Journal of Biosciences and Medicines, 2024, 12, 21-37
https://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Mental Health Consequences among Sudanese Due to the Armed Conflicts and Civil Unrest of 2023: One Year Later

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How to cite this paper: Elnour, S.M.B., Saeed, N.Y.O.M., Osman, A.B.M., Hassan, A.A., Mustafa, E.M.N.H.A., Hamato, R.A.S., Mohamed, M.M.A., Osman, A.A.M.A., Abdallah, O.M.S., Ahmed, A.A.M. and Eltaib, J.A.H. (2024) Mental Health Consequences among Sudanese Due to the Armed Conflicts and Civil Unrest of 2023: One Year Later. *Journal of Biosciences and Medicines*, **12**, 21-37.
https://doi.org/10.4236/jbm.2024.124003

Received: March 8, 2024
Accepted: April 5, 2024
Published: April 8, 2024

Abstract

Aim: To investigate depression, anxiety, PTSD, and insomnia levels among Sudanese citizens after a year has passed since the start of Armed Forces conflict in Sudan. Methods: An online survey was distributed. It is composed of five parts, covering the following areas: 1) sociodemographic data; 2) depression assessment; 3) generalized anxiety disorder assessment; 4) post-traumatic stress disorder assessment; and 5) insomnia assessment. Statistical Package for Social Sciences version 27 was used for data analysis; frequency and percentage were used to describe the qualitative variables. Spearman's correlation analysis and Chi-square test were used for correlation and association analysis; a P-value equal to or less than 0.05 was considered statistically significant. Results: The study included 283 participants, primarily female (76.0%), with a mean age of 35.26 ± 6.96 years. The majority of participants were married (50.5%) and had a university level of education (50.2%). At the start of the war, 70.3% of participants were inside the war zones, and at the time of data collection, 73.5% were outside Sudan. The length of stay in the war zone ranged from 1 to 300 days, with a mean of 48.59 ± 70.284 days. Ad-

ditionally, 63.3% of participants stated that they did not receive any form of mental health intervention, and the remaining did not provide an answer. There was a high prevalence of moderate-severe depression (50.5%), moderate anxiety (35.3%), PTSD (56.5%), and sub-threshold insomnia (53.4%) among the participants. Correlation analyses revealed associations between demographic factors such as sex, age, marital status, and education and mental health issues. Notably, female participants showed a higher prevalence of PTSD (53.0%) compared to male participants (67.6%). Conclusions: There is a substantial impact of war-related trauma on mental health, revealing a high prevalence of moderate-severe depression, moderate anxiety, PTSD, and sub-threshold insomnia among the participants. This emphasizes the importance of tailored interventions and support systems to address the unique needs of individuals affected by war trauma.

Keywords

Sudan, War, Conflict, Mental, Health

1. Introduction

The impact of armed conflict on mental health is a critical concern, with individuals experiencing emotional and psychological distress, including post-traumatic stress disorder (PTSD), depression, and generalized anxiety disorder (GAD). The loss of homes, livelihoods, and disrupted social networks can exacerbate these challenges, leading to feelings of isolation and despair. Furthermore, the displacement of families often results in significant disruptions to children's education, as schools may lack staff due to insecurity, resulting in lost educational opportunities for students. [1]

Due to exposure to potentially traumatic events, ongoing stressors, and enduring living challenges, individuals who witnessed war face an increased risk of experiencing mental health repercussions, leading to a decline in well-being and quality of life. [2] [3] There is also a heightened risk of developing mental disorders. In a systematic review and meta-analysis by Blackmore *et al.* (2020), a prevalence of 30% was found for depression and post-traumatic stress disorder (PTSD), 11% for anxiety disorders, and 1.5% for psychotic disorders among this population. [4] Similarly, Henkelmann *et al.* (2020) reported comparable figures for PTSD, depression, and anxiety disorders. [5]

The Situation in Sudan

While a comprehensive national mental health assessment study is lacking in Sudan, various articles have addressed specific sectors or groups regarding psychiatric needs. These include studies on schoolchildren, perinatal care, internally displaced persons, out-patients, and community catchment areas. Notable findings from these studies include a 12% prevalence of depression and anxiety among high-school students in Khartoum State, a 23% prevalence of perinatal

psychiatric disorders in primary care settings and communities in the capital city, and higher rates of psychiatric disorders among internally displaced persons, with estimates of 53% overall, including specific disorders like major depressive disorder, generalized anxiety disorder, social phobia, and post-traumatic stress disorder. Additionally, the prevalence rate for major psychotic disorders among internally displaced individuals stands at 1.5%, with limited data available on suicide attempts, completed suicides, and substance use disorders. [6]-[11]

Currently in Sudan, there is an ongoing armed conflict that commenced on April 15, 2023, and involves the Sudanese military and paramilitary forces. This conflict is part of Sudan's history of warfare, including the 2003 Darfur war, and is based on a power struggle within the military regime. One faction supports General Abdel Fattah al-Burhan, Chairman of the Transitional Sovereignty Council, while the other faction is the paramilitary Rapid Support Forces (RSF), loyal to General Mohamed Hamdan Dagalo (Hemedti). These power dynamics have escalated, particularly after the 2019 uprising that ousted former dictator Omar al-Bashir. [12]

