



Post Traumatic Stress Disorder among Adolescents Schooled in Public Schools

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Abstract

Objective: A traumatic event has a negative impact on the psychological well-being of adolescents, the purpose of our study is to assess the post-traumatic stress disorder PTSD in adolescents in public schools of the prefecture of Salé in Morocco, to evaluate comorbid disorders and thus to study the effect of PTSD on their social and academic life. **Method and measures:** 871 school adolescents who completed the objectives of the study, their age varied between 12 and 17 years and they completed by themselves the questionnaires concerning socio-demographic data, a list of life events, the CPTS-RI (Children's Post Traumatic Stress Reaction Index) for assessing the symptoms of PTSD, STAIY (State Trait Inventory Anxiety) and CDI (Children Depression Inventory). **Results:** A large proportion of post-traumatic stress disorder was found in students with 63.9% but with different levels (19.5% PTSD low, 25.1% PTSD moderate, 18.1% PTSD severe and only 1.2% PTSD very severe). 84.4% of students are anxious and 55.2% of students have depression. Adolescents who have been exposed to at least one traumatic event in their lifetime have 88.69%. In the event, the main traumatic condition that caused the post-traumatic stress disorder was the sudden and unexpected death of a loved one with 27.7%. PTSD, anxiety and depression have a negative effect on students' school life; therefore, 72.5% of students have poor grades. **Conclusion:** A traumatic event can develop at a PTSD. There is a high rate of post-traumatic stress disorder and students are in school deficit. There are practical implications for the support and care provided to these adolescents.

Subject Areas

Psychology

Keywords

Adolescent, Schooling, Traumatic Event, CPTS-RI, Post-Traumatic Stress Disorder

1. Introduction

The reaction states to psychic trauma correspond to an important problem of public health in the world. The appearance of psychological disorders has long been associated with the occurrence of life events, often traumatic [1]. When it is an event that causes or may cause trauma, this is called a traumatic or potentially traumatic event.

A similar event experienced by different people may have very different traumatic effects from person to person. In fact, traumatic events such as social or family violence, physical or sexual assault, natural or industrial disasters, collective accidents, situations of war or conflict confront individuals with feelings of fear that sometimes exceeds their ability to adapt. Therefore, to have a traumatic effect, the event must represent a threat (real, potential or imagined) for the physical and psychological integrity of the person, in front of which the victim feels unable to react, to occur suddenly and unexpectedly and be accompanied by feelings of helplessness, terror, distress, dread, loneliness, abandonment, etc. Individuals facing these traumatic events can then develop a post-traumatic stress disorder, also known as post-traumatic stress disorder (PTSD), which is one of the most serious and debilitating mental disorders that can occur following a trauma.

Clinical signs of PTSD in adolescents are generally similar to post-traumatic reactions in adults [2]. However, adolescents may show specificities with extreme reactions such as becoming more impulsive or consuming substances in an abusive way [3]. Studies have shown features of PTSD symptomatology in children and adolescents [4]. For Terr [5], a number of semiological and developmental specificities color the presentation of the young patient's PTSD. Adolescents may also verbally exaggerate dichotomous talk, somatization and blame others for what happened [6].

The aim of this study is to determine the prevalence of Posttraumatic Stress Disorder (PTSD) among the school population and particularly during adolescence for middle and high school students in the public schools of the Salé prefecture, in view of the major importance of the continuity of teenage schooling for their well-being. As far as I know, there is no work in Morocco, or little work, at the global level that is related to the subject of our study and there are hardly any published studies that have investigated the associations. between the impact of traumatic events experienced by school-aged adolescents on their psychological well-being and especially on the appearance of certain psychological disorders such as the post-traumatic stress disorder that was studied in our work and the relationship of this disorder with the social life and educa-

tional background of these adolescents. As well as to assess the symptomatology related to PTSD and in our work, we are limited to two comorbid disorders, which are anxiety and depression, and these are the most observed disorders after a post-traumatic stress disorder.

2. Methods and Materials

2.1. Study Population

This is a cross-sectional survey, our study was conducted at the level of public schools in the prefecture of Salé in north-western Morocco, the study targets adolescents with a school level of college and high school with a age under 18 years old having seen the standards of our study. The survey was conducted in two urban communes (Salé and Sidi Bouknadel), the city of salé is divided into five municipal districts which are Lamrissa, Tabriquet, Bettana, Layaada and hssaine (or karia and Salé jdida).

