The relationship between multiple exposures to violence and war trauma, and mental health and behavioural problems among Palestinian children and adolescents

Basel El-Khodary* and Muthanna Samara

Department of Psychology, Kingston University London, Penrhyn Road, Kingston upon Thames, KT1 2EE United Kingdom

Dr. Basel El-Khodary
B.El-Khodary@Kingston.ac.uk

Professor Muthanna Samara
M.Samara@Kingston.ac.uk

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Abstract

The current study aims to investigate the effect of cumulative exposure to violence on mental health amongst children and adolescents living in the Gaza Strip. The sample consists of 1,029 children and adolescents aged 11–17 years. Of them, 533 (51.8%) were female and 496 (48.2%) were male. War-traumatic events were measured using the War-Traumatic Events Checklist (W-TECh). Violence was derived from the Multicultural Events Schedule for Adolescents (M.E.S.A.) containing three domains: violence at home, violence in the neighbourhood, and violence at school. Emotional and behavioural problems were measured using the Strengths and Difficulties Questionnaire (SDQ). Posttraumatic Stress Disorder was measured using the Post-Traumatic Stress Disorders Symptoms Scale (PTSDSS). Finally, depression symptoms were measured by the Depression scale. Around two thirds of the children (64.5%, (N = 665) reported that they were exposed to violence at home, 48.2% (N = 497) reported to violence in the neighbourhood, 78.2% (N = 806) reported to violence at school. In addition, boys significantly showed more exposure to violence compared to girls. Moreover, the prevalence of PTSD according to DSM-5 is 53.5% (N = 549). The results also showed that cumulative effect of exposure to violence in more contexts (political war trauma, violence at home, neighbourhood and/or school) predicted higher levels of PTSD, social and emotional problems, and depression, and overall mental health problems amongst children. Furthermore, children who are exposed to violence at the neighbourhood, at home, at school and to war trauma are more likely to have mental health problems. Cumulative exposure to violence may increase the propensity of developing mental health problems such as PTSD, emotional and behavioural problems, and depression symptoms and thus interventions should be targeted to these populations.

Keywords: Violence; Mental Health; Traumatic events; PTSD; Emotional and social problems; Depression; Children

Introduction

Exposure to war-traumatic events may increase the propensity for developing post-traumatic stress disorder (PTSD); the more exposure to war-traumatic events the greater the PTSD symptoms [1, 4]. Research has also found that those who are exposed to violence during their lifetime [22] including violence at home [8, 9, 31, Moretti et al. 2006, Self-Brown 2004], violence at the community [Esterhuyse 2007, 31], and war trauma exposure [8, 9] are more likely to develop mental health problems including PTSD, depression, psychological distress, aggression, externalising (Gvirsman et al. 2014) and internalising (Fowler et al. 2009) symptoms, and severe harmful effects on the development process [42].

Several studies (e.g., Cloitre et al. [11]) show that exposure to multiple traumas in childhood may lead to complex symptoms including PTSD in adulthood. Furthermore, cumulative exposure to violence in more than two contexts (e.g., witnessing violence at home, sexual abuse, parenting stress) lead to higher children's behavioural and emotional problems, and PTSD [14, 16, 20]. The probability of PTSD is higher if children and adolescents are exposed to both war-traumatic events and violence [13]. Kira et al. [26] found that exposure to continuous chronic trauma with community violence, cumulative stress, and secondary trauma is positively associated with PTSD, depression, and anxiety amongst Palestinian children.

Previous literature shows that exposure to violence has an intense effect on children's development as it may cause poor attachment, PTSD or negative emotions [34], and interfere with normal developmental functions (e.g., sense of safety, social relationships, and regulation of emotions) [35]. To better understand the effect of exposure to violence on the developmental processes, Cicchetti and Lynch [10] propose the ecological-transactional model to explain the collective influence of child maltreatment and exposure to community violence on child development. The model consists of levels of ecological contexts related to

the proximity to the individual where they interact with each other shaping the individual's development [30].

Unlike previous studies, the current study, while taking into account demographic and multiple violence exposure at the same time of war trauma, includes a wide range of mental health and behaviour problems. This is the first study investigating the effect of ongoing cumulative exposure to violence at home, in the neighbourhood, at school, and political violence (exposure to war trauma) to two wars (2008 war and 2012 war). Therefore, we examine the role of exposure to violence and war trauma on the PTSD according to DSM-5, emotional and behavioural problems, and depression. Then, we assess the effect of exposure to cumulative violence in the four contexts (violence at home, in the neighbourhood, at school, and exposure to war trauma) on PTSD, depression and SDQ total difficulties. Finally, we examine the relationship between the number of contexts that in which children were exposed to violence and the subsequent combined overall multiple mental health problems combining that combines the three factors: PTSD, depression and SDQ total difficulties.

Methods

Participants and procedures

Palestinian children and adolescents (N = 1,131) aged 11–17 years (M 13.71, SD 1.36), from years 7, 8 and 10 at school, were approached to participate in the study. Of them, 102 students were absent or transferred to other schools at the time of the data collection. As a result, the total number of the sample was 1,029 students; 496 (48.2%) of which were male and 533 (51.8%) were female. The participants were chosen according to place of residence, from the whole of the Gaza Strip (five areas: Rafah, Khan Younis, Middle Area, Gaza, or North Gaza), type of school [two types: primary (year 7 and year 8) or secondary (year 10)], and gender (male or female) using stratified random sampling. From each place of residence,

two types of schools (primary: two classes and secondary: one class) were randomly chosen; then from these schools one boys' school and one girls' school were randomly chosen. As a result, 10 classes from each year (7, 8 and 10) were selected on the basis of 5 boys' classes and 5 girls' classes. The total number of classes was 30 (5 places of residence; 3 grades: year 7, 8 and 10; and 2 genders: male and female).

Thirty social workers and school counsellors were fully trained and performed the study in the classes of the children. They read and explained the general instructions for each questionnaire and answered all clarifications from the children who filled the questionnaires. The data were collected 1 month after the war on the Gaza Strip, which occurred from 14th to 26th November 2012.

Children were given information sheets about the study and a parental consent form to give to their parents. Ethical approval was gained from the Ministry of Education in the Gaza Strip and from the ethical committee of Kingston University London.

Study instruments

Interviews with children and adolescents were conducted in schools in two 40-min separate sessions.

Demographic variables include age (11–17 years), gender (male, female), family order (the first, the middle, the last), family size, type of residence (city, refugee camp, village), parents' education, parents' jobs status (employed, unemployed), citizenship status (refugee, non-refugee), whether parents are alive or dead and family income [less than US$600 vs. US $600 and more: the poverty line in Palestine for a household (Palestinian Central Bureau of Statistics, 20154)].

War-Traumatic Events Checklist (W-TECh). The W-TECh was constructed by the two authors (El-Khodary and Samara 20192013). Some of the items were adapted from previous

studies [19, 40]. However, the items were modified to adapt to the last traumatic war events that took place in the Gaza Strip. The W-TECh consists of 28 items (yes and no answer options) and is divided into three categories: (1) experiencing personal trauma, in which children or adolescents are the target of war-related traumas such as being shot or injured with live ammunition; (2) witnessing human trauma, in which children or adolescents witness others (e.g., family member, friend, or neighbour) being shot and/or injured during the war; and (3) seeing demolition of property, in which children or adolescents observe the demolition of their home, school, and/or farm during the war. The participants responded by "yes" = 1 or "no" = 0. The Cronbach's Alpha-reliability for this scale is 0.795. Higher score indicates higher war traumas.

Violence at home, in the neighbourhood and at school. This tool consists of five items derived from the Multicultural Events Schedule for Adolescents (M.E.S.A.) (threatened by violence; experienced physical violence; theft of personal possessions; have you ever been emotionally abused or neglected, for example, being frequently shamed, ignored, or repeatedly told that you are "no good"; other exposure to violence) [5]. For each item, the participants were asked whether they have experienced any of the above at home, in their neighbourhood, at school, or in more than one setting. Each scale consisted of five items (violence at home alpha = 0.564; violence at school alpha = 0.510; violence at the neighbourhood alpha = 0.550). The reliability is not adequate, however, this set of questions represents an inventory checklist and not a construct (Sandler and Guenther 1985).

