NEW RESEARCH

Impact of the Russian Invasion on Mental Health of Adolescents in Ukraine

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Objective: Very limited evidence is available on the psychological impact of war on adolescents in Ukraine. This study compared war experiences and posttraumatic stress disorder (PTSD), anxiety and depression in adolescents living in war-torn and peaceful regions of Ukraine, more than 2 years after Russia first invaded in 2014.

Method: The cross-sectional study included 2,766 students aged 11-17 years living in the war-torn Donetsk region and in Kirovograd in central Ukraine. Self-reported PTSD, depression, and anxiety were assessed by Harvard Trauma Questionnaire, Patient Health Questionnaire-9, and Generalized Anxiety Disorder-7. Data were collected from September 2016 to January 2017. Binary and multinomial logistic regression models were used to examine the association between PTSD, anxiety, and depression and regions.

Results: War trauma and daily stress were higher in adolescents in the Donetsk region; 881 (60.2%) adolescents had witnessed armed attacks, 204 (13.9%) were victims of violence, and 409 (27.9%) were forced to leave their homes. They also had significantly increased risks for PTSD (odds ratio [OR] 4.11, 95% CI 2.37-7.13), severe anxiety (OR 3.10, 95% CI 1.83-5.27), and moderately severe/severe depression (OR 2.65, 95% CI 1.79-3.92).

Conclusion: Traumatic events and daily stress were strongly associated with psychological distress in adolescents living in a war-torn region in Ukraine. These findings can help in understanding, measuring, and addressing the long-term impact that the current escalating war in Ukraine will have on adolescents' mental health and social functioning.

Key words: adolescents; anxiety; depression; posttraumatic stress disorder; war

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The Russian invasion of Ukraine, which started in February 2022, is the largest European ground offensive since the Second World War. It is a dramatic escalation of the armed conflict that has affected parts of Eastern Ukraine since 2014. Countless civilians have been killed, and millions of children, women, and elderly people have fled the country. The United Nations Children's Fund estimates that 0.5 million children became refugees in just the first week of the conflict,[1] and the numbers have been rising rapidly since then. Although the situation has rapidly worsened, the armed conflict in Eastern Ukraine has lasted 8 years. However, large-scale studies on adolescents who have been affected by the ongoing conflict are lacking. During war, adolescents are exposed to atrocities, organized violence, disintegration of social networks, and resettlement during crucial phases of their physical, emotional, social, and cognitive development.[2] These experiences could cause serious risks to their physical and psychological well-being and development.[3]

Although the links between mental health risks and armed conflicts have been well established,[4] the reported prevalence of mental disorders in children and adolescents has varied widely.[5] The prevalence of posttraumatic stress disorder (PTSD), anxiety, and depression has ranged from 7.6% to 68.9%, 23.7% to 94.9%, and 4.1% to 41.2%, respectively.[6-9] These wide variations could be attributed to the types and levels of exposure, methodological issues, and use of different psychiatric assessment instruments. The characteristics of exposure to war events (ie, level and type of events) and the child/adolescent's age, sex, socioeconomic status (SES), and social support have been the main factors that have influenced the development of mental disorders in children and adolescents.[10] However, conflicting results have been reported on the influence of sex and age on PTSD. Some studies have shown that girls reported higher levels of distress than boys,[6,11] while other studies did not find any effect of gender.[12,13] In addition, some studies have reported that older children experienced more PTSD

symptoms than younger children,[14] while others showed the opposite.[12,15] Studies have also shown that children from families with low SES status reported higher levels of distress[6] and that exposure to 5 or more traumatic events increased the risk for PTSD.[7] Strong social support, high parental education, and positive coping strategies have been shown to be protective factors for the development of PTSD and other psychological symptoms.[16,17]

However, previous studies have had limitations. These studies were primarily conducted on internationally displaced people during war, were based on small sample size, and were conducted in one region affected by armed conflict. In addition, only few studies have reported mental health outcomes based on regions that were differently affected by war. Perkins *et al.*[11] included children from 2 regions of Syria, but both regions were affected by the civil war. In contrast, Eyüboglu *et al.*[18] compared the mental health outcomes of children in 2 regions: one region affected by the armed conflict between the Turkish Military and Kurdistan Workers' party and one region that was not exposed to the conflict.[18] However, the sample size of 756 was relatively small, and only the risk of PTSD was assessed.