A study that included 221 adult Sudanese citizens living in Khartoum State at the start of the armed conflict, whose ages were 35.02 ± 11.83 years, highlighted a significant prevalence of depression and anxiety. It was found that 25.3% had moderate-severe depression, 62.0% had severe depression, 36.2% had moderate anxiety, and 52.9% had severe anxiety. indicating a pressing need for mental health support and intervention in the affected population. [13]

To effectively tackle these challenges, it is crucial to establish holistic support structures and interventions that emphasize the mental well-being and safety of those impacted by the conflict while also addressing their psychological requirements. In this paper, we aimed to investigate depression, anxiety, PTSD, and insomnia levels among Sudanese citizens from all states after a year of the armed forces conflict that has been ongoing in Sudan to better understand the long-term mental health effects, effectiveness of interventions received, and community resilience during this transitional phase.

2. Materials and Methods

An observational cross-sectional study was conducted among Sudanese citizens both within and outside Sudan, with data collection taking place in March 2024 via Google Forms. The survey was distributed across various social media platforms such as Facebook, Twitter, Instagram, and LinkedIn, focusing on groups relevant to Sudanese communities. To enhance participation, the survey was designed to be engaging, user-friendly, and culturally sensitive. Participation was specifically requested from Sudanese citizens who had spent at least one day in war-affected cities. Exclusions were applied to individuals previously diagnosed with a mental disorder by a physician before the conflict, regardless of their current treatment status. Convenience sampling was used.

Cochran's Formula for unknown population was used to calculate the sample size.

$$n_0 = Z^2 pq/e^2$$

where

e is the desired level of precision (*i.e.* the margin of error),

p is the (estimated) proportion of the population that has the attribute in question,

q is $1 - p$.

$$((1.96)^2 (0.5) (0.5))/(0.05)^2 = 385.$$

To gather data, a well-structured online questionnaire was developed in the local language, Arabic. The questionnaire covered all the objectives of the study. Ethical approval and consent from participants were obtained at the beginning of the survey. Participants were informed about the purpose of the study, their right to decline participation, and the confidentiality of their data, which would only be used for research-related purposes.

The questionnaire was divided into five parts. The first part collected information about the characteristics of the study participants, including age, sex, marital status, education, job, number of family members, experiences of fleeing the war zone, length of stay in the war zone, types of war violence experienced, and whether they sought any psychological first aid, mental health counseling, and/or comprehensive psychological care. The second part assessed depression, the third part assessed generalized anxiety disorder, the fourth part assessed post-traumatic stress disorder, and the fifth part assessed insomnia.

2.1. Measures

Patient Health Questionnaire (PHQ-9) [14]

The PHQ-9 is a questionnaire used to measure the symptoms and severity of depression. It consists of nine items, and higher scores indicate greater symptom severity. The questionnaire has a clinical cutoff score of 10, which predicts a diagnosis of depression according to the DSM-IV criteria. The internal consistency of the questionnaire is high, with a Cronbach's alpha ranging from 0.74 to 0.89.

To calculate the scores, each item on the PHQ-9 is assigned a value based on the response options: not at all = 0, several days = 1, more than half the days = 2, and nearly every day = 3. The scores from all the items are added up, and the total score is interpreted as follows: 1 - 4 indicates minimal depression, 5 - 9 indicates mild depression, 10 - 14 indicates moderate depression, 15 - 19 indicates moderately severe depression, and 20 - 27 indicates severe depression.

Generalized Anxiety Disorder (GAD-7) [15]

The GAD-7 is a brief seven-item screening questionnaire. It is used to assess generalized anxiety disorder, social phobia, and panic disorder. Higher scores on the GAD-7 indicate greater symptom severity

To calculate scores on the GAD-7, individuals rate their symptoms on a scale of 0 to 3, corresponding to not at all, several days, more than half the days, and nearly every day, respectively. The scores from all the items are added up, and

the total score is interpreted as follows: 0 - 4 indicates minimal anxiety, 5 - 9 indicates mild anxiety, 10 - 14 indicates moderate anxiety, and a score greater than 15 indicates severe anxiety.

Post-traumatic stress disorder checklist (PCL-5) [16]

The PCL-5 is a self-report measure used to assess the 20 symptoms of post-traumatic stress disorder (PTSD) according to the DSM-5 criteria. It serves various purposes, including monitoring symptom change during and after treatment, screening individuals for PTSD, and making a provisional diagnosis of PTSD.

The self-report rating scale for each symptom ranges from 0 to 4, with descriptors such as: not at all, a little bit, moderately, quite a bit, and extremely. This rating scale is a change from the 1 - 5 scale used in the DSM-IV version.