Post-traumatic Stress Disorders Symptoms Scale (PTSDSS). This tool is adapted from Altawil, Harold and Samara [4] and was modified to be compatible with the diagnostic criteria of PTSD according to DSM-5 (El Khodary and Samara 2019 2013). The scale consists of 50 items including intrusion symptoms, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity. Children and adolescents rate

their experiences on a 5-points Likert scale (very often, often, moderately, rarely and never). Functional impairment includes items related to somatic symptoms (e.g., I get tired easily), cognitive symptoms (e.g., I cannot stop thinking about the traumatic event that I was exposed to), emotional symptoms (e.g., I get tense and nervous easily without good reason), social symptoms (e.g., I like to break the rules of my family or school), and academic dysfunctional symptoms (e.g., I cannot concentrate on my study). Participants are considered to have PTSD when they: (a) are exposed to at least one traumatic experience (b) score moderately to very often on symptoms of at least one intrusion symptom, at least one avoidance symptom, at least two negative alterations in cognitions and mood symptoms, and at least two symptoms related to alterations in arousal and reactivity; (c) show significant alteration in functional impairment; and (d) the duration of symptoms is more than 1 month. Children and adolescents rate their experiences on a 5-points Likert scale (very often, often, moderately, rarely and never). The Cronbach's Alpha reliability for this scale in this study is very high (0.959). The participant will either have PTSD according to DSM-5 or not. The items of PTSD are also added up together to construct total PTSD symptoms.

Strengths and Difficulties Questionnaire (Arabic version) [17]. This questionnaire consists of 25 items (https://www.sdqinfo.org). SDQ has been widely used in the Palestinian sample and has high internal consistency [39, 49]. In this study we use total difficulties to investigate emotional and behavioural problems. The children and adolescents complete the questionnaire by ticking the box that reflected their responses on a 3-point Likert-type scale: certainly true = 2, somewhat true = 1 and not true = 0. The total difficulties scale consists of 20 items ($\alpha = 0.744$). Higher score indicates higher total difficulties. In addition, we have categorised the total difficulties scale into normal (scores < 80th percentile) versus borderline-clinical (scores ≥ 80th percentile) based on the cumulative frequency of the current sample.

The Child Depression Inventory (CDI) [28]. is a self-report inventory that includes ten items with three sentences each. The item "feeling of sadness", for example, is represented by the three sentences: I am sad once in a while, I am sad many times, and I am sad all the time. The participants respond by choosing one of the three sentences. The Cronbach's alpha reliability is 0.801. Higher score indicates higher depression. In addition, we have categorised the depression scale into normal (scores < 80th percentile) versus borderline-clinical (scores ≥ 80th percentile) based on the cumulative frequency of the current sample.

Statistical analysis

To investigate the differences amongst variables, we use T test and one-way ANOVA. Chi square test is used to investigate the differences between violence categories and PTSD according to DSM-5.

We also conducted a four-level logistic regression analyses to investigate which variables predicted higher scores on the SDQ total difficulties, depression and PTSD. This is used to examine how exposure to war-traumatic events and exposure to violence (at home, in the neighbourhood, or at school) predict mental health and behavioural problems. Scores on the SDQ and depression were re-coded and split according to the current sample for the borderline and clinical range (≥ 80th percentile) versus normal range (< 80th percentile) as the dependent variables. Using the 80th percentile as a cutoff point for the borderline and clinical range is standard practice and has been demonstrated as having concordance with DSM-IV diagnosis (He et al. 2013). Furthermore, we constructed an overall mental health variable that includes the categorical variables (PTSD according to DSM-5, depression and total difficulties according to the cutoff point ≥ 80th percentile). This variable indicates whether any participant have none, one, two or three of the above mental health problems. In the logistic regression analysis, the dependent variable would be mental health problems

(PTSD according to DSM-5 classification, borderline-clinical total difficulties, borderline-clinical depression, or multiple overall mental health problems). The independent variable will include demographic variables and exposure to violence. First, univariate analysis for each single variable (demographic and violence) in relation to the outcomes will be performed. Second, step 1, will include demographic variables and violence at home. Step 2 will include violence in the neighbourhood in addition to step 1 variables. In step 3, violence at school will be also added. Finally, in step 4 war trauma will be added to the full model. Odds ratio [95% confidence interval (CI)] will be reported along with Cox and Snell R^2 and Nagelkerke R^2 to indicate how much variance is explained by each model.

Considering the nature of the students' data reported nested within schools, hierarchical linear modelling (HLM) will be also conducted to determine the role of school on the outcomes. First, mental health problems (PTSD, depression, SDQ total difficulties and multiple mental health problems) will be considered as outcomes. School will be added as a random factor first (model 1) then the other predictors (demographic and exposure to traumatic events and violence) will be added as fixed model in addition to school (model 2). ICC is also calculated for each model. The ICC is the proportion of variance between groups to the total variance (see Heck et al. 2014). ICC equals to: intercept of the school variance divided by the sum of the intercept of the school variance plus residual.

Results

Demographics varibales and socioeconomic status (SES)

The family size ranged from 2 to 18 (M 8.6, SD 2.41); most live in the city (67.2%) with the vast majority of mothers and nearly half of fathers are unemployed, and approximately 96% of their parents were alive (see Table 1).

INSERT TABLE 1 HERE

Prevalence of war-traumatic events, violence, and PTSD

Every child or adolescent had been exposed to at least one war-traumatic event. Approximately 90% (N = 931) witnessed or heard shelling by tanks, artillery, or military planes and 75% (N = 766) witnessed the signs of shelling on the ground. With regard to violence, 64.6% (N = 665) reported that they had been involved in violence at home, 48.3% (N = 497) were involved in violence in the neighbourhood, and 78.3% (N = 806) were involved in violence at school. Furthermore, 53.4% (N = 549) met the diagnostic criteria for PTSD according to DSM-5, 24.1% (N = 246) are in the borderline-clinical range for depression and 24.4% (N = 248) are in the borderline-clinical range for total difficulties. In addition, the combined mental health variable shows that 31.3% (N = 322) have no mental health problem, 43.6% (N = 448) have one mental health problem, 17.4% (N = 179) have two mental health problems, and 7.7% (N = 79) have three concurrent mental health problems.

The relationship of Demographic variables and socioeconomic status with violence and mental health problems

Boys reported that they had been involved in higher levels of violence in the neighbourhood [$t(1021) = 11.4$, $p < 0.001$], violence at school [$t(1021) = 2.91$, $p = 0.004$], total violence [$t(1021) = 6.17$, $p < 0.001$], SDQ total difficulties [$t(1015) = 5.19$, $p < 0.001$] and depression symptoms [$t(1019) = 4.52$, $p < 0.001$], compared to girls. In contrast, girls reported higher levels of PTSD symptoms [$t(1025) = 2.60$, $p = 0.009$] than boys.

Participants from low socioeconomic status were also more likely to be exposed to violence at home (unemployed father, low income, non-refugee), violence in the neighbourhood (low income, non-refugee, dead mother or father), violence at school (non-refugee), to have higher PTSD symptoms (low income), higher depression symptoms (unemployed father, dead mother or father, low income) and total difficulties (unemployed father, low income, dead mother, non-refugee). We also found that the non-refugee group were more likely to be

exposed to violence at home, neighbourhood and at school, and have more total difficulties comapred to the refugee group (see Table 2).

INSERT TABLE 2 HERE

Post hoc test (LSD correction) shows that children and adolescents living in cities had significantly more exposure to violence in the neighbourhood than those living in villages ($p = 0.005$) [$F(2, 1018) = 3.96$, $p = 0.01$].

The cumulative effect of violence in four contexts (violence at home, violence at school, violence in the neighbourhood, and political war trauma violence) was also investigated. One-way ANOVA showed that there is a significant cumulative effect of exposure to violence in one hand, and SDQ total difficulties [$F(3, 1013) = 15.09$, $p < 0.001$], PTSD symptoms [$F(3, 1023) = 19.46$, $p < 0.001$] and depression symptoms [$F(3, 1017) = 17.52$, $p < 0.001$] on the other hand.