Until now, only 2 studies to our knowledge have focused on the psychological impact of the early phase of war in Ukraine on adolescents. A cross-sectional study by Klymchuk and Gorbunova[19] measured PTSD and found that 28.0% of 1,505 adolescents aged 10-15 years were at risk of PTSD. However, that study was conducted in one nonwar city, Lviv, and the adolescents' experiences of war were not measured. The second study was a longitudinal study of adolescents in east Ukraine[20] that measured the risk of PTSD and depression. The authors found that 33.9% of 160 adolescents aged 15-17 years who had PTSD developed depression compared with 8.5% without PTSD. This study did not report the prevalence of PTSD or depression, the sample size was small, and the age range was narrow.

This is the largest epidemiological study to our knowledge using standardized measures that examined the impact of the Russia–Ukraine war on the mental health of adolescents. The aim of the study was to compare the war experiences and risk of PTSD, anxiety, and depression of adolescents living in the Donetsk region, which has experienced ongoing conflict since the Russian invasion in 2014, with adolescents living in Kirovograd, which was a peaceful region at the time of the study. The second aim was to examine the associations between war experiences of adolescents and the risk of developing PTSD, anxiety, and depression. We hypothesized that adolescents living in the Donetsk region would show higher risks of PTSD, anxiety, and depression than those living in Kirovograd.

METHOD

Participants and Procedure

This cross-sectional study was based on data collected from September 2016 to January 2017, more than 2 years after Russia invaded areas of Eastern Ukraine in February 2014. Participants were recruited from schools in 2 regions that had different exposures to the Ukraine war. The Donetsk region had a population of nearly 4.2 million in 2016 and is in southeast Ukraine. The data were collected from 3 cities in the Donetsk region: Kramatorsk, Sloviansk, and Druzhkovka. Kirovograd, which is about 500 km away, had a population of about 920,000 at the time and is in central Ukraine. It was a peaceful region of the country in 2016 and was not directly affected by that phase of the war. In Kirovograd, data were collected from 2 cities: Kropyvnytskyi and Alexandria.

The principals of each school were contacted to determine their willingness to participate in the study. Figure 1 shows a flowchart of the recruitment process in the 2 regions.

