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Post-traumatic stress disorder in adolescents during the COVID-19 pandemic: a cross-sectional Tunisian study

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Abstract

Objectives Evaluate the prevalence of post-traumatic stress disorder (PTSD) on Tunisian adolescents enrolled in secondary schools during the COVID-19 pandemic and to identify associated factors.

Methods We conducted a cross-sectional, descriptive, and analytic study on a sample of Tunisian adolescents. Participants were randomly selected from two schools in the region of Hamma (southern of Tunisia). This survey took place during the period extending from 5 March to 26 May 2021. Students were asked to complete a pre-established information sheet which contains questions about socio-demographic features, medical history, knowledge about the pandemic of COVID-19, and personal or family history of being infected with this virus. The Child PTSD Symptom Scale (CPSS) was used to screen for PTSD among students.

Results The sample was composed of 326 students (92 boys and 234 girls; mean age 16.65 years). The prevalence of PTSD was 37.4% according to the CPSS. Adolescents had more PTSD symptoms when they lived in a conflictual family atmosphere ($AOR = 3.1$ [1.4–6.9]). Moreover, adolescents who were infected by the virus, or whose relatives were contaminated or dead because of the COVID-19 infection, were more likely to develop PTSD symptoms. We stated that students who estimated that their knowledge about the COVID-19 pandemic were insufficient had a significant higher risk for PTSD ($AOR = 2.5$ [1.4–4.6]).

Conclusion Students seemed to have high frequency of PTSD symptoms during the COVID-19 pandemic. The identification of risk and protective factors are interesting to guide screening and prevention actions.

Key points

- Adolescents were vulnerable to psychological distress during COVID-19 pandemic, they were more exposed to develop post-traumatic stress disorder.
- A total of 37.4% was the prevalence of PTSD among Tunisian adolescents. Sufficient information about the pandemic was protective. Conflictual family atmosphere constitutes a risk factor.
- Family and social efforts should be directed toward supporting teenagers to cope with the pandemics' mental health burden.

Keywords Adolescent, COVID-19, Lockdown, Post-traumatic stress disorder, Psychological distress

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Introduction

The COVID-19 pandemic has imposed several changes in the life of citizens around the world. Family, schools, leisure activities, and working routines were upset. People of all ages may be affected by life changes and especially youth [1]. In fact, children and adolescents

need a constant, stable, and secure environment for a harmonious and balanced psychological development. The disruption of their routines because of the pandemic with a frequent exposure to the risk of infection and death of their relatives and oneself will threaten their psychological stability and contribute to widespread emotional distress and an increased risk of psychiatric disorders shortly [2].

Several studies have assessed the impact of this pandemic on children and adolescents. Stress, anxiety, depression, domestic violence, post-traumatic stress disorder, etc. have been reported [3–5]. Psychological distress related to the exposure to stressful situations appears to be common to all ages. In fact, the COVID-19 infection is a still little-known disease with an uncertain prognosis and associated with a variable risk of mortality depending on the country, the individual vulnerability, and the viral strain. This uncertainty with an exposure to the possibility of contamination or mourning situations constitutes traumatic events that can lead to PTSD symptoms.

Sun conducted an online study on a total of 2091 Chinese people and found that, during this pandemic, 4.6% of adult participants have a high level of PTSD symptoms [6]. Studies on youth are few. In China, a cross-sectional study of young people aged 14–35 years found that 14.4% presented PTSD symptoms 2 weeks after the outbreak of COVID-19 [4].

In Tunisia, from March to May 2021, death frequencies have increased from 8329 to 12,623, and cases from 240,617 to 344,688 (<https://www.coronavirus-statistiques.com/stats-pays/coronavirus-nombre-de-cas-tunisie/>). This period corresponded to the 3rd wave of the pandemic [7]. The region of Hamma in the city of Gabes, an oasis town in southern Tunisia (total population of approximately 62,390 inhabitants) has undergone this huge spread of the virus. It was one of the most devastated areas during this wave in Tunisia. Compared to other Tunisian areas, the peak of cases was reached sooner in Hamma. As a result, the region has experienced an earlier lifting of the rules of social distancing (gradual lifting of lockdown, returning to school, permission for some assemblies, etc.).

Moreover, PTSD symptoms may result in a functional impairment that disrupts adolescent's school, family, and relationship life. Such disruption depends on protective and risk factors that must be considered and assessed to promote adolescent mental health.