Post hoc test (LSD correction) shows that children and adolescents who were exposed to violence in four contexts reported more problems (SDQ total difficulties: M 16.54, SD 6.03; depression: M 7.31, SD 3.89) than those exposed to violence in three contexts (SDQ total difficulties: M 14.99, SD 6.13, $p = 0.001$; depression: M 6.40, SD 4.14, $p = 0.002$) who in turn had more problems than those exposed to violence in two contexts (SDQ total difficulties: M 14.38, SD 6.07; depression: M 5.50, SD 3.63) ($p < 0.001$), and one context (SDQ total difficulties: M 12.19; SD 6.05; depression: M 4.53, SD 3.42) ($p < 0.001$). Similarly, post hoc test (LSD correction) shows that children and adolescents who were exposed to violence in four contexts reported more PTSD symptoms (M 51.61, SD 23.34) than those exposed to violence trauma in two contexts (M 41.64, SD 23.83) ($p < 0.001$), and one context (M 34.92, SD 22.30) ($p < 0.001$). Likewise, those who were exposed to violence in three contexts reported more PTSD symptoms (M 49.71, SD 22.82) than those exposed to violence in two contexts and one context ($p < 0.001$). Additionally, those who were exposed

to violence in two contexts reported more PTSD symptoms than those exposed to violence in one context ($p = 0.01$).

Exposure to Violence and war trauma and PTSD according to DSM-5

The results show that there is a significant difference in PTSD according to DSM-5 in relation related to children's exposure to war trauma exposure ($X^2(3, N = 1027) = 35.86$, $p < 0.001$), violence at home ($X^2(1, N = 1022) = 18.38$, $p < 0.001$), violence in the neighbourhood ($X^2(1, N = 1022) = 13.37$, $p < 0.001$), and violence at school ($X^2(1, N = 1022) = 13.71$, $p < 0.001$). Children and adolescents who had been exposed to war trauma (N = 1029, 100%), violence at home (N = 665, 64.5%), violence in the neighbourhood (N = 497, 48.2%), and violence at school (N = 806, 78.2%) met the diagnostic criteria for PTSD according to DSM-5 more than those who had not been exposed to violence. Cumulative violence exposure in four contexts (N = 200, 61.9%) or three contexts (N = 225, 56.8%) met the diagnostic criteria of PTSD more than those exposed to violence in two contexts (N = 88, 44%) and in one context (N = 36, 33.3%) ($p < 0.001$).

The prediction of mental health problems from exposure to violence and war trauma

Logistic regression analyses were performed to examine the association between exposure to violence in one hand, and PTSD according to DSM-5, SDQ total difficulties in the borderline-clinical range, depression in the borderline-clinical range and overall mental health and behavioural problems on the other hand. The final step of the logistic regression analyses for all these outcomes were significant (step 4). Only the results for step 4 are discussed while step 1–3 are presented in the tables.

PTSD according to DSM-5. The results at step 4 show that females, children of older age, city residents, exposure to violence at home, violence in the neighbourhood, and exposure to war trauma significantly predicted PTSD according to DSM-5 (see Table 3).

INSERT TABLE 3 HERE

SDQ total difficulties in the borderline-clinical range. The results at step 4 show that males, employed mothers, city residents, violence at home, violence in the neighbourhood, and violence at school significantly predicted total difficulties in the borderline-clinical range (see Table 4).

INSERT TABLE 4 HERE

Depression in the borderline-clinical range. The results at step 4 show that low level of mothers' education, dead mothers, city residents, exposure to violence at home, violence in the neighbourhood, violence at school, and exposure to war trauma significantly predicted depression in the borderline-clinical range (see Table 5).

INSERT TABLE 5 HERE

Overall mental health and behavioural problem

One mental health problem versus none. The results at step 4 show that older children, city residents, exposure to violence at home, violence in the neighbourhood, violence at school, and exposure to war trauma significantly predicted one mental health problem in comparison to none (see Supplementary Table 1).

Two mental health problems versus none. The results at step 4 show that city residents, exposure to violence at home, violence in the neighbourhood, violence at school, and exposure to war trauma significantly predicted two mental health problems in comparison to none (see Supplementary Table 2).

Three mental health problems versus none. The results at step 4 show that older children, low family income, dead mothers, city residents, exposure to violence at home, violence in the neighbourhood, violence at school, and exposure to war trauma significantly predicted overall multiple mental health problem compared to none (see Table 6).

INSERT TABLE 6 HERE

Hierarchical linear modelling (HLM): School differences in relation to exposure to violence and mental health problems. We collected the data within a nested structure (i.e., students within schools). Hence, we decided to conduct hierarchical linear modelling to isolate any effects for school in our data (see Supplementary Table 3). We used HLM to generate a random-intercept model first and with subsequent fixed predictors. A model containing only school and the outcome measures for PTSD according to DSM-5 (yes vs. no), depression in the borderline-clinical range vs. normal, SDQ total difficulties in the borderline-clinical range vs. normal, and overall multiple mental health and behavioural problems were generated to determine if school was significant. A second model was built with all the previous predictors (demographics, socioeconomic status, and exposure to violence at home, neighbourhood, and school, and war trauma). Results for the first model indicate that school was a significant predictor for PTSD according to DSM-5, depression in the borderline-clinical range, total difficulties in the borderline-clinical range, and overall multiple mental health and behavioural problems (all $p < 0.001$). The second model indicates that school is not significant except for overall multiple mental health and behavioural problems ($p = 0.02$). The second model for PTSD according to DSM-5 was significant for older age ($p = 0.03$), being female ($p = 0.04$), exposure to violence at home ($p = 0.01$), exposure to violence in the neighbourhood ($p = 0.001$), and exposure to war trauma ($p < 0.001$). The second model for borderline-clinical depression was significant for low level of mothers' education ($p = 0.02$), dead mothers ($p = 0.02$), exposure to violence at home ($p < 0.001$), exposure to violence in the neighbourhood ($p = 0.001$), and exposure to violence at school ($p = 0.002$). The second model for borderline-clinical SDQ total difficulties was significant for city residents ($p = 0.02$), exposure to violence at home ($p = 0.009$), exposure to violence in the neighbourhood ($p = 0.01$), and exposure to violence at school ($p = 0.01$). Finally, the second model for overall multiple mental health and behavioural problems was significant for

school ($p = 0.02$), older age ($p = 0.004$), low level of fathers' education ($p = 0.04$), dead mothers ($p = 0.03$), city residents ($p = 0.01$), exposure to violence at home ($p < 0.001$), exposure to violence in the neighbourhood ($p < 0.001$), exposure to violence at school ($p < 0.001$), and exposure to war trauma ($p < 0.001$). ICC was reported for each model to indicate the proportion of variance between groups to the total variance (see Supplementary Table 3).

Discussion

The current study aims to investigate the cumulative effects of exposure to war-traumatic events and violence on children and adolescents in the Gaza Strip. Children in the Gaza Strip are continuously exposed to war-traumatic events that often lead to severe mental health problems as well as impairment in many areas of functioning [50]. They are also exposed to violence in multiple sittings and contexts including their homes, neighbourhoods, and schools [14]. This cumulative exposure to violence may aggravate the effect of trauma on children and adolescents' mental health, particularly given the shortage of counselling and professional support. Previous studies did not include a wide range of mental health and behaviour problems as we did in our study while taking into account the multiple exposure to violence in different contexts. Finally, the study confirmed the effect of exposure to violence on the relationship between exposure to war trauma and mental health and behavioural problems.

The results show that every child or adolescent had been exposed to at least one war-traumatic event. This could be because the last two wars (2008 war and 2012 war) were massive and targeted all areas in the Gaza Strip. Approximately, two-thirds of the participants had been exposed to violence at home, around 50% had been exposed to violence in the

neighbourhood, and 78.2% had been exposed to violence at school. In other words, the majority of participants had been exposed to multiple contexts of violence.

In-line with previous studies [14, 23, 25, 44], boys reported more exposure to war-traumatic events and exposure to violence than girls. In the Palestinian culture, boys have greater freedom to participate in outdoor activities making them more likely to be exposed to traumatic events and violence compared to girls.

Economic hardship is considered one of the most important ecological variables related to negative responses to trauma and PTSD. Hence, the effect of exposure to traumatic events in developing counties is of considerable concern due to the vulnerability to the adverse ramifications of poverty and lack of resources [15]. Consistent with previous studies [2, 12, 18], parents who suffer from high levels of economic stress are not able to fulfil the basic needs of the family; consequently, they become less nurturing and more aggressive towards their children who become more vulnerable to violence at home. This in turn could increases the likelihood of PTSD [41, 46].