To obtain the total symptom severity score, the scores for each of the 20 items are summed, resulting in a range of 0 - 80. Additionally, symptom cluster severity scores can be obtained by summing the scores for the items within a specific cluster. The clusters are as follows: cluster B (items 1 - 5), cluster C (items 6 - 7), cluster D (items 8 - 14), and cluster E (items 15 - 20).

A provisional diagnosis of PTSD can be made by considering any item rated as 2 or higher (moderately or higher) as an endorsed symptom. Following the DSM-5 diagnostic rule, a provisional PTSD diagnosis requires at least 1 symptom from cluster B (questions 1 - 5), 1 symptom from cluster C (questions 6 - 7), 2 symptoms from cluster D (questions 8 - 14), and 2 symptoms from cluster E (questions 15 - 20). A cutoff score of 33 is considered indicative of PTSD.

Insomnia assessment (ISI) [17]

The Insomnia Index Scale (ISI) is a 7-item self-report questionnaire used to assess the nature, severity, and impact of insomnia. The usual recall period for the ISI is the last month

The ISI evaluates several dimensions of insomnia, including the severity of sleep onset problems, sleep maintenance problems, and early morning awakening problems. It also assesses sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by sleep difficulties.

Each item on the ISI is rated on a 5-point Likert scale, ranging from 0 for no problem to 4 for very severe problem. The scores for each item are then totaled, resulting in a total score ranging from 0 to 28.

The interpretation of the ISI scores is as follows: 0 - 7 absence of insomnia; 8 - 14 sub-threshold insomnia, 15 - 21 moderate insomnia, 22 - 28 severe insomnia. These score ranges provide an indication of the severity of insomnia experienced by an individual.

2.2. Data Analysis

The data was coded to be compatible with the Statistical Package for Social Sciences (SPSS) version 27. The analysis involved both qualitative and quantitative variables. For qualitative variables, frequency and percentage were used to

describe the data. Quantitative variables were described using the mean and standard deviation (SD) (mean ± SD). Spearman correlations and Chi-square tests were used to examine correlations and associations between variables. The P value level of $p \leq 0.05$ was used to determine statistical significance.

3. Results

The study included 283 participants, and their characteristics were described in (Table 1). The participants' ages ranged from 21 to 65 years, with a mean ± standard deviation of 35.26 ± 6.96 years. Among the participants, 215 (76.0%) were female. 143 (50.5%) were married, and 192 (50.2%) had a university level of education. (Table 1)

Table 1. Characteristics of participants. Demographic characteristics of participants were reported, in addition to fleeing the war zone, length of stay in the war zone, relocation, and receiving mental health interventions. (N = 283).

	N	%
Age	21 - 65	35.26 ± 6.96
Sex		
Female	215	76.0
Male	68	24.0
Marital status		
Single	120	42.4
Married	143	50.5
Divorced	20	7.1
Education		
Primary	29	4.1
Secondary	15	15.8
University	192	50.2
Post-graduate	47	29.9
Number of family members	1 - 7	4.51 ± 2.048
Place of stay at the start of the war		
In Sudan affected cities	199	70.3
In Sudan safe cities	20	7.1
Outside Sudan	64	22.6
Length of stay in the warzone (N = 199)	1 - 300	48.59 ± 70.284
Current place of stay		
Did not relocate (Inside warzones)	24	8.5
Inside Sudan safe cities	51	18.0
Outside Sudan	208	73.5
Received Mental health intervention		
psychological first aid	0	0
mental health counseling	0	0
comprehensive psychological care	0	0
Did not receive mental health intervention	179	63.3

At the start of the war, 199 (70.3%) of participants were inside the warzones, 20 (7.1%) were in safe cities in Sudan, and 64 (22.6%) were outside Sudan. At the time of data collection (February 2024), 24 (8.5%) did not relocate and were still inside Sudan in their primary residences in warzones; 51 (18.0%) were inside Sudan, in safe cities; and 208 (73.5%) were outside Sudan. The length of stay in the war zone ranged from 1 to 300 days, with a mean ± standard deviation of 48.59 ± 70.284 days. Of the participants, 179 (63.3%) stated that they did not receive any sort of mental health intervention; the remaining 104 (36.7%) did not answer the question. (Table 1)

One hundred thirty-five of the participants (47.7%) were unable to return to school, university, or work. (Figure 1)

Those who were unemployed increased from 28 (9.9%) to 52 (18.4%), while students decreased from 12 (4.2%) to 4 (1.4%). Daily payments and monthly payments decreased from 12 (4.2%) and 207 (73.2%) to 8 (2.8%) and 68 (24.0%), respectively, while housewives had to get a job, decreasing from 24 (8.5%) to 16 (5.7%). (Figure 2)