There are 94 public schools in Salé prefecture with 37 high schools and 57 colleges, with a sample of 10 high schools and 15 colleges. The sampling of high school and college students at public school level is 50 students for each school, so the number of teenagers attending school is 1250 students, 268 of them refused to participate in the study (students without informed consent).

The pupils who took part in this work were 982 adolescents and their age is between 12 and 17, but 111 adolescents who did not complete the questionnaires (students without traumatic event), this is how the data collected from 871 adolescents were analyzed, with 523 schoolchildren and 348 high school students. By sex, there were 480 female students and 391 male students. To know that the city of Sidi bouknadel is a small town by contribution to the city of salé, the city of Sidi bouknadel contains only one high school and three colleges and we had taken only one college for our investigation. **Figure 1** shows the final sample

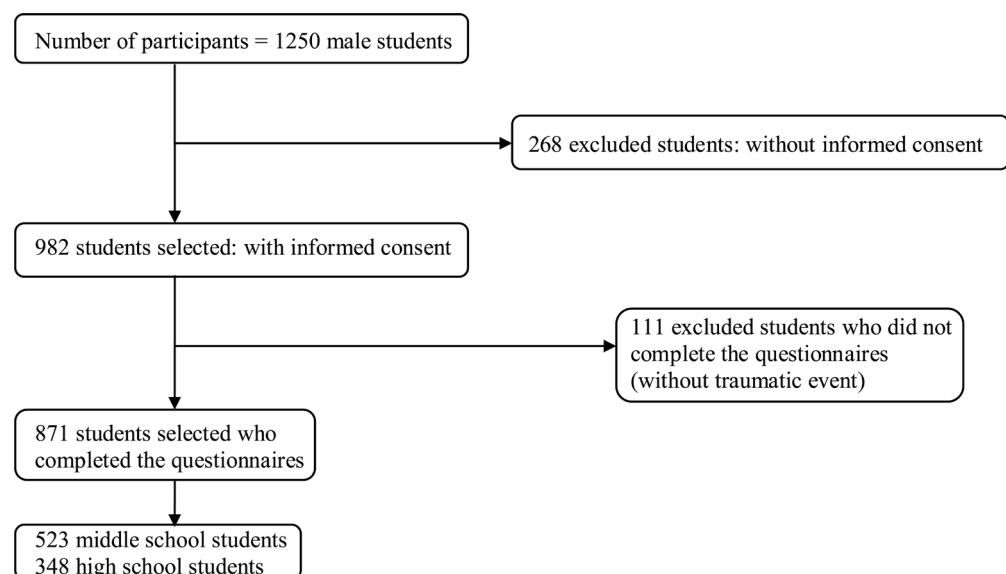


Figure 1. Participant presentation diagram.

of the students who have completed the entire procedure of inquiry.

The participation rate was therefore 78.56%. The percentage of students who were at least exposed to a traumatic event in their lifetime is 88.69%.

2.2. The Inclusion and Exclusion Criteria

Inclusion criteria:

- Have lived or witnessed a potentially traumatic event.
- To be currently educated.
- Being present at the school during the course of the study.
- Do not go beyond the age of 17 years.
- Have given informed consent.

The exclusion criteria:

- Do not be currently in school.
- Exceed the age of 17 years.
- Refuse to participate.
- Do not have a mental disability.

2.3. Judgment Criteria

The primary judgment criterion was self-assessment of students with the Children Post Traumatic Stress Reaction Index (CPTS-RI) which was conducted in a direct meeting with students to assess the post-traumatic stress disorder, this scale presents 20 items with 5 levels of scores, a score greater than 12 suggests the presence of a post-traumatic stress disorder with 4 categories of severity according to the score obtained.

The secondary objectives were to assess the presence of symptoms of comorbid anxiety and depressive disorders, respectively through the questionnaires State Treatment Inventory Anxiety Form Y (STAIY) and Children Depression Inventory (CDI).

2.4. Procedure

A first meeting was established with the principals of schools to explain the purpose of our study, also to fix and prepare an appointment with 50 students from each school.