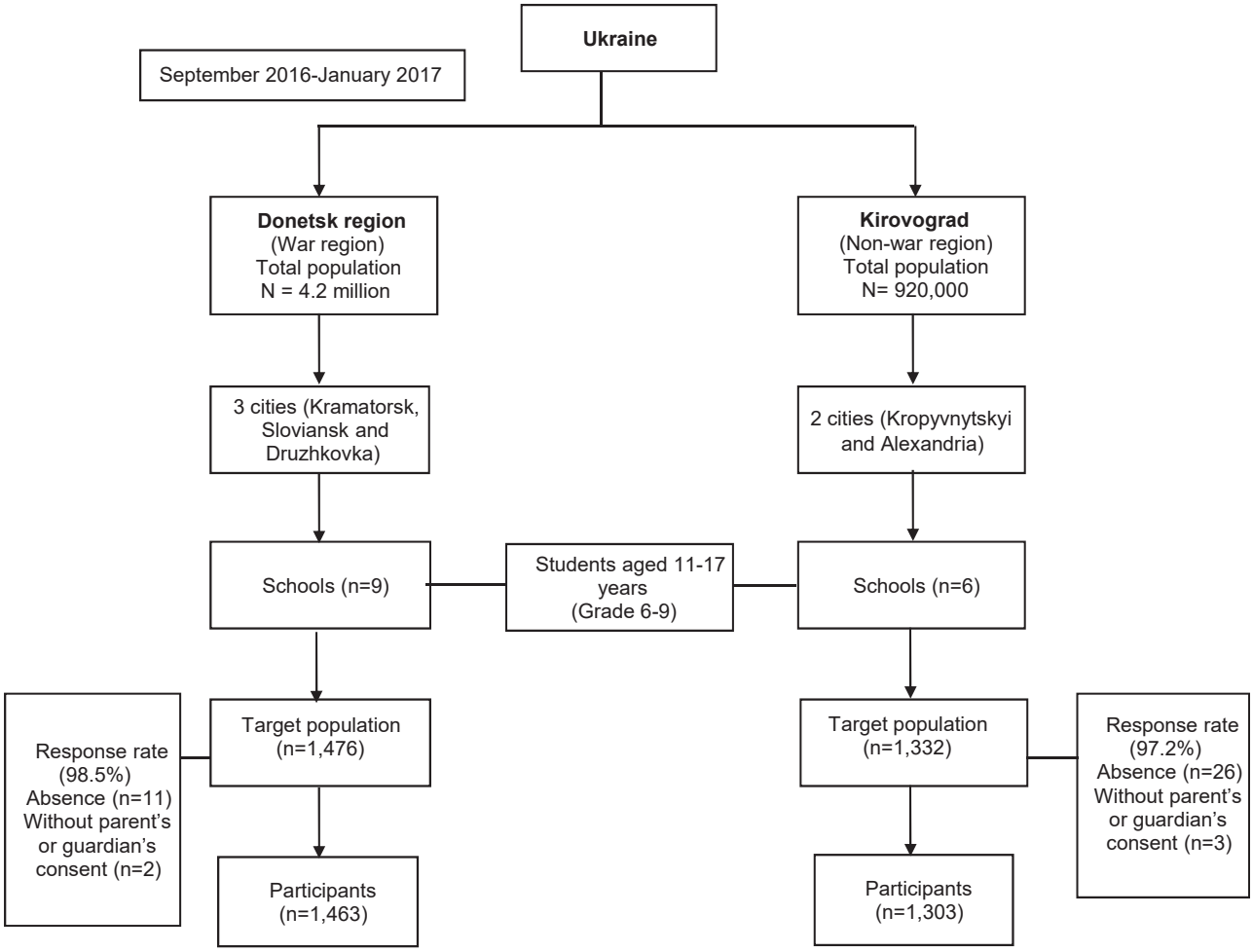
A total of 2,766 participants aged 11-17 years were selected from 15 government-funded schools: 9 in the Donetsk region and 6 in the Kirovograd region. The adolescents were eligible to participate if their parents or guardians provided consent, which is a mandatory legal procedure for minors in Ukraine. Only 42 adolescents were excluded from the study: 37 (11 in Donetsk region and 26 in Kirovograd) were absent from school on the day of the data collection, and 5 (2 in Donetsk region and 3 in Kirovograd) parents or guardians refused to give their consent. The adolescents were told that their participation was voluntary, their answers would be confidential, and they could withdraw from the study at any time without any explanation.

The adolescents were asked to fill in a paper version of the questionnaire in their classroom and returned it to teachers in a sealed envelope. It took them about 45 minutes to complete the questionnaire under the supervision of the researchers and their teachers. The study was approved by the Ethical Committee for Medical Research Ethics of Donetsk National Medical University.

Measures

The demographic factors investigated were sex, age, region, parental occupation, and family structure. The sex of the respondent was assessed as boy or girl. The region of residence had 2 categories: Donetsk region and Kirovograd. Parental occupation was categorized into employed and unemployed. The family structure included living with 2 biological parents, 1 parent, reconstituted family, and

FIGURE 1 Flowchart of Recruitment Process in 2 Regions



others. One parent included living with only a biological mother or biological father. The reconstituted family category included adolescents living with a biological mother and foster father or a biological father and foster mother. The war trauma questionnaire was used to assess the adolescents' exposure to war-related events. It was developed by Ukrainian child and adolescent psychiatrists and psychologists who were working with adolescents exposed to war events and were familiar with the types of war experiences. The questionnaire comprised 12 items that reported direct war violence, witnessing attacks by armed forces, property damages or looted, seeking safer places, or spending long hours at military checkpoints. All measures of psychopathology were translated into Ukrainian and Russian language and back-translated.