The sound of gunfire, bombs, or explosions was the most frequent war violence personally experienced by participants or their family members, friends, or acquaintances in 235 (83.4%) and 283 (100%), respectively, followed by armed robbery in 193 (68.1%) and 224 (79.1%), respectively. The death of a family member, friend, or acquaintance was experienced by 204 (72.0%) of participants. Verbal abuse was experienced by 172 (60.7%) among family members, friends, or acquaintances in comparison to 35 (12.3%) personally. A gunshot or bomb wound was experienced by 125 (44.1%) among family members, friends, or acquaintances in comparison to 4 (1.4%) personally. Physical abuse was experienced by 98 (34.6%) among family members, friends, or acquaintances in comparison to 4 (1.4%) personally. Sexual abuse was experienced by 23 (8.1%) among family members, friends, or acquaintances in comparison to 11 (3.9%) personally. Rape was experienced by 20 (7.0%) among family members, friends, or acquaintances in comparison to 11 (3.9%) personally. (Figure 3)

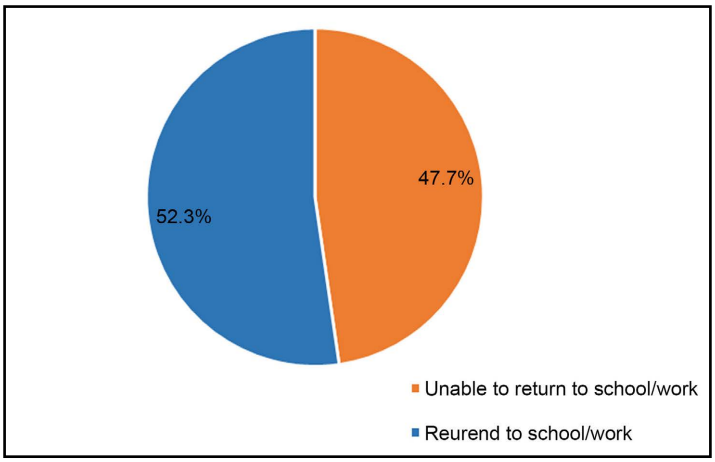

Figure 1. Returning to school or work since the start of the war. Frequency distribution (N = 283).

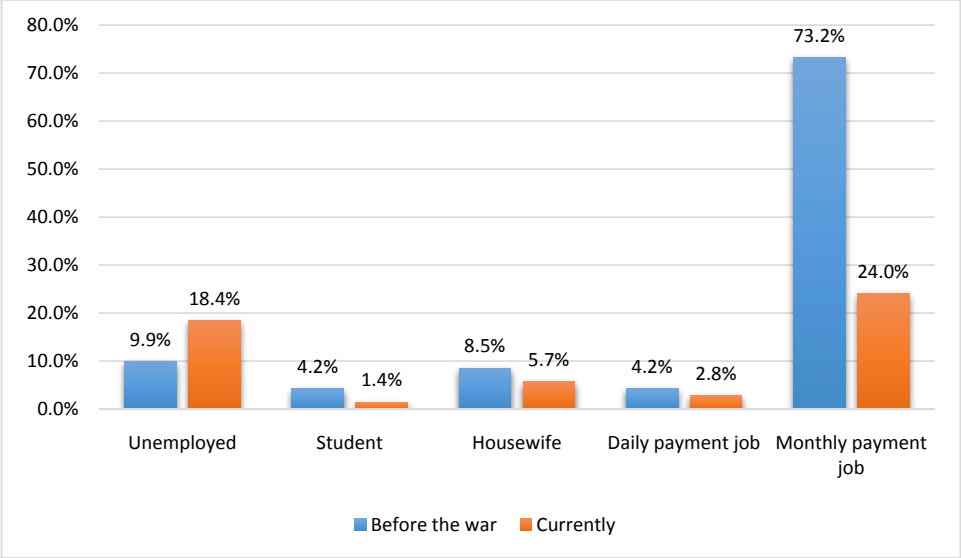

Figure 2. Occupation before and since the start of the war. Frequency distribution (N = 283).