So, we aimed on this study to evaluate the prevalence of post-traumatic stress disorder on a sample of Tunisian adolescents enrolled in secondary schools, in the Hamma region, and to identify associated factors.

Methods

Participants

We conducted a cross-sectional, descriptive, and analytic study on Tunisian adolescents aged between 14 and 18 years and enrolled from the secondary schools in the Hamma region.

The study sample size was calculated using the following formula:

$$N = \frac{P \times Q \times 4}{0.02^2}$$

with P being the prevalence of PTSD set at 2.7% according to Tang et al. [8] on their study conducted among 2485 Chinese students and $Q = 1 - P$.

Then, for a precision of 2%, a confidence interval of 95%, and an increase of 10% for the rate of missing answers, the minimum number of our sample was estimated at 289 students.

Sample selection

In this study, we used a randomized, multistage, and stratified sampling strategy.

The region of Hamma contains four secondary schools from which we randomly selected two schools to be included.

Each school contains four levels: from 1st grade of secondary education (SE) to the 4th grade of SE. Thus, two classes of each level were randomly selected in each of the 2 schools.

Finally, the sample was composed of 406 students (140% of the required sample). From all the students, 47 have refused to participate at this survey. Thirty-three students were finally excluded from the analysis due to missing values in questionnaire items and due to their age exceeding 18 years. The final sample consisted of 326 students (92 boys and 234 girls; mean age 16.65 years, *SD* 1).

Measures

A pre-established information sheet

Students were asked to complete a pre-established information sheet which contains questions about socio-demographic features, medical history, knowledge about the pandemic of COVID-19, and personal or family history of being infected with this virus.

The Child PTSD Symptom Scale (CPSS)

The Child PTSD Symptom Scale (CPSS) is one of the most frequently used instruments to assess posttraumatic stress in children and adolescents. It was designed to assess PTSD diagnostic criteria and symptom severity among children aged between 8 and 18 [9]. The symptoms covered are based on the definitions and criteria

from the DSM-IV; however, the CPSS was adapted to include developmentally appropriate language to maximize children's understanding of the items [9]. It has been administered for research purposes in communities where large groups of children have experienced trauma [10]. The scale includes 17 symptom items divided into 3 subscales: re-experiencing, avoidance, and hyper-arousal behaviors, each measured on a 4-point frequency scale from 0 (not at all or only at one time) to 3 (5 or more times a week/almost always). A total score is measured by adding the scores for each symptom item and calculating a total score between 0 and 51. Higher scores indicate more severe symptoms [9] and the clinical cutoff appropriate for diagnosing PTSD is 15 or greater.

Procedure

The assessment procedure was reviewed and approved by the Regional Directorate for Education of Gabes.

This survey took place during the period extending from 5 March to 26 May 2021. This period was 1 month following the peak of the 3rd wave of the COVID-19 pandemic in region of Hamma, having imposed the compulsory lockdown of citizens and the closure of schools.

Visits to schools were planned weeks after health restriction measures were lifted (lockdown, etc.) and the government's decision to return to school. Investigating doctors have respected the hygienic rules imposed by health authorities to prevent the spread of the coronavirus, including wearing a properly fitted mask, keeping physical distance of at least 1 m from participants, cleaning hands regularly, and aerating the spaces.

Ten student groups per classroom were organized before the assessment. The questionnaire was distributed in the presence of at least one doctor from the research team who was responsible for explaining to each group of

students the nature of the study and the task requested. Every participant gave his/her written informed consent.

Data were collected anonymously and collectively. All data were anonymized, accessible only by personnel specifically appointed and trained according to procedures agreed with the principal investigator.

Statistical analysis

Statistical analysis was performed using SPSS 20. Categorical variables were carried out by numbers and percentages. Quantitative variables were driven by means and standard deviations. We used the chi-squared test " χ^2 " to compare two qualitative variables, Fisher's exact test when one or more of the theoretical counts in the contingency table are less than five and the *t*-test for independent samples to compare the means when we are faced with two variables, one dependent quantitative type and the other independent qualitative type.

At the end of this analysis, the variables that were associated with PTSD in the univariate analysis at threshold 0.2 were introduced into a multivariate model by binary logistic regression. Adjusted odds ratios (ORA) and their 95% CIs were determined, taking into consideration confounding factors and interaction terms.

Results

Sample presentation

Socio-demographic and medical characteristics of participants are summarized in Table 1.