On the other hand, it appears that children tend to protect their parents from information about real traumatic impact [7] [8]. Research has also shown that parents underestimate the post-traumatic reactions of their children [9] [10] [11]. This highlights the value of directly questioning children and adolescents to assess their symptoms of PTSD [12] [13].

In the second meeting that was with the 50 students, it was to explain the purpose and the interest of the study, if they had questions about the progress of the study, and then I distributed Information letter for each student explaining the purpose of the study and the informed consent that must be signed by their parents or guardians. In the third meeting and after receiving the informed con-

sents signed by the adolescents who agreed to participate in the study, the data was collected using two questionnaires that were completed only by the adolescents (A data questionnaire sociodemographic and a checklist of life events). In the fourth meeting, the rest of the data were collected using three questionnaires which were completed by themselves (CPTS-RI, STAIY and the CDI in turn). All the data was totally anonymous and I was there for all the meetings to answer any questions. Students who were absent during the third and fourth meetings, then had a fifth meeting scheduled for these students to accomplish the same goals of the third and fourth meetings.

That is, there are 111 adolescents who reported that they had not experienced any traumatic event in their lifetime, so they did not complete the CPTS-RI, STAIY and CDI questionnaires.

2.5. Materials Used

Measuring instruments self-administered to students collected data on the socio-demographic characteristics of the adolescent and his family and the symptoms of various disorders in the student. These instruments were administered according to the following steps:

- A questionnaire of socio-demographic data.
- Life Events Checklist is a list of challenging or stressful situations that students may have to experience and presents 17 questions to evaluate PTSA Criterion A as described by the DSM-IV Diagnosis and Statistical Manual for Mental Disorders (Diagnostic and Statistical Manual of Mental Disorders Version IV) [14]. For subjects who have never been confronted with a traumatic event defined by criteria A1 and A2 of the DSM-IV the investigations stopped, while the subjects having been confronted with a traumatic event the investigations continued.
- The CPTS-RI (Children's Post Traumatic Stress Reaction Index) to assess symptoms of PTSD after exposure to various traumatic events [15] and can be used as a self-administered scale in adolescents.

The CPTS-RI is one of the best studied tools and one of the most used in the world to detect PTSD and to quantify the intensity of the symptomatology given the good quality of its psychometric properties. 20-item scale for children from 6 to 16 years, each item on the scale is rated in 5 levels (0 never, 1 almost never, 2 sometimes, 3 often, 4 most often). The overall score varies between 0 and 80. The duration is 15 to 20 minutes. The CPTS-RI is a flexible tool that has been adapted to children or adolescents from different cultures, facing various traumatic experiences. It has been translated into several languages (English, Arabic, Croatian, Norwegian, Vietnamese and French).

The gradation into 4 categories according to the score is as follows: a score between 12 and 24 indicates a low level of PTSD, between 25 and 39 a moderate level, between 40 and 59 a severe level and a score of over 60 a very severe level.

CPTS-RI items corresponding to diagnostic criteria B (Symptoms of Revivis-

cence), C (Symptoms of avoidance and dullness) and D (Symptoms of over-activation) of the DSM III-R (American Psychiatric Association, 1987). However, the diagnostic criteria for PTSD are not very different between the DSM-III-R and the DSM-IV, they are only slightly different in the approach of certain symptoms and the DSM-III, DSM-III-R, DSM-IV criteria have been shown to have stable diagnostic validity rates.

- A self-assessment questionnaire that assesses anxiety levels STAIY (State Trait Inventory Anxiety Form Y Spielberger, 1983, French version of Brochon-Schweitzer and Paulhan, 1993) [16], Anxiety represents feelings of apprehension, tension, nervousness and anxiety that the subject feels. The time is not limited, but on average students take 10 minutes to complete the questionnaire. This scale includes 20 items, each answer to a questionnaire item corresponds to a score from 1 to 4 (1 indicating the lowest degree of anxiety, 4 the highest degree). This scale has lines indicated by I and lines indicated by O. For the lines indicated by I, the answer "no" is rated 4, rather no = 3, rather yes = 2 and yes = 1. For the lines indicated by O, the "no" is rated 1, rather no = 2, rather yes = 3, yes = 4. The total score thus varies from 20 to 80. The grades can be divided into five levels: higher than 65 (very high), 56 to 65 (high), 46 to 55 (medium), 36 to 45 (low), lower at 35 (very weak).