Posttraumatic Stress Disorder. PTSD was assessed using the Harvard Trauma Questionnaire (HTQ), which has been widely used with traumatized civilians, war veterans, torture victims, and refugees, including adolescents.[21-23] The first 16 items are consistent with the PTSD criteria in *DSM-IV*. These comprise 3 subdomains: reexperiencing traumatic events, avoidance and numbing, and increased arousal. The adolescents were asked to rate the items in relation to how they felt during the last week based on a 4-point Likert scale with the following ratings: 1 = not at all, 2 = a little, 3 = quite a bit, and 4 = extremely. According to the instructions of the HTQ manual, the item scores were added and divided by the total number of answered items, and individuals with scores of $\geq$2.5 were considered symptomatic of PTSD.

Anxiety. Anxiety symptoms were assessed using the Generalized Anxiety Disorder-7 (GAD-7) self-report instrument. This screening tool is based on the diagnostic criteria for generalized disorder anxiety in *DSM-IV* and has been used

with adults and adolescents.[24,25] The 7 items used a 4-point Likert scale to measure how often the adolescents felt anxious in the last 2 weeks. The 4 options were as follows: 0 = not at all, 1 = several days, 2 = half of the days, and 3 = nearly every day. The total score ranged from 0 to 21, with 0-4 indicating minimal anxiety, 5-9 mild anxiety, 10-14 moderate anxiety, and 15-21 severe anxiety.

Depression. Depression symptoms were assessed using the 9-item Patient Health Questionnaire (PHQ-9), a self-administered tool that has been used with adults and adolescents and measures the severity of depression, based on *DSM-IV* criteria over the last 2 weeks.[26-28] The questionnaire uses a 4-point Likert scale to measure how frequently symptoms are experienced. The 4 options were as follows: 0 = not at all, 1 = several days, 2 = than half of the days, and 3 = nearly every day. The total score ranged from 0 to 27, with 0-4 indicating no or minimal depression, 5-9 mild depression, 10-14 moderate depression, 15-19 moderately severe depression, and 20-27 severe depression.

Statistical Analysis

The distribution of the subpopulations, namely, sex, age, mother's occupation, father's occupation, and family structure, was explored in the war and nonwar regions. A binary logistic regression model was used to examine the significant differences in demographic characteristics and war experiences between regions. The cutoff score of $\geq$2.5 was used to categorize adolescents with PTSD.[21] Scores indicating mild and moderate anxiety in the GAD-7 were merged to create 3 categories: none (0-24), mild/moderate (5-9), and severe (15-21).[24] For depression, measured by the PHQ-9, mild and moderate depression were merged, and moderately severe and severe depression were merged. This created 3 categories: none (0-4), mild/moderate depression (5-14), and moderately severe/severe depression (15-27).[27] Binary and multinomial logistic regression models were used to examine the associations between regions and PTSD, anxiety, and depression. Relevant a priori factors were included in the analysis based on previous studies. The risk factors that were significantly associated with the risks of PTSD, anxiety, or depression in the univariate analysis were used to build multivariable logistic regression models. Odds ratio (OR) was used to estimate the strength of the associations, and 95% CI was calculated. Independent factors with a statistical significance of $p < .05$ were included in the multivariable logistic regression models. All statistical analyses were performed using IBM SPSS Version 27.0 statistical software (IBM Corp.).

RESULTS

The total sample comprised 2,766 participants aged 11-17 years of age: 1,463 from the Donetsk region, 770 (52.6%) girls, with mean (SD) age of 13.0 (1.3) years, and 1,303 from Kirovograd, 643 (49.4%) girls, with mean (SD) age of 12.9 (1.3) years (Table 1). There were no significant differences between adolescents living in the 2 regions by sex, age, mother's occupation, and family structure. The difference in father's occupation was significant: 242 (16.6%) of the fathers in the Donetsk region were unemployed compared with 65 (4.9%) in Kirovograd ($p < .001$).