The results are in-line with previous studies [8, 9, 46, Cooley-Quille et al. 2001, Esterhuyse 2007, Gvirsman et al. 2014] that indicate that exposure to violence in different contexts are independently related to mental health and behavioural problems. Furthermore, similar to previous studies [14, 20, 37, 46] we found that the cumulative effects of exposure to war-traumatic events and violence increased the severity of mental health and behavioural problems. However, our study included all levels of specific violence exposure in multiple contexts and how these in turn affect the child's wellbeing in line with the ecological-transactional model [10, 30].

The results of the regression analysis shows that exposure to war trauma, violence at home, violence at school, and/or violence in the neighbourhood significantly predict mental health problems, namely PTSD, depression symptoms, and total difficulties [23, 33, 43]. Continuous

exposure to war trauma and violence is found to be a risk factor that can increase the propensity for PTSD and other mental health and behavioural problems [24, Johnson and Thompson 2008, Canetti et al. 2010]. However, in our study, we found that violence at school was not a significant predictor for PTSD when adjusting for demographic and violence in other contexts (home, neighbourhood and war trauma). On the other hand, war trauma was not a significant predictor for total difficulties, while all violence contexts were significant predictors for depression and multiple mental health and behavioural problems. This indicate that each mental and behavioural problem has specific context and mechanism. These were also mostly confirmed by HLM analysis when taking into account schools' differences.

We also found that children of older age, low fathers' education level, and unemployed mothers are more likely to have PTSD symptoms after exposure to war trauma and violence. Previous research into the Palestinian culture shows that older children are more exposed to war-traumatic events [32, 48]. Hence, they are more liable to develop PTSD symptoms, especially if it is combined with other sorts of violence. Although females are less exposed to war trauma and violence than boys [13, 23], they are more vulnerable to develop and show more PTSD symptoms [27, 38]. Furthermore, low socio-economic status is found to be a risk factor which aggravates the propensity for developing PTSD [26, 27, 41, 46].

Consistent with previous research [41], the relationship between exposure to violence and exposure to war trauma, and mental health problems is stronger for depression symptoms and emotional and behavioural problems than for PTSD.

These results were mostly supported by HLM analysis, which also found that various demographic variables and exposure to violence in various sittings predicted negative behavioural and mental health outcomes. Moreover, these results found that these negative effects were not accounted for by the participating schools except for multiple mental health and behavioural problems.

To conclude, children and adolescents in the Gaza Strip are exposed to ongoing trauma and violence in multiple contexts, which aggravates the effects of exposure and lead to higher mental health and behavioural problems. This nictitates necessitates the need for counselling programmes that can help these families and their children [41, 46]. These interventions should take into account different factors that occur in different contexts.

Limitations and strengths of the study

This study has some limitations. First, the data were collected 1 year after the war-traumatic events occurred, and as a result, the participants might forget some information regarding the war-traumatic events. However, previous studies proved that the effects of traumatic events can have prolonged effects on mental health problems including PTSD [29]. Second, the data were collected from one source (children and adolescents), therefore, future studies could include data from other sources such as parents and teachers. Third, reports on some of the data may not be reliable especially in relation to parental income. However, the rate of unemployed fathers (45.5%) and mothers (93%) are high compared to other societies. In addition, adolescents in the Gaza Strip society are usually aware of the economic situation of the family. Fourth, the variance of the regression models was relatively low and thus there could be other variables that can explain these mental and behavioural problems in addition to the ones we have included in the study.

Despite the limitations, the study highlights the importance of ecological factors which affect children and adolescents' mental health, looking at the individual characteristics (gender, age, behaviour), the closest and proximal environment to the child (home and school violence, and socioeconomic factors) and the distal environment (neighbourhood and political violence) and how these affect the child's wellbeing (mental health and behavioural factors) [6, 7). The current study shows that the cumulative effect of exposure to war trauma and violence in

different context aggravate the severity of PTSD and other mental health and behavioural problems. This is the first study that has been done after the 2012 war using DSM-5 diagnostic criteria for PTSD. The study looked at the factors that affect the relationship between exposure to violence and mental health and behavioural problems and revealed that some factors can help to mitigate the mental health consequences including PTSD according to DSM-5, depression and total difficulties. It also looked at the effect of these factors on multiple mental health problems, indicating the cumulative effect of exposure to violence in different context to cumulative mental health and behavioural problems.

Thus, policy makers, practitioners and clinicians should take these factors into account when designing suitable prevention and intervention programs. Focused attention should be given to providing psychosocial support within a multi-layered system such as basic services and security, family and community support, focus non-specialised support, and specialised services [21]. Including families and teachers in the intervention activities may contribute positively on children's mental health status [51].

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Table1

The frequencies of demographic variables and socioeconomic status

	N	%
Age		
12 or less	184	17.9
13-14	485	47.1
15 or more	344	33.4
Gender		
Male	496	48.2
Female	533	51.8
Family member No.		
Less than 5	31	3.0
5-8	446	43.3
More than 8	476	46.2
Family order		
The first	199	19.3
The middle	664	64.5
The last	160	15.5
Type of residence		
City	692	67.2
Refugee camp	132	12.8
Village	203	19.7
Father education		
None	190	18.4
School education	543	52.7
Higher education	280	27.2
Father job		
Unemployed	469	45.5
Employed	548	53.2
Father		
Alive	989	96.0
Dead	37	3.6
Mother education		
None	176	17.1
School education	624	60.6
Higher education	219	21.3
Mother job		
Unemployed	948	92.0
Employed	73	7.1
Mother		
Alive	998	96.9
Dead	25	2.4
Family income		
Less than $600	770	74.8
$600 and more	217	21.1
Citizenship		
Refugee	335	32.5
Not refugee	690	67.0

Table 2

Means and standard deviations of demographic variables and socioeconomic status with exposure to violence and war trauma, and mental health problems

	Gender		Fathers		Fathers		Mothers		Income		Citizenship status	
	Boys	Girls	Alive	Dead	Employed	Unemployed	Alive	Dead	Low	High	Refugee	Non-refugee
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Violence at home	1.29 (1.30)	1.42 (1.33)	1.36 (1.33)	1.36 (0.99)	1.26 (1.27)	1.47 (1.36)**	1.35 (1.32)	1.56 (1.22)	1.41 (1.33)	1.23 (1.31)	1.20 (1.26)	1.42 (1.33)*
Violence in neighbourhood	1.22 (1.16)***	0.49 (0.87)	0.82 (1.06)	1.58 (1.36)***	0.78 (1.06)	0.91 (1.10)	0.83 (1.08)	1.63 (1.07)*	0.89 (1.10)**	0.66 (1.00)	0.73 (1.07)	0.90 (1.08)*
Violence at school	1.92 (1.46)**	1.67 (1.31)	1.78 (1.39)	2.08 (1.40)	1.75 (1.39)	1.84 (1.39)	1.79 (1.38)	1.80 (1.73)	1.80 (1.37)	1.77 (1.45)	1.61 (1.33)	1.88 (1.41)**
Total violence	4.45 (2.11)***	3.59 (2.29)	3.96 (2.25)	5.02 (1.87)**	3.80 (2.31)	4.23 (2.16)**	3.98 (2.25)	4.72 (2.30)	4.10 (2.21)**	3.67 (2.37)	3.55 (2.37)	4.22 (2.15)***
SDQ total difficulties	16.11 (6.21)***	14.11 (6.05)	15.01 (6.22)	16.25 (5.70)	14.54 (6.23)	15.63 (6.14)**	14.98 (6.21)	17.88 (5.73)*	15.40 (6.11)***	13.48 (6.30)	14.76 (6.05)	15.21 (6.27)
PTSD	45.18 (24.07)	49.03 (23.31)**	47.00 (23.62)	51.69 (26.87)	46.47 (23.42)	47.88 (24.14)	47.20 (33.71)	46.04 (26.04)	48.75 (23.90)**	42.46 (22.86)	47.42 (24.61)	47.03 (23.32)
Depression symptoms	6.90 (3.77)***	5.78 (4.11)	6.23 (3.96)	8.27 (4.28)**	5.90 (4.03)	6.73 (3.88)**	6.25 (3.97)	8.28 (3.96)*	6.56 (3.89)***	5.13 (4.08)	6.32 (4.07)	6.32 (3.95)