- A self-evaluation questionnaire that assesses the level of CDI depression (Children Depression Inventory) [15], this scale specifically evaluates the intensity of the symptomatology depressed (feelings of sadness, ability to take pleasure, suicidal ideation, feeling tired, academic efficiency, interpersonal relationships).

Depression is a disorder that is characterized by a profound change in the mood state in the sense of sadness, moral suffering and accompanied by many somatic symptoms.

The IDC targets children and adolescents aged 7 to 17 years and include 27 items. Each item contains three sentences describing, by increasing intensity, a depressive manifestation. The student must choose the sentence that best fits his condition in the last fifteen days. The duration of handover is 15 to 20 minutes. Each item is rated from 0 (absent or normal) to 2 (severe). A total score is calculated by the sum of all items, it ranges from 0 to 54.

2.6. Definitions of Terms

Trauma: This is an important emotional shock, usually related to a situation where a person or group of people has felt their life in danger and jeopardizes their psychic balance. These situations exceed the management capabilities of the majority of individuals.

Stress: It is a reflex, neurobiological, physiological and psychological reaction of alarm, mobilization and defense, of the individual in the face of an aggression, a threat or an unexpected situation. Next to a trauma, the individual can react in different ways, adapted or not.

Traumatic event: According to the DSM-IV-TR: “The subject has lived, witnessed or been confronted with an event or events during which individuals may have died or be very seriously injured or have been threatened with death or serious injury or where their physical integrity or that of others may have been threatened. The subject’s reaction to the event resulted in intense fear, feeling impotence or horror”.

Post-Traumatic Stress Disorder (PTSD): Whether in ICD-X or DSM-IV-R, PTSD is a combination of symptoms that can be used to diagnose it. These symptoms are consecutive to exposure to a traumatic event. They may be revealed or prolonged in time, beyond the withdrawal of the subject from the traumatic situation.

Anxiety: It is a biological mechanism that protects us from stressful and dangerous situations. The symptoms are an irrational and excessive fear, feeling of apprehension and tension, difficulty in managing the daily tasks, anxious thoughts, or excessive physical responses to the context.

Depression: This is a complex mood disorder caused by a variety of factors including genetic predisposition, personality, stress, and brain chemistry. The main symptom is a state of sadness or despair that is usually present and affects the person’s performance at work, school or social relations.

2.7. Statistical Analysis

The data collected were statistically processed using SPSS (Statistical Package for the Social Sciences) software version 13; this version was obtained at the laboratory of biostatistics and Clinical Research and Epidemiology (LBRCE) of the Faculty of Medicine and Pharmacy in Rabat-Morocco. The data were processed for a descriptive statistical analysis, these data were presented in the form of and percentage for each variable studied. Continuous or quantitative variables were also expressed as mean and standard deviation. The comparison of the quantitative variables was performed using the T test of Student. The comparison of qualitative or categorical variables was performed by a chi-square test (χ^2). A correlation was made for a comparison between the continuous variables using the Pearson correlation. The level of statistical significance was considered when $p < 0.05$.

2.8. Ethical Considerations

The research project began after receiving a research authorization from the Ministry of National Education. The work was first introduced by the information necessary for the informed consent of the participants. Students were informed of the research objectives and the confidentiality of the answers, followed by letter information explaining the purpose of the study and prior informed consent were sent to the parents or guardians of the 1250 students. After their agreement on the study, the prior consent forms were signed by 982 students.

3. Results

3.1. Traumatic Characteristics and Events of the Sample

1) Sociodemographic data:

There were 871 adolescents in school and they were presented by 391 boys (44.9%) and 480 girls (55.1%). The 871 students completed a questionnaire on their social, family, school and consumption status of psychoactive substances (tobacco, alcohol and illicit drugs) **Table 1** shows the different sociodemographic data of students.

The average age of the students was 14.98 (standard deviation = 1.497), the minimum age is 12, and the maximum age is 17. The average number of students' brothers was 2.56 (standard deviation = 1.450). The parents' income was low with an average of 2 out of 6 on the scale, which implies that it is around 2000 dirhams (dh) and 4000 dirhams per month (standard deviation = 1.506). With regard to psychoactive products, weekly smoking frequency was low with an average of 1.27 (standard deviation = 2.495), alcohol frequency per week appeared to be too low with an average of 0.03 (standard deviation = 0.212) and the average frequency of illicit drug use per week (especially Indian hemp, also called hashish or cannabis) was 0.47 (standard deviation = 1.517) so is a low consumption.