Table 2 presents the adolescents' exposure to the war in the 2 selected regions. All adolescents had experienced at least 1 war-related event (mean [SD] events = 3 [3.4]). Adolescents in the Donetsk region experienced a higher number of war-related events than adolescents in Kirovograd. In the Donetsk region, 204 (13.9%) had been victims of violence compared with 6 (0.5%) in Kirovograd; they had been kidnapped, arrested, imprisoned, tortured or used as a human shield. Just under a third, 442 (30.3%), of the adolescents in the Donetsk region had witnessed civilians being killed, injured, or intimidated compared with 2 (0.2%) in Kirovograd. The majority, 881 (60.2%), of adolescents in the Donetsk region had witnessed attacks by armed forces, heavy weapons, artillery fire, or explosions

TABLE 1 Sociodemographic Characteristics of Adolescents in War and Nonwar Regions

Characteristics	Donetsk region (war) (n = 1,463)		Kirovograd (nonwar) (n = 1,303)		
	Mean	(SD)	Mean	(SD)	p[a]
Age, y	13.0	(1.3)	12.9	(1.3)	.610
	n	(%)	n	(%)	
Sex					.085
Girls	770	(52.6)	643	(49.4)	
Boys	693	(47.4)	660	(50.7)	
Mother's occupation					.978
Employed	1,139	(77.9)	1,015	(77.9)	
Unemployed	324	(22.2)	288	(22.1)	
Father's occupation[b]					< .001
Employed	1,218	(83.4)	1,237	(95.0)	
Unemployed	242	(16.6)	65	(4.9)	
Family structure					.316
Biological parents	916	(62.6)	824	(63.2)	
One parent	272	(18.6)	227	(17.4)	
Reconstituted family	227	(15.5)	193	(14.8)	
Others	48	(3.3)	59	(4.5)	

[a]*Binary logistic regression model.*
[b]*Missing 4.*

TABLE 2 War Experiences of Adolescents in War and Nonwar Regions

War experiences	Donetsk region (war) (n = 1,463) n	(%)	Kirovograd (nonwar) (n = 1,303) n	(%)	OR	(95% CI)[a]	p[b]
Direct violence							
Victim of violence (kidnapped, arrested, imprisoned, tortured) or used as human shield	204	(13.9)	6	(0.5)	34.47	(15.39-78.63)	< .001
Threatened by armed forces or military events[c]	404	(27.6)	11	(0.8)	44.94	(24.55-82.25)	< .001
Witnessed homes destroyed, broken windows[d]	544	(37.2)	14	(1.1)	55.29	(32.29-94.68)	< .001
Witnessed civilians killed, injured, or intimidated[e]	442	(30.3)	2	(0.2)	283.11	(70.43-1138.91)	< .001
Witnessed attacks by armed forces, heavy weapons, artillery fire, or explosions	881	(60.2)	7	(0.5)	290.62	(137.12-615.98)	< .001
Property/home looted, confiscated, destroyed, or lacked shelter	109	(7.5)	7	(0.5)	15.04	(6.97-32.42)	< .001
Nonviolent impact							
Forced to leave hometown	409	(27.9)	17	(1.3)	29.26	(17.89-47.85)	< .001
Lost social support networks	387	(26.5)	19	(1.5)	24.22	(15.17-38.68)	< .001
Forced separation from parents or family members[f]	178	(12.2)	10	(0.8)	17.82	(9.38-33.85)	< .001
Difficulties adapting to new location	340	(23.2)	181	(13.9)	1.88	(1.54-2.29)	< .001
Seeking safer places/hiding in basements/ and/or air raid shelters	390	(26.7)	5	(0.3)	94.53	(38.97-229.29)	< .001
Frequent or long hours spent at military checkpoints[g]	487	(33.3)	54	(4.1)	11.53	(8.59-15.47)	< .001