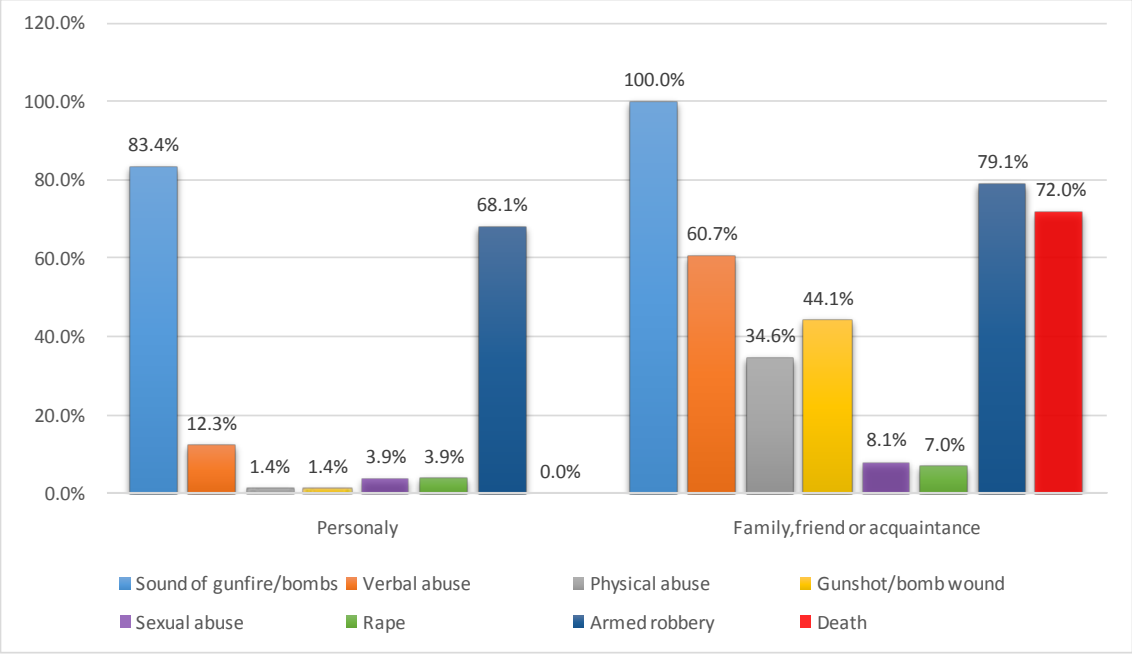

Figure 3. Types of war violence. Both direct and indirect war trauma or violence are experienced by the participant or someone they know, such as family members, friends, or acquaintances (N = 283).

The most frequent level of depression observed among participants was a moderate-to-severe level among 143 (50.5%). The most frequent levels of GAD observed among participants were moderate among 100 (35.3%) and mild among 99 (35%). PTSD was present among 160 (56.5%) participants. The most frequent level of insomnia observed among participants was subthreshold insomnia among 151 (53.4%). (Table 2)

In (Table 3) Spearman's correlation was utilized to examine the relationship between demographic factors and mental health issues, including depression,

Table 2. Frequency distribution of mental health assessments. The severity levels for depression, generalized anxiety disorder, post-traumatic stress disorder, and insomnia.

	Severity	**Frequency**	**Percent**
Depression	Mild	14	8.5
	Moderate	64	22.6
	Moderate - severe	143	50.5
	Severe	52	18.4
GAD	Minimal	12	4.2
	Mild	99	35
	Moderate	100	35.3
	Severe	72	25.4
PTSD	Absent	123	43.5
	Present	160	56.5
Insomnia	Absent	0	0
	Subthreshold	151	53.4
	Moderate	116	41.0
	Severe	16	5.7

Table 3. Spearman's Correlations of Mental Health Assessment. Correlation between LOS in the war zone, some demographic characteristics, and depression, generalized anxiety disorder, posttraumatic stress disorder, and insomnia.

		Depression	**Anxiety**	**Insomnia**	**PTSD**
LOS within the war zone	Correlation Coefficient	0.044	0.035	−0.189**	−0.079
	Sig. (p-value)	0.232	0.277	0.001	0.093
Sex	Correlation Coefficient	−0.016	−0.183**	0.036	0.126*
	Sig. (p-value)	0.392	0.001	0.272	0.017
Age	Correlation Coefficient	0.032	−0.002	0.034	0.001
	Sig. (p-value)	0.294	0.488	0.282	0.491
Marital Status	Correlation Coefficient	−0.288**	−0.119*	0.017	−0.080
	Sig. (p-value)	0.000	0.022	0.391	0.090
Education	Correlation Coefficient	−0.349**	−0.211**	−0.034	0.133*
	Sig. (p-value)	0.000	0.000	0.282	0.013

*. Correlation is significant at the 0.05 level. **. Correlation is significant at the 0.01 level.

anxiety, insomnia, and PTSD. The correlation analysis revealed that the length of stay in the war zone had a statistically insignificant correlation with depression (correlation coefficient = 0.044, p-value = 0.232) and anxiety (correlation coefficient = 0.035, p-value = 0.277), but a significant correlation with insomnia (correlation coefficient = −0.189, p-value = 0.001). Additionally, the correlation between the length of stay in the war zone and PTSD was not significant (correlation coefficient = −0.079, p-value = 0.093). Education and marital status showed significant correlations with depression, anxiety, and PTSD, indicating a substantial link with these mental health issues. Education had a strong negative

correlation with depression (correlation coefficient = −0.349, p-value = 0.000) and anxiety (correlation coefficient = −0.211, p-value = 0.000), while marital status also exhibited a significant negative correlation with depression (correlation coefficient = −0.288, p-value = 0.000) and anxiety (correlation coefficient = −0.119, p-value = 0.022). Additionally, education had a significant positive correlation with PTSD (correlation coefficient = 0.133, p-value = 0.013), while marital status showed an insignificant correlation with PTSD (correlation coefficient = −0.080, p-value = 0.090) (Table 3).