*** $p < .001$, ** $p < .01$, * $p < .05$

Table 3

Logistic regression: Prediction of PTSD Diagnosis according to DSM-5 from exposure to violence and war traumatic events while adjusting for demographic and SES variables

Predictors	Univariate†	Step 1+	Step 2#	Step 3‡	Step 4§
	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]
Demographic variables					
Age (older)	1.08 [0.99, 1.18]	1.21 [1.07, 1.38]**	1.21 [1.06, 1.37]**	1.21 [1.07,1.38]**	1.17 [1.02, 1.33]*
Gender (Female)	1.08 [0.84, 1.38]	1.14 [0.85, 1.54]	1.39 [1.01, 1.91]*	1.41 [1.03, 1.95]*	1.68 [1.20, 2.35]**
Family income	0.83 [0.61, 1.13]	0.87 [0.58, 1.30]	0.94 [0.63, 1.40]	0.93 [0.62, 1.40]	1.01 [0.67, 1.54]
Family size (large)	1.27 [0.89, 1.81]	1.14 [0.77, 1.69]	1.19 [0.80, 1.77]	1.18 [0.79, 1.75]	1.11 [0.74, 1.66]
Father education (low)	0.78 [0.64,0.95] *	0.76 [0.59, .99]*	0.78 [0.60, 1.01]	0.79 [0.60, 1.02]	0.80 [0.61, 1.04]
Mother education (low)	0.91 [0.74, 1.12]	0.93 [0.70, 1.23]	0.96 [0.72, 1.27]	0.96 [0.72, 1.27]	0.98 [0.73, 1.31]
Father's job	0.91 [0.71, 1.16]	1.24 [0.91, 1.70]	1.26 [0.92, 1.72]	1.26 [0.92, 1.73]	1.25 [0.90, 1.73]
Mother's job (unemployed)	0.58 [0.35, 0.94] *	0.58 [0.29, 1.13]	0.59 [0.30, 1.16]	0.56 [0.28, 1.11]	0.59 [0.29, 1.19]
Father's alive or dead (dead)	2.02 [0.98, 4.16]	1.67 [0.66, 4.26]	1.47 [0.57, 3.79]	1.43 [0.55, 3.69]	1.25 [0.48, 3.28]
Mother's alive or dead(dead)	1.11 [0.50, 2.47]	1.34 [0.49, 3.65]	1.27 [0.47, 3.46]	1.28 [0.47, 3.50]	1.68 [0.58, 4.86]
Type of residence: city vs. others (City)	1.08 [0.83, 1.40]	1.38 [0.94, 2.04]	1.33 [0.90, 1.96]	1.37 [0.92, 2.03]	1.51 [1.01, 2.80]*
Type of residence: refugee camp vs. others (Others)	0.72 [0.50, 1.05]	0.78 [0.47, 1.30]	0.76 [0.45, 1.27]	0.77 [0.46, 1.29]	0.94 [0.55, 1.60]
Type of residence: village vs. others (Village)	1.11 [0.82, 1.52]				
Citizenship: Refugee vs. non-refugee (non-refugees)	1.01 [0.78, 1.32]	1.15 [0.81, 1.63]	1.10 [.77, 1.56]	1.07 [0.75, 1.52]	1.12 [.77, 1.61]
Exposure to traumatic events					
Violence at home	1.15 [1.05, 1.27] **	1.11 [1.003, 1.24]*	1.10 [0.98, 1.23]	1.11 [0.99, 1.24]	1.14 [1.02, 1.28]*
Violence at neighbourhood	1.30 [1.15, 1.47]***		1.32 [1.14, 1.54]***	1.31 [1.12, 1.53]	1.29 [1.10, 1.52]**
Violence at school	1.10 [1.01, 1.20]*			1.10 [0.99, 1.22]	1.10 [.99, 1.23]
War-trauma	1.10 [1.07, 1.14]***				1.11 [1.07, 1.14]***
Cox & Snell R^2		.040	.057	.060	.107
Nagelkerke R^2		.053	.075	.080	.143

*** $p < .001$, ** $p < .01$, * $p < .05$

† Fathers' education level, $\chi^2(1, N = 949) = 5.87$, $p = .01$; unemployed mothers, $\chi^2(1, N = 1020) = 4.88$, $p = .02$, exposure to violence at home, $\chi^2(1, N = 1022) = 9.27$, $p = .002$, in the neighbourhood, $\chi^2(1, N = 1022) = 19.97$, $p < .001$, at school, $\chi^2(1, N = 1022) = 4.84$, $p = .02$; and to war-trauma, $\chi^2(1, N = 1023) = 58.68$, $p < .001$.

+ $\chi^2(14, N = 819) = 33.49$, $p = .002$

$\chi^2(15, N = 819) = 47.63$, $p < .001$

‡ $\chi^2(16, N = 819) = 50.88$, $p < .001$

§ $\chi^2(17, N = 816) = 92.52$, $p < .001$

Table 4

Logistic regression: Prediction of SDQ total difficulties in the borderline-clinical range from exposure to violence and war traumatic events while adjusting for demographic variables and socioeconomic status

Predictors	Univariate †	Step 1+	Step 2#	Step 3‡	Step 4§
	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]
Demographic variables					
Age	0.97 [0.87, 1.07]	1.10 [0.95, 1.27]	1.09 [0.94, 1.26]	1.09 [0.94,1.26]	1.08 [0.93, 1.25]
Gender (Male)	0.48 [0.36, 0.65]***	0.52 [0.37, 0.75]***	0.61 [0.42, 0.89]*	0.62 [0.43, 0.91]*	0.65 [0.45, 0.96]*
Family income (low)	0.53 [0.35, 0.79]**	0.56 [0.33, 0.96]*	0.60 [0.35, 1.03]	0.60 [0.35, 1.02]	0.61 [0.35, 1.05]
Family size (large)	1.37 [0.87, 2.15]	1.37 [0.84, 2.24]	1.42 [0.86, 2.33]	1.38 [0.84, 2.28]	1.35 [0.82, 2.22]
Father education (low)	0.75 [0.60,0.94]*	0.81 [0.59, 1.11]	0.38 [0.60, 1.14]	0.83 [0.61, 1.15]	0.84 [0.61, 1.16]
Mother education	0.88 [0.69, 1.12]	1.08 [0.77, 1.51]	1.10 [0.78, 1.54]	1.10 [0.69, 1.47]	1.07 [0.76, 1.51]
Father's job	0.81 [0.61, 1.08]	0.99 [0.68, 1.44]	0.99 [0.68, 1.45]	1.01 [0.69, 1.47]	1.03 [0.70, 1.51]
Mother's job (employed)	1.19 [0.69, 2.04]	2.12 [1.03, 4.37]*	2.19 [1.06, 4.52]*	2.06 [0.99, 4.28]	2.11 [1.01, 4.40]*
Father's alive or dead	1.38 [0.67, 2.85]	0.76 [0.27, 2.16]	0.66 [0.23, 1.92]	0.64 [0.22, 1.86]	0.60 [0.20, 1.75]
Mother's alive or dead (dead)	1.47 [0.62, 3.45]	1.09 [0.37, 3.18]	1.07 [0.36, 3.11]	1.09 [0.72, 1.67]	1.30 [0.44, 3.85]
Type of residence: city vs. others (City)	1.40 [1.02, 1.93]*	1.65 [1.02, 2.65]*	1.59 [0.98, 2.56]	1.67 [1.03, 2.70]*	1.70 [1.05, 2.76]*
Type of residence: refugee camp vs. others (Others)	0.67 [0.42, 1.07]	0.80 [0.40, 1.57]	0.78 [0.39, 1.53]	0.80 [0.40, 1.58]	0.77 [0.38, 1.55]
Type of residence: village vs. others (Others)	0.81 [0.56, 1.18]				
Citizenship: Refugee vs. non-refugee (non-refugees)	1.31 [0.96, 1.80]	1.18 [0.77, 1.80]	1.13 [0.74, 1.73]	1.09 [0.72, 1.67]	1.11 [0.73, 1.70]
Exposure to traumatic events					
Violence at home	1.16 [1.04, 1.29] **	1.17 [1.03, 1.34]*	1.16 [1.02, 1.33]*	1.20 [1.04, 1.37]**	1.20 [1.04, 1.37]**
Violence at neighbourhood	1.37 [1.20, 1.55]***		1.24 [1.06, 1.45]**	1.22 [1.04, 1.43]*	1.21 [1.03, 1.43]*
Violence at school	1.13 [1.02, 1.25]*			1.16 [1.02, 1.31]*	1.73 [1.03, 1.33]*
War-trauma	1.03 [1.00, 1.07]*				1.02 [0.99, 1.06]
Cox & Snell R^2		.049	.058	.064	.068
Nagelkerke R^2		.075	.088	.098	.105

*** $p < .001$, ** $p < .01$, * $p < .05$

† Gender (female), $\chi^2(1, N = 1017) = 24.06$, $p < .001$, low family income, $\chi^2(1, N = 977) = 10.50$, $p = .002$, low fathers' education level, $\chi^2(1, N = 933) = 6.00$, $p = .01$, city residents, $\chi^2(1, N = 1015) = 4.57$, $p = .03$, exposure to violence at home, $\chi^2(1, N = 1013) = 8.02$, $p = .005$; in the neighbourhood, $\chi^2(1, N = 1013) = 24.03$, $p < .001$, at school, $\chi^2(1, N = 1013) = 5.59$, $p = .01$, and to war-trauma, $\chi^2(1, N = 1013) = 6.28$, $p = .01$.