Pupils with a college level had 60%, while high school students had 40%. Most of the students were from the town of salé (97.5), while only 2.5% of the students were from the city Sidi bouknadel because it is a very small town by contribution to the town of salé. The majority of students had parents who were in couples (83.4%). Only 2.9% of fathers were unemployed, while 83.7% of mothers were housewives. 6.7% of families were found to have insanitary housing (lived in a garage, in a single room, or in a slum).

2) Exposure to traumatic events:

There are 17 traumatic events in the life events checklist; all students responded that they did not experience the following traumatic event during their lifetime: Participation in a fight or presence in a war zone.

The 871 students responded that they experienced one or more traumatic events during their lifetime. **Table 2** illustrates the various traumatic events experienced by students during their life and the duration of the traumatic event.

Students who had experienced the following traumatic events had a very low proportion:

- Serious injury, injury or death caused by you to someone 1.0%.
- Natural disaster 1.1%.
- Exposure to a toxic substance 1.3%.
- Captivity 1.4%.
- Other unwanted and unpleasant sexual experience 1.7%.

The most significant and stressful event was the sudden and unexpected death of a loved one with 27.7% of students followed by the following traumatic events: Another very stressful experience with 17.5% and Accident of the way

Table 1. Données sociodémographiques.

| | Effective | Percentage (%) |
|--------------------------------|-----------|----------------|
| Sex | | |
| Male | 391 | 44.9 |
| Female | 480 | 55.1 |
| Age | | |
| 12 | 56 | 6.4 |
| 13 | 101 | 11.6 |
| 14 | 177 | 20.3 |
| 15 | 171 | 19.6 |
| 16 | 200 | 23.0 |
| 17 | 166 | 19.1 |
| City of salé (district) | | |
| Lamrissa | 161 | 18.5 |
| Tabriquet | 228 | 26.2 |
| Bettana | 99 | 11.4 |
| Layaada | 155 | 17.8 |
| Karia | 114 | 13.1 |
| Salé jdida | 92 | 10.5 |
| City of Sidi bouknadel | 22 | 2.5 |
| Class | | |
| Middle School 1 | 148 | 17.0 |
| Middle School 2 | 169 | 19.4 |
| Middle School 3 | 206 | 23.7 |
| High school 1 | 213 | 24.4 |
| High school 2 | 125 | 14.4 |
| High school 3 | 10 | 1.1 |
| Family situation | | |
| Married | 726 | 83.4 |
| Divorced | 46 | 5.3 |
| Death of one of the parents | 64 | 7.3 |
| Death of parents | 2 | 0.2 |
| Host family | 33 | 3.8 |
| Father's job | | |
| Trade | 300 | 34.4 |
| Employee | 174 | 19.9 |
| Public function | 242 | 27.8 |
| Retirement | 70 | 8.0 |
| Unemployed | 25 | 2.9 |

Continued

| | | |
|------------------------------|-----|------|
| Mother's job | | |
| Trade | 34 | 3.9 |
| Employee | 49 | 5.7 |
| Public function | 45 | 5.1 |
| Retirement | 3 | 0.3 |
| Unemployed | 729 | 83.7 |
| Salary | | |
| Under 2000 dh | 219 | 25.1 |
| Between 2000 - 4000 dh | 224 | 25.7 |
| Between 4000 - 6000 dh | 166 | 19.1 |
| Between 6000 - 8000 dh | 124 | 14.2 |
| Between 8000 - 10,000 dh | 88 | 10.1 |
| More than 10,000 dh | 50 | 5.7 |
| Type of accommodation | | |
| House | 391 | 44.9 |
| House rental | 81 | 9.3 |
| Apartment | 235 | 27.0 |
| Apartment rental | 106 | 12.2 |
| Insalubrious housing | 58 | 6.7 |
| Tobacco | | |
| No | 640 | 73.5 |
| Yes | 231 | 26.5 |
| Alcohol | | |
| No | 846 | 97.1 |
| Yes | 25 | 2.9 |
| Illegal drugs | | |
| No | 774 | 88.9 |
| Yes | 97 | 11.1 |