The most frequent level of depression was moderate-severe depression, which was observed in 143 (50.0%) participants. 114 (53.0%) were females and 29 (42.6%) were males (Chi-square = 2.933; p-value = 0.402). In terms of age, 33 (60.0%) participants were aged 18 - 29 years, 109 (48.7%) participants aged 30 - 50 years, and 1 (25.0%) participant older than 50 years had moderate-severe depression, while 3 (75.0%) of this age group: 50 years and older, had severe depression. (Chi-square = 11.657; p-value = 0.046). Regarding marital status, 72 (60.0%) single participants, 67 (46.9%) married participants, and 4 (20.0%) divorced participants had moderate-severe depression, while most divorced participants had moderate depression (12 (60.0%)) (Chi-square = 56.435; p-value = 0.001) (Table 4).

The most frequent levels of GAD observed among participants were moderate among 100 (35.3%) and mild among 99 (35%). Most females had mild GAD 73 (34.0%), followed by severe GAD 70 (32.6%), and moderate GAD 64 (29.8%). Most males had moderate GAD (36.9%) followed by mild GAD (Chi-square = 26.506; p-value = 0.001). In terms of age, participants in the 18 - 29 age group mostly had moderate GAD in 20 (36.4%), followed by mild GAD in 19 (34.5%). Participants in the 30 - 50 age group mostly had mild GAD in 80 (35.7%), followed by moderate GAD in 77 (34.4%). Most participants aged more than 50 years had moderate GAD 3 (75.0%) (Chi-square = 3.768; p-value = 0.708). Regarding marital status, most single participants had a moderate GAD of 48 (40.0%). Most married participants had mild GAD of 63 (44.1%), and most divorced participants equally had mild and moderate GAD of 8 (40.0%) each (Chi-square = 14.827; p-value = 0.022) (Table 5).

PTSD was present in 160 (56.5%) participants. 114 (53.0%) females and 4 (67.6%) males (Chi-square = 4.496; p-value = 0.023). 34 (61.8%) 18 - 29 age group, 122 (54.5%) 30 - 50 age group, and all participants older than 50 years 4 (100.0%) (Chi-square = 4.091; p-value = 0.129). Among 72 (60.0%) single, 80 (55.9%) married, and all divorced participants, 8 (40.0%) (Chi-square = 2.832; p-value = 0.243) (Table 6).

All participants had some level of insomnia; the most frequent level of insomnia observed among participants was subthreshold in 151 (53.4%). Subthreshold insomnia was present among 117 (54.4%) females and 34 (50.0%) males (Chi-square = 0.411; p-value = 0.814). In terms of age, the most frequent level was subthreshold present in the 18 - 29, 30 - 50, and older than 50 years age groups among 33 (60.0%), 116 (51.8%), and 2 (50.0%), respectively (Chi-square = 4.251; p-value =

0.373). Regarding marital status, the most frequent level was subthreshold present in single, married, and divorced participants among 64 (53.3%), 75 (52.4%), and 12 (60.0%), respectively (Chi-square = 10.955; p-value = 0.027) (Table 7).

Table 4. Association analysis using Chi-square. Frequency distribution of depression according to participants` characteristics.

		Depression				Chi-square	P-value
		Mild	Moderate	Moderate - severe	Severe		
Sex	Female	16 (7.4%)	48 (22.3%)	114 (53.0%)	37 (17.2%)	2.933	0.402
	Male	8 (11.8%)	16 (23.5%)	29 (42.6%)	15 (22.1%)		
Age	18 - 29	5 (9.1%)	9 (16.4%)	33 (60.0%)	8 (14.5%)	11.657	0.046*
	30 - 50	19 (8.5%)	55 (24.6%)	109 (48.7%)	41 (18.3%)		
	50<	0 (0.0%)	0 (0.0%)	1 (25.0%)	3 (75.0%)		
Marital status	Single	12 (10.0%)	4 (3.3%)	72 (60.0%)	32 (26.7%)	56.435	0.001*
	Married	12 (8.4 %)	48 (33.6%)	67 (46.9%)	16 (11.2%)		
	Divorced	0 (0.0%)	12 (60.0%)	4 (20.0%)	4 (20.0%)		
Total		24 (8.5%)	64 (22.6%)	143 (50.0%)	52 (18.4%)		

*. Correlation is significant at the 0.05 level.

Table 5. Association analysis using Chi-square. Frequency distribution of GAD according to participants' characteristics.

		GAD				Chi-square	P-value
		Minimal	Mild	Moderate	Severe		
Sex	Female	8 (3.7%)	73 (34.0%)	64 (29.8%)	70 (32.6%)	26.502	0.001*
	Male	4 (5.9%)	26 (38.2%)	36 (52.9%)	2 (2.9%)		
Age	18 - 29	3 (5.5%)	19 (34.5%)	20 (36.4%)	13 (23.6%)	3.768	0.708
	30 - 50	9 (4.0%)	80 (35.7%)	77 (34.4%)	58 (25.9%)		
	50<	0 (0.0%)	0 (0.0%)	3 (70.0%)	1 (25.0%)		
Marital status	Single	8 (6.7%)	28 (23.3%)	48 (40.0%)	36 (30.0%)	14.827	0.022*
	Married	4 (2.8%)	63 (44.1%)	44 (30.8%)	32 (22.4%)		
	Divorced	0 (0.0%)	8 40.0%)	8 (40.0%)	4 (20.0%)		
Total		12 (4.2%)	99 (35.0%)	100 (35.3%)	72 (25.4%)		

*. Correlation is significant at the 0.05 level.