+ $\chi^2(14, N = 811) = 40.99$, $p < .001$.

$\chi^2(15, N = 811) = 48.12$, $p < .001$

‡ $\chi^2(16, N = 811) = 53.71$, $p < .001$

§ $\chi^2(17, N = 808) = 57.25$, $p < .001$

Table 5

Logistic regression: Prediction of depression in the borderline-clinical range from exposure to violence and war traumatic events while adjusting for demographic variables and socioeconomic status

Predictors	Univariate †	Step 1+	Step 2#	Step 3‡	Step 4§
	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]
Demographic variables					
Age	.030 [0.92, 1.14]	1.04 [0.90, 1.21]	1.03 [0.89, 1.20]	1.04 [0.89,1.20]	1.01 [0.86, 1.17]
Gender (Female)	0.59 [0.44, .79]***	0.68 [0.47, 0.98]*	0.85 [0.58, 1.25]	0.87 [0.59, 1.28]	0.91 [0.61, 1.35]
Family income (low)	0.50 [0.33, 0.75]**	0.64 [0.37, 1.10]	0.70 [0.40, 1.22]	0.69 [0.39, 1.20]	0.72 [0.41, 1.26]
Family size (large)	1.03 [0.67, 1.57]	1.23 [0.75, 2.03]	1.30 [0.78, 2.15]	1.26 [0.76, 2.09]	1.19 [0.71, 1.98]
Father education (low)	0.68 [0.54,0.85]**	0.84 [0.61, 1.15]	0.87 [0.63, 1.19]	0.88 [0.63, 1.21]	0.86 [0.62, 1.19]
Mother education (low)	0.61 [0.48, .78]***	0.66 [0.47, 0.94]*	0.66 [0.46, 0.94]*	0.66 [0.46, 0.95]*	0.68 [0.47, 0.97]*
Father's job	0.71 [0.53, 0.69]*	1.05 [0.72, 1.54]	1.07 [0.72, 1.57]	1.09 [0.73, 1.60]	1.10 [0.74, 1.63]
Mother's job (unemployed)	0.55 [0.28, 1.07]	0.89 [0.37, 2.16]	0.92 [0.38, 2.24]	0.86 [0.35, 2.09]	0.90 [0.36, 2.20]
Father alive or dead	2.34 [1.19, 4.63]*	1.08 [0.41, 2.85]	0.91 [0.34, 2.43]	0.87 [0.33, 2.33]	0.87 [0.32, 2.34]
Mother alive or dead (dead)	3.60 [1.62, 8.01]**	3.02 [1.13, 8.03]*	2.93 [1.09, 7.84]*	3.03 [1.12, 8.14]*	3.11 [1.14, 8.51]*
Type of residence: City vs. others (City)	1.45 [1.05, 1.99]*	1.90 [1.16, 3.13]*	1.83 [1.10, 3.02]*	1.96 [1.18, 3.26]**	1.99 [1.19, 3.33]**
Type of residence: Refugee camp vs. others	0.90 [0.58, 1.40]	1.19 [0.61, 2.31]	1.17 [0.60, 2.27]	1.22 [0.62, 2.40]	1.31 [0.66, 2.60]
Type of residence: Village vs. others (Others)	0.63 [0.42, 0.93]*				
Citizenship: Refugee vs. non-refugee (refugees)	0.94 [0.69, 1.27]	0.79 [0.52, 1.20]	0.75 [0.49, 1.14]	0.72 [0.47, 1.09]	0.73 [0.48, 1.12]
Exposure to traumatic events					
Violence at home	1.13 [1.02, 1.26] *	1.23 [1.08, 1.40]**	1.22 [1.06, 1.39]**	1.26 [1.10, 1.45]**	1.27 [1.10, 1.46]**
Violence at neighbourhood	1.49 [1.31, 1.69]***		1.37 [1.17, 1.61]***	1.34 [1.14, 1.58]***	1.29 [1.10, 1.52]**
Violence at school	1.15 [1.04, 1.27]**			1.20 [1.05, 1.37]**	1.20 [1.05, 1.37]**
War-trauma	1.05 [1.02, 1.09]***				1.05 [1.01, 1.10]**
Cox & Snell R^2		.061	.078	.087	.093
Nagelkerke R^2		.095	.121	.135	.143

*** $p < .001$, ** $p < .01$, * $p < .05$

† Gender (female), $\chi^2(1, N = 1021) = 12.56$, $p < .001$, low family income, $\chi^2(1, N = 981) = 12.51$, $p = .001$, low fathers' education level, $\chi^2(1, N = 943) = 10.66$, $p = .001$, low mothers' education level, $\chi^2(1, N = 984) = 15.42$, $p < .001$, unemployed fathers, $\chi^2(1, N = 1010) = 4.92$, $p = .02$, dead fathers, $\chi^2(1, N = 1018) = 5.68$, $p = .01$, dead mothers, $\chi^2(1, N = 1016) = 9.49$, $p = .002$, city resident, $\chi^2(1, N = 1019) = 5.34$, $p = .02$, village resident, $\chi^2(1, N = 1019) = 5.62$, $p = .02$, exposure to violence at home, $\chi^2(1, N = 1017) = 5.45$, $p = .01$, in the neighbourhood, $\chi^2(1, N = 1017) = 38.86$, $p < .001$, at school, $\chi^2(1, N = 1017) = 7.76$, $p = .005$, and to war-trauma, $\chi^2(1, N = 1017) = 14.10$, $p < .001$.

+ $\chi^2(14, N = 816) = 51.77$, $p < .001$

$\chi^2(15, N = 816) = 66.61$, $p < .001$

‡ $\chi^2(16, N = 816) = 74.64$, $p < .001$

§ $\chi^2(17, N = 813) = 79.21$, $p < .001$

Table 6

Logistic regression: Prediction of overall mental health problem versus none from exposure to violence and war traumatic events while adjusting for demographic variables and socioeconomic status