Note: *CI = confidence interval; OR = odds ratio.*
[a]*Adjusted by sex and age.*
[b]*Binary logistic regression model (reference: Kirovograd).*
[c]*Missing 1 (Donetsk region).*
[d]*Missing 2 (Donetsk region).*
[e]*Missing 3 (Donetsk region).*
[f]*Missing 1 (Donetsk region).*
[g]*Missing 2 (Donetsk region).*

compared with 7 (0.5%) in Kirovograd. In the Donetsk region, 409 (28.0%) adolescents had been forced to leave compared with 17 (1.3%) who had been forced to leave Kirovograd.

Table 3 shows the point prevalence of the risks of PTSD, anxiety, and depression in adolescents living in the 2 regions together with their associations. The point prevalence of PTSD was 77 (5.3%) in the Donetsk region and 16 (1.2%) in Kirovograd. Mild/moderate anxiety was experienced by 423 (28.9%) vs 302 (23.2%) adolescents, and severe anxiety was experienced by 64 (4.4%) vs 19 (1.5%) adolescents. Mild/moderate depression was experienced by 412 (28.2%) vs 328 (25.2%) adolescents, and moderately severe/severe was experienced depression by 109 (7.5%) vs 38 (2.9%). The correlation between PTSD and depression was 0.69 in the Donetsk region and 0.26 in Kirovograd, the correlation between PTSD and anxiety was 0.58 and 0.25, respectively, and the correlation between depression and anxiety was 0.73 and 0.49, respectively. The p value was $p < .001$ for all these correlations.

Stepwise logistic regression was used to examine the associations between the risks of PTSD, anxiety, and depression and regions (Table 3). Adolescents were more than 4 times more likely to have PTSD in the Donetsk region than in Kirovograd (OR 4.11, 95% CI 2.37-7.13), just over 3 times as likely to have severe anxiety (OR 3.10, 95% CI 1.83-5.27), and nearly three times as likely to have moderately severe/severe depression, (OR 2.65, 95%

TABLE 3 Association Between Risk of Posttraumatic Stress Disorder, Anxiety, and Depression in Adolescents in War and Nonwar Regions

	Donetsk region (war) (n = 1,463)		Kirovograd (nonwar) (n = 1,303)		Univariate analysis			Multivariate analysis		
	n	(%)	n	(%)	OR	(95% CI)	P	OR	(95% CI)	P
Harvard Trauma Questionnaire[a]										
≥2.5	77	(5.3)	16	(1.2)	4.47	(2.59-7.69)	< .001	4.11	(2.37-7.13)[c]	< .001
<2.5	1386	(94.7)	1287	(98.8)		Ref			Ref	
Generalized Anxiety Disorder-7[b]										
None	976	(66.7)	982	(75.4)		Ref			Ref	
Mild/moderate	423	(28.9)	302	(23.2)	1.41	(1.19-1.67)	< .001	1.32	(1.09-1.58)[c]	.003
Severe	64	(4.4)	19	(1.5)	3.39	(2.02-5.69)	< .001	3.10	(1.83-5.27)[c]	< .001
Patient Health Questionnaire-9[b]										
None	942	(64.4)	937	(71.9)		Ref			Ref	
Mild/moderate	412	(28.2)	328	(25.2)	1.25	(1.05-1.48)	.011	1.19	(1.01-1.43)[d]	.050
Moderately severe/severe	109	(7.5)	38	(2.9)	2.85	(1.95-4.17)	< .001	2.65	(1.79-3.92)[d]	< .001

Note: *Kirovograd region as reference. OR = odds ratio.*
[a]*Binary logistic regression model.*
[b]*Multinomial logistic regression model.*
[c]*Adjusted by sex, age, father's occupation, and family structure.*
[d]*Adjusted by sex, age, father's occupation, mother's occupation, and family structure.*

CI 1.79-3.92). These associations did not change when they were adjusted for sex, age, parents' occupation, and family structure. We conducted sensitivity analyses with PTSD, anxiety, and depression as continuous measures, and the findings remained significant (Table S1, available online).