Table 6. Association analysis using Chi-square. Frequency distribution of PTSD according to participants' characteristic.

		PTSD		Chi-square	P-value
		Absent	Present		
Sex	Female	101 (47.0%)	114 (53.0%)	4.496	0.023*
	Male	22 (32.4%)	46 (67.6%)		

Continued

Age	18 - 29	21 (38.2%)	34 (61.8%)	4.091	0.129
	30 - 50	102 (45.5%)	122 (54.5%)		
	50<	0 (0.0%)	4 (100.0%)		
Marital status	Single	48 (40.0%)	72 (60.0%)	2.832	0.243
	Married	63 (44.1%)	80 (55.9%)		
	Divorced	12 (60.0%)	8 (40.0%)		
Total		123 (43.5%)	160 (56.5%)		

*. Correlation is significant at the 0.05 level.

Table 7. Association analysis using Chi-square. Frequency distribution of insomnia according to participants' characteristics.

		Insomnia				Chi-square	P-value
		Absent	Sub threshold	Moderate	Severe		
Sex	Female	0 (0.0%)	117 (54.4%)	86 (40.0%)	12 (5.6%)	0.411	0.814
	Male	0 (0.0%)	34 (50.0%)	30 (44.1%)	4 (5.9%)		
Age	18 - 29	0 (0.0%)	33 (60.0%)	19 (34.5%)	3 (5.5%)	4.251	0.373
	30 - 50	0 (0.0%)	116 (51.8%)	96 (42.9%)	12 (5.4%)		
	50<	0 (0.0%)	2 (50.0%)	1 (25.0)	1 (25.0%)		
Marital status	Single	0 (0.0%)	64 (53.3%)	52 (43.2%)	4 (3.3%)	10.955	0.027*
	Married	0 (0.0%)	75 (52.4%)	60 (42.0%)	8 (5.6%)		
	Divorced	0 (0.0%)	12 (60.0%)	4 (20.0%)	4 (20.0%)		
Total		0 (0.0%)	151 (53.4 %)	116 (41.0%)	16 (5.7%)		

*. Correlation is significant at the 0.05 level.

4. Discussion

The ongoing armed conflict in Sudan has had a significant impact on the mental health of individuals, leading to various conditions such as depression, GAD, PTSD, and insomnia. The study specifically focused on Sudanese individuals who were in any of the affected cities at one point during the armed When comparing the mental health of Sudanese citizens during the initial months of war with current findings [13], a decrease in severe depression from 62.0% to 18.4% is observed. Conversely, moderate-severe depression increased from 25.3% to 50.5%. Mild GAD was the most frequent at 33.9%, whereas currently, moderate GAD is the most prevalent at 35.3%. Initially, 24.9% had PTSD, which has now risen to 56.5%. Subthreshold insomnia was present in 57.5%, and in the current study, it remains the most prevalent level of insomnia at 53.4%.

The study revealed a negative correlation between female sex and depression, suggesting a higher likelihood of depression among females. Additionally, a negative correlation was found between age and PTSD, indicating a higher likelihood of PTSD among younger age groups, as well as a negative correlation be-

tween married individuals and PTSD, suggesting a higher likelihood of PTSD among married participants. [13]

The correlation analysis conducted in the study revealed several significant findings related to the impact of war trauma on mental health. The length of stay in the war zone was found to have a significant negative correlation with insomnia, indicating that a longer duration in the war zone was associated with higher levels of insomnia. However, this correlation was not observed with depression, anxiety, or PTSD, suggesting that the length of stay did not have a significant impact on these mental health issues. This finding is consistent with the findings of a study that investigated the same mental health issues at the beginning of the armed conflict. [13]

The study also highlighted the variability in individuals' experiences of war trauma, with some individuals experiencing significant trauma despite a brief stay, while others spent an extended period in the war zone without experiencing substantial trauma. This variability underscores the individual differences in resilience and coping mechanisms, which can influence how individuals respond to trauma.

Moreover, the study identified significant correlations between education and marital status and depression, anxiety, and PTSD, indicating a substantial link between these demographic factors and mental health issues. Specifically, education showed a strong negative correlation with depression and anxiety, while marital status exhibited a significant negative correlation with depression and anxiety. Additionally, education had a significant positive correlation with PTSD, while marital status showed an insignificant correlation with PTSD.

The prevalence rates of depression and anxiety disorders among long-settled war refugees vary significantly. For example, a systematic review by Bogic *et al.*, (2015) stated that the prevalence of depression was 2.3% - 80%, for PTSD it was 4.4% - 86%, and for unspecified anxiety disorder it was 20.3% - 88%. However, prevalence estimates were typically in the range of 20% and above for all three disorders. [18] These findings indicate that the risk of having a serious mental disorder is substantially higher in war refugees than in the general population, even after refugee resettlement.