Predictors	Univariate †	Step 1+	Step 2#	Step 3‡	Step 4§
	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]
Demographic variables					
Age (older)	1.09 [0.91, 1.31]	1.44 [1.10, 1.87]**	1.42 [1.09, 1.86]*	1.45 [1.11,1.89]**	1.36 [1.03, 1.79]*
Gender	0.56 [0.34, 0.93]*	0.75 [0.39, 1.43]	1.28 [0.63, 2.58]	1.34 [0.66 2.72]	1.65 [0.80, 3.40]
Family income (low)	0.17 [0.06, 0.48]**	0.16 [0.36, 0.71]*	0.19 [0.04, 0.85]*	0.18 [0.04, 0.84]*	0.21 [0.04, 0.94]*
Family size (large)	1.24 [0.61, 2.51]	1.05 [0.48, 2.30]	1.20 [0.54, 2.66]	1.14 [0.51, 2.55]	1.04 [0.46, 2.36]
Father education (low)	0.57 [0.38,0.85]**	0.56 [0.32, 0.98]*	0.58 [0.33, 1.04]	0.59 [0.33, 1.07]	0.59 [0.32, 1.07]
Mother education (low)	0.75 [0.49, 1.15]	0.91 [0.50, 1.67]	0.97 [0.52, 1.81]	0.97 [0.52, 1.81]	0.98 [0.52, 1.87]
Father's job	0.74 [0.45, 1.22]	1.48 [0.77, 2.83]	1.53 [0.79, 2.96]	1.56 [0.80, 3.04]	1.55 [0.78, 3.05]
Mother's job (unemployed)	0.40 [0.11, 1.35]	0.68 [0.31, 3.39]	0.73 [0.14, 3.72]	0.64 [0.12, 3.25]	0.74 [0.14, 3.94]
Father alive or dead	2.83 [0.78, 10.31]	0.98 [0.19, 4.86]	0.70 [0.13, 3.64]	0.63 [0.12, 3.30]	0.55 [0.10, 2.94]
Mother alive or dead (dead)	4.24 [0.83, 21.42]	10.36 [0.93, 114.6]	10.44 [0.93, 116.1]	10.80 [0.96, 121.4]	13.13 [1.16, 148.4]*
Type of residence: City vs. others (City)	1.75 [1.00, 3.05]*	3.28 [1.38, 7.76]**	3.13 [1.29, 7.54]*	3.56 [1.45, 8.71]**	4.04 [1.61, 10.09]**
Type of residence: Refugee vs. others	0.52 [0.23, 1.21]	0.95 [0.28, 3.20]	0.91 [0.26, 3.15]	0.99 [0.28, 3.44]	1.21 [0.33, 4.33]
Type of residence: Village vs. others (Others)	0.70 [0.37, 1.36]				
Citizenship: Refugee vs. non-refugee	1.19 [0.70, 2.03]	1.13 [0.54, 2.34]	1.00 [0.48, 2.09]	0.92 [0.44, 1.92]	0.97 [0.46, 2.05]
Exposure to traumatic events					
Violence at home	1.34 [1.11, 1.61]**	1.45 [1.15, 1.82]**	1.42 [1.12, 1.79]**	1.48 [1.17, 1.89]**	1.53 [1.20, 1.96]**
Violence at neighbourhood	2.18 [1.75, 2.71]***		2.02 [1.52, 2.69]***	1.96 [1.47, 2.61]***	1.91 [1.43, 2.57]***
Violence at school	1.32 [1.10, 1.57]**			1.38 [1.10, 1.74]**	1.40 [1.11, 1.78]**
War-trauma	1.15 [1.09, 1.22]***				1.16 [1.09, 1.25]***
Cox & Snell R^2		.120	.152	.168	.205
Nagelkerke R^2		.132	.168	.184	.226

*** $p < .001$, ** $p < .01$, * $p < .05$

† Gender (female), $\chi^2(1, N = 79) = 14.87$, $p = .02$, low family income, $\chi^2(1, N = 72) = 20.56$, $p = .001$, low fathers' education level, $\chi^2(1, N = 75) = 18.19$, $p = .006$, city resident, $\chi^2(1, N = 79) = 6.20$, $p = .04$, exposure to violence at home, $\chi^2(1, N = 79) = 21.88$, $p = .002$, in the neighbourhood, $\chi^2(1, N = 79) = 63.11$, $p < .001$, at school, $\chi^2(1, N = 79) = 17.199$, $p = .002$, and to war-trauma, $\chi^2(1, N = 79) = 55.60$, $p < .001$.

+ $\chi^2(14, N = 55) = 104.75$, $p < .001$

$\chi^2(15, N = 55) = 135.43$, $p < .001$

‡ $\chi^2(16, N = 55) = 150.24$, $p < .001$

§ $\chi^2(17, N = 55) = 187.55$, $p < .001$

Supplementary Table 1

Logistic regression: Prediction of one mental health and behavioural problem versus none from demographic variables and traumatic events

Predictors	Univariate †	Step 1+	Step 2#	Step 3‡	Step 4§
	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]
Demographic variables and socioeconomic status					
Age (Older)	1.10 [0.99, 1.22]	1.26 [1.09, 1.46]**	1.27 [1.09, 1.47]**	1.28 [1.10,1.50]**	1.24 [1.05, 1.45]**
Gender	0.70 [0.52, 0.93]*	0.78 [0.55, 1.10]	0.97 [0.67, 1.41]	1.02 [0.70, 1.48]	1.18 [0.80, 1.73]
Family income	0.92 [0.65, 1.29]	1.23 [0.79, 1.93]	1.33 [0.84, 2.09]	1.31 [0.83, 2.07]	1.40 [0.88, 2.22]
Family size (Large)	1.57 [1.05, 2.34]*	1.49 [0.96, 2.32]	1.59 [1.01, 2.49]*	1.56 [0.99, 2.45]	1.48 [0.94, 2.34]
Father education (Low)	0.75 [0.60, 0.95]*	0.77 [0.57, 1.05]	0.78 [0.58, 1.06]	0.81 [0.59, 1.09]	0.84 [0.62, 1.14]
Mother education	0.82 [0.65, 1.05]	0.96 [0.69, 1.33]	1.01 [0.73, 1.41]	1.01 [0.73, 1.41]	1.00 [0.72, 1.40]
Father's job (Unemployed)	0.72 [0.54, 0.96]*	0.76 [0.53, 1.09]	0.77 [0.53, 1.11]	0.77 [0.53, 1.12]	0.74 [0.51, 1.08]
Mother's job (Unemployed)	0.72 [0.42, 1.23]	0.70 [0.32, 1.53]	0.72 [0.33, 1.59]	0.66 [0.30, 1.45]	0.75 [0.33, 1.69]
Father's alive or dead	1.56 [0.59, 4.17]	0.54 [0.17, 1.69]	0.46 [0.14, 1.49]	0.42 [0.13, 1.37]	0.40 [0.12, 1.28]
Mother's alive or dead (Dead)	2.92 [0.81, 10.44]	8.24 [0.97, 69.51]	7.66 [0.90, 64.76]	8.00 [0.94, 67.98]	7.33 [0.85, 62.74]
Type of residence: City vs. others (City)	1.27 [0.94, 1.72]	2.03 [1.29, 3.18]**	1.97 [1.25, 3.11]**	2.10 [1.33, 3.34]**	2.25 [1.41, 3.60]**
Type of residence: Refugee camp vs. others (Others)	0.76 [0.50, 1.15]	0.92 [0.52, 1.62]	0.88 [0.49, 1.55]	0.89 [0.50, 1.58]	1.05 [0.58, 1.90]
Type of residence: Village vs. others (Others)	0.87 [0.61, 1.23]				
Citizenship: Refugee vs. non-refugee (Non-refugees)	1.10 [0.81, 1.50]	1.21 [0.80, 1.82]	1.13 [0.75, 1.71]	1.05 [0.69, 1.60]	1.12 [0.73, 1.73]
Exposure to violence and traumatic events					
Violence at home	1.24 [1.10, 1.39]***	1.22 [1.06, 1.39]**	1.19 [1.04, 1.35]**	1.21 [1.06, 1.39]**	1.24 [1.08, 1.42]**
Violence at neighbourhood	1.42 [1.21, 1.67]***		1.44 [1.18, 1.76]***	1.41 [1.16, 1.73]**	1.41 [1.15, 1.72]**
Violence at school	1.20 [1.08, 1.33]**			1.21 [1.07, 1.37]**	1.22 [1.08, 1.38]**
War-trauma	1.08 [1.04, 1.11]***				1.08 [1.04, 1.30]***
Cox & Snell R^2		.120	.152	.168	.205
Nagelkerke R^2		.132	.168	.184	.226

*** $p < .001$, ** $p < .01$, * $p < .05$

† Gender (Female), $\chi^2(1, N = 488) = 14.87$, $p = .01$, large family size, $\chi^2(1, N = 419) = 5.70$, $p = .02$, low fathers' educational level, $\chi^2(1, N = 411) = 18.19$, $p = .01$, father job (unemployed), $\chi^2(1, N = 444) = 7.17$, $p = .02$, exposure to violence at home, $\chi^2(1, N = 445) = 21.88$, $p < .001$, exposure to violence in the neighbourhood, $\chi^2(1, N = 445) = 63.11$, $p < .001$, exposure to violence at school, $\chi^2(1, N = 445) = 17.19$, $p = .001$, and exposure to war-trauma, $\chi^2(1, N = 445) = 55.60$, $p < .001$.