Table 4 shows the associations between war experiences and the risk of PTSD. Direct violent and nonviolent war exposures were associated with an elevated risk of PTSD. Adolescents who were victims of violence were more than 4 times as likely to develop PTSD (OR 4.35, 95% CI 2.67-7.07). The risk of PTSD for adolescents who saw civilians killed, injured, or intimidated was more than 3-fold (OR 3.39, 95% CI 2.12-5.46), and it was nearly 5-fold for adolescents who lost their social support networks (OR 4.78, 95% CI 2.99-7.63). Adolescents were at increased risk for developing anxiety and depression when they were exposed to both direct violent and nonviolent war events Tables S2 and S3, available online).

DISCUSSION

This study presents unique and significant findings on the trauma and mental health issues experienced by adolescents during the early phase of the Russia–Ukraine war. First, adolescents from the war-torn Donetsk region reported higher levels of trauma and elevated risks of PTSD, anxiety, and depression than adolescents in Kirovograd in central Ukraine. Second, adolescents' exposure to both violent and nonviolent war-related events contributed to this risk. These findings are even more crucial now, as the Russia–Ukraine war has affected the whole country, and many more adolescents are at risk of developing mental disorders.

Our findings regarding the extent of war experiences are consistent with previous studies, investigating adolescents living in regions that experienced numerous war-related atrocities.[14,29] Increase in the intensity and frequency of direct conflict has been shown to cause severe trauma and increase the risk of mental disorders.[15] In our study, nonviolent trauma due to war, including forced relocation and loss of social support, also increased the risk for PTSD. This confirms previous research that nonviolent war trauma can influence mental well-being in the same way as direct war violence.[11] Forced relocation exposes adolescents to extra stressors, including the significant loss of close or extended family members, peers, and community; socioeconomic adversity; and adversities and challenges after resettlement.[10,30] Adolescents can be burdened with challenges created by changes in family dynamics, such as caring for younger siblings and psychologically or physically affected caregivers. Strong support systems can provide adolescents with a sense of security, comfort, and the ability to cope with adverse situations.[31] However, fleeing war can fracture extended families when relatives stay behind to

TABLE 4 Association Between War Experiences and Risk of Posttraumatic Stress Disorder in Total Sample

	Total sample (N = 2,766)				
War experiences	**n**	**(%)**	**OR**	**(95% CI)[a]**	***p***
Direct violence					
Victim of violence (kidnapped, arrested, imprisoned, tortured) or used as human shield	210	(7.6)	4.35	(2.67-7.07)	< .001
Threatened by armed forces or military events[b]	416	(15.0)	2.19	(1.38-3.48)	.001
Witnessed homes destroyed, broken windows[c]	558	(20.2)	1.55	(0.97-2.59)	.065
Witnessed civilians killed, injured or intimidated[d]	444	(16.1)	3.39	(2.12-5.46)	< .001
Witnessed attacks by armed forces, heavy weapons, artillery fire, or explosions	888	(32.1)	1.61	(0.96-2.70)	.07
Property/home looted, confiscated or destroyed or lacked shelter	116	(4.2)	2.76	(1.46-5.21)	.002
Nonviolent impact					
Forced to leave hometown	426	(15.4)	2.23	(1.41-3.54)	.001
Lost social support networks	406	(14.7)	4.78	(2.99-7.63)	< .001
Forced separation from parents or family members[e]	188	(6.8)	3.83	(2.32-6.32)	< .001
Difficulties adapting to new location	521	(18.8)	3.42	(2.23-5.24)	< .001
Seeking safer places/hiding in basements and/or air raid shelters	395	(14.3)	1.94	(1.21-3.11)	.006
Frequent or long hours at military checkpoints[f]	541	(19.6)	3.08	(1.95-4.86)	< .001