Furthermore, this current study found a negative correlation between female sex and depression, suggesting a higher likelihood of depression among females. Additionally, a negative correlation was observed between age and PTSD, indicating a higher likelihood of PTSD among younger age groups. Similarly, a negative correlation was found between married individuals and PTSD, suggesting a higher likelihood of PTSD among married participants. It has been previously discussed that potential predictors of poor mental health include older age, female gender, and lower education. [5]

The findings of this study also align with those of other studies, highlighting the widespread impact of war trauma on mental health. A systematic review observed prevalence rates of 13% and 42% (95% CI 8% - 52%) for diagnosed and self-reported anxiety, 30% and 40% (95% CI 23% - 48%) for diagnosed and

self-reported depression, and 29% and 37% (95% CI 22% - 45%) for diagnosed and self-reported PTSD among general refugee populations. [5] Additionally, a study found elevated rates of PTSD symptoms among civilians who witnessed the Ukraine war, indicating the prevalent nature of trauma-related disorders. [19] [20]

Contrary to the consensus on war's negative impact on mental health, A research by Bonanno *et al*., (2012) suggests variability in how individuals respond to trauma. [21] For instance, a study found that a significant number of people exhibit resilience after traumatic events and do not develop long-term psychiatric conditions such as PTSD, anxiety, or depression. They argue that human beings have an inherent capacity for psychological resilience, which enables many within war-affected populations to maintain stable mental health despite exposure to severe stressors (21).

Furthermore, a comprehensive analysis argues against generalizing the impact of conflict on mental well-being. Their findings suggest that only a fraction of those exposed to combat-related stressors experience debilitating long-term consequences for their mental health. The substantial variation in individual responses points toward factors like pre-existing vulnerabilities and support systems playing crucial roles in determining who develops psychiatric disorders following traumatic experiences. [22]

Our findings revealed that the majority of participants, a staggering 63.3%, did not receive any form of mental health intervention. And the remaining 36.7% did not respond to this question. This lack of support is concerning, as it suggests that a large portion of individuals affected by the conflict are not receiving the necessary care to address their mental health conditions. The high prevalence of moderate-severe depression, moderate anxiety, PTSD, and sub-threshold insomnia among the participants further underscores the urgent need for accessible and effective mental health interventions in the affected areas of Sudan.

These findings highlight the importance of prioritizing mental health support and resources to address the impact of the conflict on individuals' well-being. The lack of access to mental health interventions and support in Sudan during the ongoing armed conflict is alarming and requires immediate attention. Also, immediate prioritization of the reconstruction of the health system is crucial to mitigating the long-term consequences of the war. [23]

Given these considerations, it is crucial to acknowledge that the effect of war trauma on mental health is not exclusively determined by the duration of stay in the war zone or time passed since leaving the war zone alone. Additional factors, including the nature and severity of the experienced trauma, individual resilience, and the availability of support systems, can also impact mental health outcomes. To comprehend the intricate interplay between length of stay, trauma exposure, resilience, and mental health outcomes, further research and a thorough evaluation of individual experiences and characteristics are necessary. This approach can provide valuable insights for developing interventions and support systems tailored to address the specific needs of individuals affected by

war trauma.

5. Limitations

The use of self-reporting tools for mental health disorder diagnosis, which is less sensitive than in-person interviews with qualified medical professionals, is one limitation to take into account when interpreting the study's findings. Nevertheless, the tools were previously validated.

6. Recommendations

For those impacted by conflict, mental health interventions and support can help mitigate the harmful effects of trauma and foster resiliency in survivors. When treating mental health issues, psychosocial therapies are clinically significant.

A comprehensive plan is necessary to handle mental health issues in an efficient manner. Raising awareness of mental health issues, lowering stigma, and guaranteeing access to trauma-informed and culturally sensitive mental health services are all part of this. Considering the results of the study, detection, screening, and encouraging people to seek mental health care are very essential.

Governments, non-governmental organizations, and community-based organizations must work together to provide comprehensive support to people who have seen war. Furthermore, better detection and treatment of mental health issues can be achieved by incorporating mental health services into primary healthcare settings and providing healthcare personnel with culturally competent care training.

7. Conclusion

The study found that exposure to war-related trauma can also lead to mental health issues. The study's correlation analysis revealed various associations between demographic factors and mental health issues, highlighting the significance of education and marital status in relation to depression, anxiety, and PTSD.

The study's findings provide valuable insights into the complex relationship between war trauma, demographic factors, and mental health outcomes, emphasizing the need for tailored interventions and support systems to address the unique needs of individuals affected by war trauma.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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List of Abbreviations

GAD: Generalized Anxiety Disorder
IDP: Internally displaced person
ISI: Insomnia Index Scale
PHQ-9: Patient Health Questionnaire
PCL-5: Post-traumatic stress disorder Checklist
PTSD: Post-traumatic stress disorder
RSF: Rapid Support Forces
SD: Standard deviation
SPSS: Statistical Package for Social Sciences