+ $\chi^2(14, N = 366) = 104.75$, $p < .001$
# $\chi^2(15, N = 366) = 135.43$, $p < .001$
‡ $\chi^2(16, N = 366) = 150.24$, $p < .001$
§ $\chi^2(17, N = 55) = 187.55$, $p < .001$

Supplementary Table 2

Logistic regression: Prediction of two mental health problem versus none from demographic variables and traumatic events

Predictors	Univariate †	Step 1+	Step 2#	Step 3‡	Step 4§
	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]	Exp(B) [95% CI]
Demographic variables and socioeconomic status					
Age (Older)	1.04 [0.90, 1.19]	1.20 [0.99, 1.45]	1.20 [0.98, 1.45]	1.21 [1.00,1.48]*	1.15 [0.94, 1.40]
Gender (Female)	0.51 [0.35, 0.74]***	0.56 [0.35, 0.89]*	0.76 [0.47, 1.24]	0.80 [0.49, 1.30]	0.98 [0.59, 1.62]
Family income (Low)	0.60 [0.37, 0.97]*	0.81 [0.43, 1.54]	0.91 [0.48, 1.75]	0.90 [0.47, 1.72]	0.98 [0.50, 1.89]
Family size (Large)	1.57 [0.91, 2.69]	1.96 [1.04, 3.70]*	2.12 [1.12, 4.03]*	2.06 [1.08, 3.92]*	1.90 [0.99, 3.66]
Father education (Low)	0.56 [0.41,0.75]***	0.70 [0.47, 1.04]	0.72 [0.48, 1.08]	0.74 [0.49, 1.11]	0.76 [0.50, 1.15]
Mother education (Low)	0.58 [0.42, 0.79]**	0.70 [0.45, 1.08]	0.74 [0.47, 1.51]	0.74 [0.47, 1.15]	0.74 [0.47, 1.16]
Father's job	0.64 [0.44, 0.93]*	1.03 [0.63, 1.66]	1.04 [0.64, 1.70]	1.05 [0.65, 1.72]	1.04 [0.63, 1.71]
Mother's job	0.67 [0.32, 1.37]	1.33 [0.52, 3.39]	1.38 [0.53, 3.57]	1.22 [0.47, 3.18]	1.41 [0.52, 3.81]
Father's alive or dead	4.13 [1.54, 11.08]**	1.12 [0.32, 3.92]	0.90 [0.25, 3.27]	0.82 [0.22, 2.97]	0.70 [0.18, 2.60]
Mother's alive or dead (Dead)	4.36 [1.11, 17.09]*	6.02 [0.63, 57.46]	5.52 [0.57, 53.22]	5.82 [0.60, 56.46]	6.78 [0.70, 65.75]
Type of residence: City vs. others (City)	1.43 [0.97, 2.13]	2.14 [1.18, 3.89]*	2.05 [1.12, 3.74]*	2.22 [1.21, 4.08]*	2.50 [1.34, 4.68]**
Type of residence: Refugee camp vs. others (Others)	0.65 [0.37, 1.14]	0.73 [0.32, 1.65]	0.69 [0.30, 1.56]	0.70 [0.31, 1.60]	0.88 [0.37, 2.05]
Type of residence: Village vs. others (Others)	0.81 [0.51, 1.30]				
Citizenship: Refugees vs. non-refugees	1.07 [0.73, 1.59]	1.00 [0.59, 1.70]	0.92 [0.54, 1.57]	0.85 [0.49, 1.45]	0.91 [0.52, 1.58]
Exposure to violence and traumatic events					
Violence at home	1.32 [1.14, 1.52]***	1.30 [1.09, 1.54]**	1.27 [1.07, 1.50]**	1.31 [1.10, 1.56]**	1.36 [1.40, 1.63]**
Violence at neighbourhood	1.72 [1.43, 2.07]***		1.62 [1.28, 2.04]***	1.59 [1.26, 2.01]***	1.56 [1.23, 1.99]***
Violence at school	1.21 [1.06, 1.39]**			1.27 [1.08, 1.50]**	1.29 [1.09, 1.53]**
War-trauma	1.13 [1.08, 1.17]***				1.14 [1.08, 1.20]***
Cox & Snell R^2		.120	.152	.168	.205
Nagelkerke R^2		.132	.168	.184	.226

*** $p < .001$, ** $p < .01$, * $p < .05$

† Gender (female), $\chi^2(1, N = 149) = 14.87$, p = .002, low income, $\chi^2(1, N = 168) = 20.56$, p = .04, low fathers' educational level, $\chi^2(1, N = 163) = 18.19$, p < .001, low mothers' educational level, $\chi^2(1, N = 173) = 11.90$, p = .001, unemployed father job, $\chi^2(1, N = 174) = 7.17$, p = .01, dead father $\chi^2(1, N = 178) = 7.17$, p = .005, dead mother, $\chi^2(1, N = 177) = 6.08$, p = .03, exposure to violence at home, $\chi^2(1, N = 179) = 21.88$, p < .001, exposure to violence in the neighbourhood, $\chi^2(1, N = 179) = 63.11$, p < .001, exposure to violence at school, $\chi^2(1, N = 179) = 17.19$, p = .004, and exposure to war-trauma, $\chi^2(1, N = 179) = 55.60$, p < .001.

+ $\chi^2(14, N = 132) = 104.75$, $p < .001$
# $\chi^2(15, N = 132) = 135.43$, $p < .001$
‡ $\chi^2(15, N = 132) = 150.24$, $p < .001$
§ $\chi^2(17, N = 132) = 187.55$, $p < .001$

Supplementary Table 3

Hierarchical linear modelling (HLM) regression model 1 (school level only) and model 2 (all predictors) on all outcome measures: Unstandardized coefficients (Estimation (E) and standard error (SE)

Predictors	PTSD Diagnosis (DSM-5)		Depression in the borderline-clinical range		Total Difficulties (SDQ) in the borderline-clinical range		Overall multiple mental health problems	
	Model 1 E (SE)	Model 2 E (SE)	Model 1 E (SE)	Model 2 E (SE)	Model 1 E (SE)	Model 2 E (SE)	Model 1 E (SE)	Model 2 E (SE)
School	.53 (.02)***	-.62 (.37)	.23 (.02)***	-.28 (.32)	.24 (.02)***	-.45 (.32)	1.01 (.05)***	-1.52 (.65)*
Demographic variables and socioeconomic status								
Age		.03 (.01)*		.02 (.01)		.02 (.01)		.09 (.03)**
Gender (Female)		.10 (.05)*		.002 (.05)		-.05 (.04)		.06 (.10)
Family income		-.00 (.04)		-.02 (.03)		-.06 (.04)		-.09 (.07)
Family size		.01 (.04)		.02 (.03)		.04 (.03)		.08 (.07)
Father education		-.05 (.03)		-.02 (.02)		-.02 (.02)		-.10 (.05)*
Mother education		-.00 (.03)		-.06 (.02)*		.01 (.02)		-.04 (.05)
Father's job		.06 (.03)		.00 (.03)		.01 (.03)		.08 (.06)
Mother's job		-.12 (.07)		-.03 (.06)		.12 (.06)		-.04 (.13)
Father's alive		.04 (.10)		.004 (.08)		-.05 (.08)		.01 (.17)
Mother's alive		.13 (.11)		.21 (.09)*		.04 (.09)		.41 (.19)*
Type of residence (city)		.06 (.05)		.08 (.04)		.11 (.04)*		.24 (.09)*
Type of residence (refugee camp)		-.03 (.06)		.06 (.06)		.00 (.05)		.01 (.12)
Type of residence (Village)								
Citizenship		.02 (.04)		-.05 (.03)		.01 (.03)		-.01 (.02)
Exposure to violence and traumatic events								
Violence at home		.03 (.01)*		.04 (.01)***		.03 (.01)**		.10 (.02)***
Violence at neighbourhood		.05 (.01)**		.04 (.01)**		.03 (.01)*		.13 (.02)***
Violence at school		.02 (.01)		.03 (.01)**		.02 (.01)*		.08 (.02)***
War-trauma		.02 (.003)***		.00 (.003)		.00 (.003)		.03 (.006)***
ICC	0.048	0.004	0.005	0.006	0.005	0.004	0.022	0.023

*** $p < .001$, ** $p < .01$, * $p < .05$