicate that age, experience years, and effective use of coping mechanisms are negatively associated with the total score of post-traumatic stress, where p is less than 0.05% in all elements. These findings underscore the importance of developing and implementing effective coping strategies, especially for individuals who may be younger or have less experience, to mitigate the impact of traumatic experiences on mental health.

Table 4 clarifies the association between sex and educational level with the levels of post-traumatic stress. The results show that there is a significant association between gender and levels of post-traumatic stress, where P=0.00001. Additionally, the levels of education are significantly associated with the levels of post-traumatic stress**.**

**Results:**

**Table 1: Frequency distribution of the studied sample regarding their demographic characteristics (n=318).**

| Variables | | Frequency | Percentage |
|---|---|---|---|
| **Sex** | Male | 84 | 26.4 |
| | Female | 234 | 73.6 |
| **Age** | 25- 29 years | 72 | 22.6 |
| | 30 - 39 years | 156 | 49.1 |
| | 40 - 49 years | 78 | 24.5 |
| | 50 to above | 12 | 3.8 |
| **Marital status** | Married | 222 | 69.8 |
| | Not married | 84 | 26.4 |
| | Divorce | 12 | 3.8 |
| **Level of Education** | Diploma | 96 | 30.2 |
| | Bachelor | 186 | 58.5 |
| | Master | 24 | 7.5 |
| | PHD | 12 | 3.8 |
| **Experience years** | >1 to 3 year | 66 | 20.7 |
| | 4 to 7 year | 96 | 30.2 |
| | 7 to above | 156 | 49.1 |

**Table 2. Mean score of post-traumatic symptoms as experienced by the participants (n=318).**

| | Statement | Mean | Std. Deviation |
|---|---|---|---|
| 1 | Any reminder brought back feelings about it | 3.1325 | 0.25239 |
| 2 | I had trouble staying asleep | 3.2830 | 0.46521 |
| 3 | Other things kept making me think about it | 2.5094 | 1.19340 |
| 4 | I felt irritable and angry | 2.6226 | 1.17105 |

| | Statement | Mean | Std. Deviation |
|---|---|---|---|
| 5 | I avoided letting myself get upset when I thought about it or was reminded of it | 2.3774 | 1.17105 |
| 6 | I thought about it when I didn't mean to | 2.3962 | 1.22033 |
| 7 | I felt as if it hadn't happened or wasn't real | 3.4151 | 0. 1322 |
| 8 | I stayed away from reminders of it. | 2.4340 | 1.17561 |
| 9 | Pictures about it popped into my mind | 2.6038 | 1.29556 |
| 10 | I was jumpy and easily startled. | 2.6038 | 1.17287 |
| 11 | I can't prevent thinking about it. | 2.6792 | 1.31634 |
| 12 | I was aware that I still had a lot of feelings about it, but I didn't deal with them. | 3.1106 | 0.24007 |
| 13 | I found myself acting or feeling like I was back at that time. | 2.4717 | 1.16094 |
| 14 | I had trouble falling asleep. | 2.4528 | 1.11031 |
| 15 | I had waves of strong feelings about it | 3.1906 | 0.38431 |
| 16 | I tried to remove it from my memory. | 2.5472 | 1.16032 |
| 17 | I had trouble concentrating. | 2.5660 | 1.22296 |
| 18 | Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart. | 2.4717 | 1.23978 |
| 19 | I felt watchful and on guard. | 2.7547 | 1.14950 |
| 20 | I had dreams about it. | 2.667 | 0.9845 |
| 21 | I can't stop talking about it. | 3.2604 | 0.21417 |
| 22 | My feelings about it were numb | 2.5231 | 0.8576 |