Knowledge about the pandemic of COVID-19 and related medical situation

In the current study, students got informed about the COVID-19 pandemic and the health situation in the country mainly from social networks (89%) and from television and radio (63.5%). The family was the source of

Table 1 Socio-demographic and medical features of students ($N = 326$)

		Number (mean \pm SD)	Frequency (%)
Age		16.65 years \pm 1	-
Sex	Boys	92	28.2
	Girls	234	71.8
Socio-economic level	High	160	49.1
	Middle to low	166	50.9
Familial status	Parents united	302	92.6
	Mono parental family	24	7.4
Leisure activities	Yes	286	87.7
	No	40	12.3
Medical history	Yes	18	5.5
	No	308	94.5

information for students in 42.3% of cases followed by the school framework (friends and teachers) in 28.8% of cases. The students judged that the information they received about the health situation was insufficient in 66.6% of cases.

Among our sample, 27.3% of students have at least one family member who has been infected by the COVID-19, and 22.4% of them were exposed to the death of their sibling due to this virus (i.e., 73 students). They were themselves infected by the COVID-19 in 4% of cases.

Prevalence of post-traumatic stress disorder in Tunisian students at the region of Hamma

The results of the CPSS assessment are summarized in Table 2. In our study, the prevalence of PTSD symptoms was 37.4% (Table 2).

Factors related to PTSD in Tunisian students during the pandemic of COVID-19

Our findings show that adolescents have more PTSD symptoms when they come from families with marital conflicts, when their knowledge of the COVID-19 pandemic is considered insufficient, when they have a personal or familial history of COVID-19 infection, and when they have a relative who died as a result of COVID-19 infection (Table 3).

Factors related to PTSD severity in Tunisian students during the pandemic of COVID-19

In this section, we opted to consider participants who had PTSD symptoms according to the CPSS, and we investigated the factors associated with severe PTSD symptoms. Table 4 shows the results.

Discussion

The COVID-19 pandemic is associated with many stressful events and especially the frequent exposure to sudden parent’s death or fear from contamination of relatives or oneself, which constitutes traumatic experiences and may lead to PTSDs.

We conducted a cross-sectional study about 326 students (14–18 years) enrolled into secondary schools in

the region of Hamma (South of Tunisia) and randomly selected from two schools. Among them, 37.4% showed PTSD symptoms according to the Child PTSD Symptom Scale. PTSD symptoms were significantly associated with family conflicts and how students were getting informed about the pandemic, personal contamination of the COVID-19, and family contamination or death because of the virus.

Prevalence of PTSD among adolescents during the COVID-19 pandemic

In the present study, the prevalence of PTSD on a sample of Tunisian adolescents was 37.4% according to the CPSS.

Adolescents seem to present more psychological distress than adults do during this pandemic [11]. The prevalence of PTSD on adult individuals in the weeks following the COVID-19 epidemic was estimated at 4.6% and 7% on two studies conducted in China [6, 12, 13]. Wang found that adolescents showed higher scores of PTSD in comparison to adults [11].

In China, Liang et al. on their study conducted 2 weeks after the occurrence of COVID-19, on 584 participants (14–35 years), found a frequency of 14.4% of PTSD symptoms [4]. This frequency was estimated at 12.8% on another study among 570 youth, conducted within 1 month of the COVID-19 emergency in China [13]. In the USA, Liu et al. found high levels of PTSD symptoms (31.8%) among 898 young adults (18–30 years) 1 month after the USA declared a state of emergency due to COVID-19 [12]. In Italy, Forte et al. found a frequency of 29.5% of PTSD symptomatology among 2286 participants (68.6% among them was aged 18–29 years [14].

Several hypothesis may explain the highest adolescent’s tendency toward psychological problems and especially PTSD during this pandemic.