Note: *OR = odds ratio.*
[a]*Adjusted by sex and age, father's occupation, mother's occupation and region.*
[b]*Missing 1.*
[c]*Missing 1.*
[d]*Missing 1.*
[e]*Missing 1.*
[f]*Missing 2.*

fight and older relatives are physically unable to make dangerous journeys. Lack of support from trusted adults and uncertainty of a stable positive environment exerts cumulative negative effects on the mental health of adolescents.[32]

Adolescents from the war-torn Donetsk region showed significantly elevated prevalence of risk of PTSD, anxiety, and depression. These findings were as anticipated, as adolescents were exposed to violent war events such as shelling, artillery fire, or explosions. They were also injured or witnessed civilians being killed and witnessed property damaged, including their own homes. The point prevalence of the risk of PTSD in our study was consistent with a previous study conducted 22 months after the Al Aqsa Intifada attacks in Israel.[8] That study reported that 695 (7.6%) adolescents aged 12-18 years experienced PTSD. However, much higher risks of PTSD were reported by other studies of children and adolescents. This may partly be because they were exposed to war for a longer period of time than in our study. A review of the risk of PTSD among Palestinian children and adolescents reported that the pooled prevalence of the risk of PTSD was 36%.[33] It was even higher (53%) among adolescents in a school-based study in Damascus, Syria.[34] In both studies, the adolescents were persistently exposed to high levels of conflicts, the loss of family members, and being forced to leave home. In contrast, most of the adolescents in the Donetsk region continued living with their intact families, did not lose family members and did not have to leave their homes. This is important, as maintaining social support with family and friends protects against the development of PTSD.[35] However, a different pattern has emerged during the 2022 Russian invasion, with many families forced to flee their homes.

The increased rates of anxiety and depression in our study were consistent with the literature.[6,11] This was probably because, after more than 2 years of war, adolescents were affected by secondary stressors, such as family separation and loss, property damage, poverty, and school closures, which could have had an additive effect.[36,37]

Interestingly, our study also found elevated rates of anxiety and depression in adolescents living in the region not affected by war, possibly because of their own fears of war in their country, concern for their friends' or relatives' safety, and conflict or media exposure.[38] Media most likely have contributed to the increased risk, as it is very likely that adolescents had access to disturbing coverage of the war. News about war, conflict, and crisis situations has been shown to trigger a sense of sadness and psychological distress in adolescents.[39]

Our study found that being exposed to war experiences increased mental health problems among adolescents in Ukraine in 2016-2017. The importance of our findings has become highly salient in view of the Russian invasion of Ukraine in February 2022 when adolescents all over Ukraine were exposed to high levels of war events. In view of this, we can expect a far higher prevalence of adolescents experiencing psychological distress, and many will have significant PTSD, anxiety, and depression.

The strengths of this study were the large sample size and the comparison of war-related events and mental health problems of adolescents in a war-torn region and a region that was not directly affected by the conflict. The findings of this study add to the literature on war trauma, but several limitations must be considered. First, this cross-sectional study provides a snapshot of the adolescents' psychological adjustment to war in Ukraine and cannot address issues related to prewar status. Second, the study was based on self-report questionnaires, and interviews would have provided more robust information on any diagnoses. Third, the war trauma questionnaire has face validity but has not previously been assessed for reliability and concurrent validity. However, the findings showed that the war trauma questionnaire has predictive validity. Fourth, psychometric properties of these instruments in the Ukrainian population were unavailable, and future studies should address this issue.

This study provides a unique insight into a country that is currently experiencing a full-scale invasion by Russia by presenting data from adolescents living in a Ukrainian region that was first invaded in 2014 and comparing it with an unaffected region. Adolescents in the war-torn Donetsk region experienced higher levels of trauma and PTSD, anxiety, and depression than peers living in central Ukraine. This study clearly shows that exposure to war directly increased the risk of psychological trauma in adolescents. In addition, the impact that war has on families and communities will have a major effect on psychological adjustment, development, and identity of young people. The psychological impact that the current war in Ukraine will have on adolescents cannot be understated. Countries that accept refugees also need to be aware of the need to provide them with timely and effective mental health services.

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