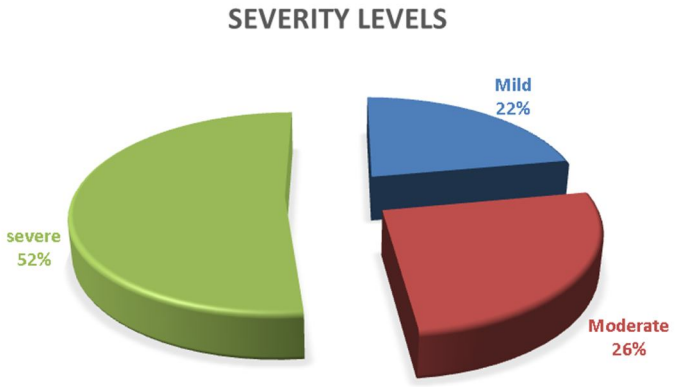


**Figure 1: Percentage distribution of the studied sample according to levels of post-traumatic disorder**

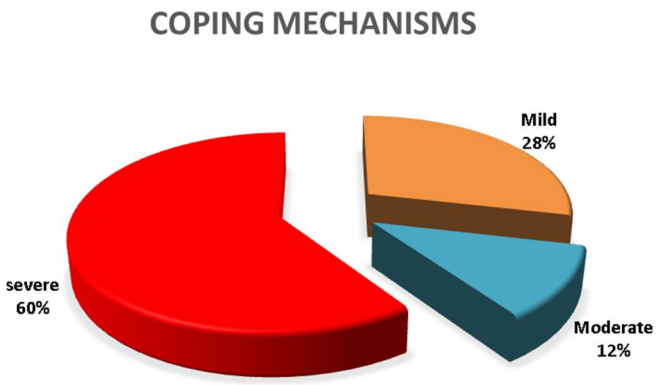


**Figure 2: Percentage distribution of the studied sample regarding their use of coping mechanisms**

**Table 3: Correlation between post-traumatic stress score with age, experience, and use of coping mechanisms**

| Items | Post-traumatic stress score | |
|---|---|---|
| | r | P-value |
| **Age** | -0.51 | 0.0001** |
| **Experience years** | -0.59 | 0.0001** |
| **Use of coping mechanisms** | -0.71 | 0.0001** |

**Table 4: Association between sex and educational level with the levels of post-traumatic stress**

| Variables | | N | Mild (n=70) | Moderate (n=83) | Severe (n=165) | $X^2$ | P-value |
|---|---|---|---|---|---|---|---|
| **Sex** | Male | 84 | 29 (34.5%) | 30 (35.7%) | 25(29.8%) | 22.9 | 0.0001** |
| | Female | 234 | 41 (17.5%) | 53(22.6%) | 140(59.9%) | | |
| **Level of Education** | Diploma | 96 | 14(14.5%) | 17(17.7%) | 65(67.8%) | 21.7 | 0.001** |
| | Bachelor | 186 | 45(24.2)% | 50(26.9%) | 91(48.9%) | | |
| | Master | 24 | 7(29.1) | 10(41.7%) | 7(29.2%) | | |
| | PHD | 12 | 4(33.3%) | 6 (50%) | 2(16.7%) | | |

## Discussion

This study aimed to assess post-traumatic stress disorder among Sudanese nurses during the military war in Khartoum state, Sudan, 2023. The current study revealed that about one-fifth of the studied sample had mild levels, about one-quarter had moderate levels, and about half had severe levels of post-traumatic disorder. The current study was supported by the study conducted in Gaza (Alhajjar, 2014). In the same line (Kolkow et al., 2007), who conducted their study on health among care providers returning from deployment to Iraq and Afghanistan, reported that about half of the studied sample had post-traumatic disorders.

Regarding the frequency distribution of the studied sample regarding their use of coping mechanisms, the results showed that about one-third of the participants were classified under the satisfactory level. At the same time, the largest group could have been more satisfactory. The current study agrees with Engelbrecht, Heunis, and Kigozi (2021), who reported that most nurses needed to use coping strategies more effectively. In the same line (Park, 2011), who studied the coping mechanisms adopted by nurses after Hurricane Katrina, revealed that nurses need educational programs about coping strategies.

The current study stated that the use of coping mechanisms was negatively associated with the severity of post-traumatic scores among the studied nurses in Sudan. The results were congruent with Engelbrecht, Heunis, and Kigozi (2021). In the same line (Huang et al., 2020) reported that using coping strategies reduces the severity of the stress among nurses.

The current study showed that post-traumatic disorder was negatively associated with age and years of experience. These results were in harmony with Buechler, D. (2007), who conducted his study on female Vietnam nurses. Alhajjar, (2014) supported the current study.

The present study stated that there was a significant association between gender and post-traumatic disorder, where the stress was higher among females than males. In the same line (Zeiher et al., 2022) reported that the female nurses had a plan to leave the hospital. Additionally, Ben-Ezra, Palgiy & Essar (2008) explored that after-war stress affects female nurses more than male nurses.

## Limitations

The current study in Sudan has some limitations. A selection bias may have occurred because the investigator could not contact the nurses absent from work during data collection because of the recent strike of more than 318 nurses due to political issues. The cross-sectional design used in this study cannot conclude the relationship between exposure and disease if exposure is a changeable characteristic. The last limitation is that no actual psychiatric diagnosis was made.

## Conclusion

The findings of this study highlight significant levels of post-traumatic disorders among the studied sample, with a notable proportion experiencing severe levels of trauma. Furthermore, the assessment of coping mechanisms revealed that only a minority of participants demonstrated satisfactory coping skills. These results underscore the pressing need for interventions aimed at addressing post-traumatic stress and enhancing coping abilities among individuals exposed to traumatic experiences, especially among healthcare professionals such as nurses.

## Recommendations:

1. Implement psycho-education programs to increase awareness about post-traumatic stress and coping strategies among healthcare workers. Provide access to support services such as counseling and peer support groups to facilitate emotional processing and resilience-building.
2. Support and conduct further research on the impact of traumatic experiences on mental health, effective coping strategies, and interventions tailored to healthcare professionals.
3. Offer training workshops and seminars on teaching effective coping strategies, stress management techniques, and self-care practices. Encourage participants to develop personalized coping plans tailored to their needs and stressors.
4. Implement regular screenings and assessments for post-traumatic stress and mental health concerns among healthcare professionals. Use validated tools and measures to track symptom changes and identify individuals needing targeted interventions.

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