Firstly, adolescence constitute a transition period where adolescent is undergoing physical, psychological, and social changes. He needs to move away from his parent and to identify with friends or different people from society, to build his autonomy and identity. The COVID-19 pandemic and its consequences may hinder the normal psychological development of adolescents. In fact,

Table 2 Prevalence and severity of PTSD symptoms according the CPSS

Severity symptoms of PTSD		Number of students	Frequency (%)	Total
No PTSD (CPSS score from 0 to 15)	Below threshold	162	49.7	62.6% (N=204)
	Subclinical symptoms	42	12.9	
PTSD (CPSS score from 16 to 51)	Mild symptoms	23	18.9	37.4% (N=122)
	Moderate to moderately severe symptoms	42	34.4	
	Severe to extremely severe symptoms	57	46.7	

Table 3 Factors related to PTSD in Tunisian students evaluation element

	The presence of PTSD symptoms according to CPSS		<i>p</i>	ROC (95% CI)	AOR (95% CI)
	Yes (N = 122)	No (N = 204)			
Age (mean ± SD)	16.66 ± 0.9	16.64 ± 1.03	0.8		
Gender (N, %)					
Male	28 (30.5%)	64 (69.5%)	0.1	Ref	Ref
Female	94 (40.2%)	140 (59.8%)		1.5 (0.9–2.5)	1.4 (0.8–2.6)
Socio-economic level (N, %)					
High	63 (37%)	107 (63%)	0.4	Ref	
Middle to low	59 (37.8%)	97 (62.2%)		1.1 (0.7–1.8)	
Family situation (N, %)					
Parents united	116 (38.4%)	186 (61.6%)	0.1	1.8 (0.7–4.8)	2.6 (0.9–7.7)
Monoparental family	6 (25%)	18 (75%)		Ref	Ref
Family conflicts (N, %)					
Yes	20 (55.6%)	16 (44.4%)	0.01	2.3 (1.1–4.6)	3.1 (1.4–6.9)*
No	102 (35.2%)	188 (64.8%)		Ref	Ref
Leisure activities (N, %)					
Yes	105 (36.7%)	181 (63.3%)	0.4	Ref	
No	17 (42.5%)	23 (57.5%)		1.2 (0.6–2.4)	
Information's about the COVID-19 pandemic (N, %)					
Sufficient	31 (28.4%)	78 (71.6%)	0.02	Ref	Ref
Insufficient	91 (41.9%)	126 (58.1%)		1.8 (1.1–2.9)	2.5 (1.4–4.6)*
Personal history of COVID-19 infection (N, %)					
Yes	11 (84.6%)	2 (15.5%)	0.001	10 (2.1–45.9)	9.3 (1.7–49.7)**
No	111 (35.5%)	202 (64.5%)		Ref	Ref
Familial history of COVID-19 infection (N, %)					
Yes	50 (56.2%)	39 (43.8%)	0.000	2.9 (1.7–4.8)	2.4 (1.3–4.2)**
No	72 (30.4%)	165 (69.6%)		Ref	Ref
A relative death because of COVID-19 infection (N, %)					
Yes	47 (64.4%)	26 (35.6%)	0.000	4.2 (2.4–7.4)	3.3 (1.8–5.9)**
No	75 (29.7%)	178 (70.3%)		Ref	Ref

N number. *Statistically significant at $p < 0.05$, **statistically significant at $p < 0.01$, Ref reference category, COR crude odd ratio, AOR adjusted odd ratio, CI confidence interval

because of the lockdown measures, youth are far from their school and friends, yet school routines are important for their relational and social development. Worries for the health situation of parent make the adolescent closer to them with even regressive attitudes. Adolescent are living internal changes in an unsecure environment which what make them more vulnerable to develop psychological distress.

Secondly, for some adolescents, deaths linked to COVID-19 were their first experience with death [1]. They were exposed to sudden separation or death of their parents without the possibility to visit the hospitals' "COVID units," to accompany their loved persons in their last days, and with deprivation of many funeral rites [1]. Such stressful events have undoubtedly a high probability to induce PTSD symptoms.

Finally, during the pandemic and especially the lockdown, children and adolescents were deprived from their social environment. Lamblin argued that this isolation might have an influence on psychiatric disorder onsets during adolescence, because of the diminution of the reciprocal interactions between brain maturation and social environment [15]. Such findings point the increased psychological and neurological vulnerabilities of adolescents, during this pandemic.

The higher frequencies of PTSD on our sample in comparison with the literature findings may be explained by methodological differences among different researches. Results are different according to the period of the data collection in relation with the pandemic outbreak, measures used to evaluate PTSD, included age intervals, and the extent of the spread of the virus in the country.

Table 4 Factors related to PTSD severity in Tunisian students

Evaluation element	Severe PTSD symptoms according to CPSS		<i>p</i>	ROC (95% CI)	AOR (95% CI)
	Mild symptoms-moderate to moderately severe symptoms (N=65)	Severe to extremely severe symptoms (N=57)			
Age (mean ± SD)	16.68 ± 0.9	16.65 ± 1.009	0.8		
Gender (N, %)					
Male	17 (60.7%)	11 (39.3%)	0.3	1.4 (0.6–3.4)	
Female	48(51.1%)	46 (48.9%)		Ref	
Socio-economic level (N, %)					
High	33 (52.4%)	30 (47.6%)	0.8	Ref	
Middle to low	32 (54.2%)	27 (45.8%)		1.07 (0.5–2.1)	
Family situation (N, %)					
Parents united	62 (53.4%)	54 (46.6%)	0.5	1.1 (0.2–5.9)	
Monoparental family	3 (50%)	3 (50%)		Ref	
Family conflicts (N, %)					
Yes	9 (45%)	11 (55%)	0.4	1.4 (0.5–3.8)	
No	56 (54.9%)	46 (45.1%)		Ref	
Leisure activities (N, %)					
Yes	51 (48.8%)	54 (51.4%)	0.3	Ref	
No	11 (64.7%)	6 (35.3%)		1.7 (0.5–5)	
Information's about the COVID-19 pandemic (N, %)					
Sufficient	11 (50%)	11 (50%)	0.7	Ref	
Insufficient	54 (54%)	46 (46%)		1.1 (0.4–2.9)	
Personal history of COVID-19 infection (N, %)					
Yes	7 (63.6%)	4 (36.4%)	0.5	1.5 (0.4–5.7]	
No	58 (52.3%)	53 (47.7%)		Ref	
Familial history of COVID-19 infection (N, %)					
Yes	27 (54%)	23 (46%)	0.8	1.05 (0.5–2.1)	
No	38 (52.8%)	34 (47.2%)		Ref	
A relative death because of COVID-19 infection (N, %)					
Yes	22 (46.8%)	25 (53.2%)	0.3	1.5 (0.7–3.1)	
No	43 (57.3%)	32 (42.7%)		Ref	

N number. *Statistically significant at $p < 0.05$, **statistically significant at $p < 0.01$, Ref reference category, COR crude odd ratio, AOR adjusted odd ratio, CI confidence interval

Gender, socioeconomic context, and PTSD

On this study, there was no significant association between gender, socio-economic level, and PTSD symptoms. Previous studies found more occurrence of PTSD on girls [16, 17]. During the COVID-19 pandemic, findings differ in the gender effect on PTSD. Wang found a higher risk of PTSD for women [11]. Liang found contrary a higher risk for men [4].

One of the reasons for these studies disparity is that despite both girls and boys are undergoing the same environmental restrictions during this pandemic, especially lack of friendly support and compulsory confinement at home, family environment seems to have an important role to explain the effect of gender on PTSD during this pandemic. In fact, domestic violence has increased during lockdown [18, 19], which what contribute to

psychological distress on girls and/or boys staying at home.

Concerning the socio-economic conditions, Miranda concluded in a literature review that children with vulnerable socio-economic contexts constitute a fragile group to developing mental health disorders during the pandemic when they are exposed to some risk factors as exposure to domestic violence or child maltreatment and infection by COVID-19 [5]. Thus, the vulnerable socio-economic context does not consist of a risk factor during this pandemic but a vulnerable condition.

Family situation and PTSD during the COVID-19 pandemic

In our sample, adolescents had more PTSD symptoms when they lived in a conflictual family atmosphere

($AOR=3.1$ [1.4–6.9]) and when they lived with their two parents ($AOR=2.6$ [0.9–7.7]). The severity of PTSD symptoms was not associated to these familial factors.

Such a result could also be explained by the increase in marital conflicts in biparental families during the pandemic; the parents found themselves caught up in these conflicts to the detriment of their parental investment [20].

Family relationships play an essential role in mental health outcomes during the pandemic. Family conflicts and domestic violence, preceding or consequence of the pandemic itself, are considered as a risk factor of psychological distress during this pandemic [5], especially since schools are closed and teenagers are far from their friends. Yet school routines are important coping mechanisms for them to fight stressful situations, so they have no other possibilities to be safe from family conflicts. Thus, they will be deprived from both familial (preoccupied with conflicts) and social support to undergo the pandemic and its consequences.

Contrary, the presence of a supportive family can be protective against mental distress [21]. Cao found that living in urban areas, family income stability, and living with parents were protective factors against anxiety, among the 7143 participants to their survey [22].

Leisure activities and PTSD during the COVID-19 pandemic

We found that adolescents presented more PTSD when they had not practice leisure activities (42.5% vs 42.5%), but difference was no significant.

During lockdown, media and reading entertainment followed by physical exercise were the most effective action used by children and encouraged by parents to mitigate children's (3–18 years old) psychological discomfort [23]. Chen states that regular physical exercise is associated with less depression and anxiety symptoms among adolescents [3].

Association between knowledge about the COVID-19 pandemic and PTSD symptoms

We stated that students who estimated that their knowledge about the COVID-19 pandemic were insufficient have a significant higher risk for PTSD ($AOR=2.5$ [1.4–4.6]). There was no statistically significant association found between knowledge about the COVID-19 pandemic and the severity of PTSD symptoms.

The pandemic of the COVID-19 constitutes an unprecedented situation because of the crisis's extent and consequent restrictions and because of the digital revolution [1]. Access to information is becoming rapid and available for all people. Some authors note that people with a sufficient level of information about this pandemic are less likely to present anxiety, depression, and PTSD [13].

Thereby, access to information about COVID-19 is important in order to limit the uncertainty and the blur that surround this global scourge.

Nevertheless, adolescents are receiving a lot of information through social media, which are sometimes more direct and less contextualized than traditional media [1]. Media could participate to adolescent victimization. On a study among children (mean age 10.56 years \pm 1.79), excessive media exposure was a risk factor for anxiety and PTSD [24].

So adult guidance would be necessary to acquire analytical skills on this information [1]. Moreover, by manipulating Internet and social media, adolescents can easily switch to a problematic use of Internet and Internet addiction, which was estimated to be very high in our country according to previous researchers [25].

Adolescent or its relative infected with COVID-19 and PTSD symptoms

Adolescents in our sample who were infected by the virus or whose relatives were contaminated or died because the COVID-19 infection was more likely to develop PTSD symptoms. These factors, however, were not linked to the intensity of PTSD symptoms.

Not surprisingly, such stressful events constitute traumatic experience predicting PTSD, which are in concordance with findings of Crosta on a study conducted among general population in Italy, and that fear and consequences of contagion were predictors of high PTSD symptomatology [26].

According to Cao et al., having a relative infected with COVID-19 was a risk factor for anxiety in a population of Chinese undergraduate students [22].

Thereby, personal or familial history of infection with COVID-19 should be considered as a risk factor for mental health disorder among children and adolescents. Health professionals should screen for PTSD symptoms in this fragile group for early intervention and education.

Conclusion

During the COVID-19 pandemic, adolescents are undergoing a new and unexpected situation that have threaten their psychological stability and development. They are frequently exposed to the risk of oneself contamination by the virus or his loved persons and to the risk of sudden deaths. Such traumatic events may lead to PTSD. We found on the present study that 37.4% of students had PTSD symptoms according to the CPSS. Methodological differences explain PTSD frequency's variations among studies. Longitudinal studies and meta-analysis will be interesting to better target the extent of the problem.

Some risk factors may be identified, such the conflictual family atmosphere, insufficient information about

the health situation during the pandemic, and personal or familial contamination by the virus or relative's death, which constitutes vulnerable groups to the mental health burden of the COVID-19 pandemic. The mitigation actions should prioritize them.

On the other hand, leisure activities, controlled and sufficient access to information about the pandemic, and family support seem to be protective factors that should be supported to help adolescents to deal with the mental health burden of the pandemics.

Abbreviations

CPSS	Child post-traumatic stress disorder symptom scale
DSM	<i>Diagnosis and Statistical Manual of Mental Disorder</i>
SD	Standard deviation
PTSD	Post-traumatic stress disorder
SE	Secondary education

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Authors' contributions

BJ and KA conceived of the presented idea. BJ and KM developed the theory and performed the computations. MY and AH verified the analytical methods. BJ encouraged KA to investigate the link between PTSD and some sociodemographic factors. AH and MY supervised the findings of this work. All authors discussed the results and contributed to the final manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The authors confirm that the data supporting the findings of this study are available within the article.

Declarations

Ethics approval and consent to participate

This work had the approbation of ethical committee of Education Administration of Gabes. Informed consent was obtained from all participants. All participants were free to opt in or out of the study at any point in time. All participants knew the purpose of the study before they agree writtenly or decline to join. The identities of the participants were hidden. Personally identifiable data was not collected. Collected data was anonymized so that it could not be linked to other data by anyone else.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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