Table 2. Exposure to traumatic events and their duration.

| | Effective | Percentage (%) |
|--|-----------|----------------|
| 1) Event | | |
| Natural disaster | 10 | 1.1 |
| Fire or explosion | 28 | 3.2 |
| Accident of the public way | 82 | 9.4 |
| Serious accident at school, at home or during leisure activities | 33 | 3.8 |
| Exposure to a toxic substance | 11 | 1.3 |
| Physical aggression | 56 | 6.4 |
| Hold-up | 53 | 6.1 |

Continued

| | | |
|--|-----|------|
| Sexual assault | 21 | 2.4 |
| Another unwanted and unpleasant sexual experience | 15 | 1.7 |
| Captivity | 12 | 1.4 |
| Illness or life-threatening injury | 38 | 4.4 |
| Intense human suffering | 67 | 7.7 |
| Violent death (homicide, suicide, ...) | 43 | 4.9 |
| Sudden and unexpected death of a loved one | 241 | 27.7 |
| Serious injury, damage or death caused by you to someone | 9 | 1.0 |
| Another very stressful experience | 152 | 17.5 |
| 2) Date of event | | |
| Between one month and 3 months | 149 | 17.1 |
| Between 3 months and 6 months | 130 | 14.9 |
| Between 6 months and one year | 136 | 15.6 |
| Between 1 year and 3 years | 196 | 22.5 |
| Between 3 year and 5 years | 102 | 11.7 |
| More than 5 years | 158 | 18.1 |

audience with 9.4%. It was noted that the majority of students who had the traumatic event: Sudden and unexpected death of a loved one, were influenced by sudden and unexpected death of a father or a mother or a brother or sister or grandfather or a grandmother.

The average of the event date was 4.51 (standard deviation = 1.703) which implies that it is around 3 months and 6 months.

3.2. Post Traumatic Stress Disorder and Comorbid Disorders

After the student chose the most stressful and unpleasant traumatic event, he completed the CPTS-RI questionnaire to assess the impact of this event and whether he was likely to generate a PTSD or not.

Table 3 demonstrates the responses given by the student from the scale CPTS-RI.

Combining the percentages of choice and choice almost every day, the results of the CPTS-RI questionnaire showed that 48.1% of students suffered from repetitive and pervasive memories of the event, such as having pictures, thoughts and perceptions that have resurfaced spontaneously, unwittingly and without triggering anything (criterion B1).

As well as students who had overwhelming memories (criterion B4) had 29%, these adolescents exhibit intense psychological pain when exposed to triggers that resemble or symbolize an aspect of the traumatic event (being upset when something has recalled the event or something triggers painful feelings related to the event).

While 36.2% (criterion C2), as well as 27.6% (criterion C4) and 25.4% (criterion C5) respectively presented social avoidance (try to avoid certain activities,

Table 3. Responses to the Self-Assessment Scale Children Post Traumatic Stress-Reaction Index: CPTS-RI.

| CPTS-RI items | Never (%) | Almost Never (%) | Sometimes (%) | Often (%) | Almost every day (%) |
|---|-----------|------------------|---------------|-----------|----------------------|
| Exposure to a traumatic event | | | | | |
| Traumatic event identification (A1) | 10.2 | 43.3 | 24.1 | 15.6 | 6.8 |
| Regular fear (A2) | 7.9 | 48.5 | 18.0 | 16.3 | 9.3 |
| Symptoms of reviviscences of the event | | | | | |
| Repetitive images (B1) | 37.8 | 19.4 | 18.0 | 15.2 | 9.6 |
| Repetitive thoughts (B1) | 32.6 | 30.3 | 13.8 | 14.9 | 8.4 |
| Repetitive Dreams (B2) | 47.9 | 24.1 | 14.6 | 8.4 | 5.1 |
| Flashbacks (B3) | 39.3 | 26.5 | 14.1 | 10.2 | 9.9 |
| Stunning memories (B4) | 38.6 | 24.7 | 7.7 | 19.7 | 9.3 |
| Physiological reactivity (B5) | 70.8 | 7.7 | 8.3 | 8.2 | 5.1 |
| Symptoms of avoidance and emotional blunting | | | | | |
| Sentimental avoidance (C1) | 48.6 | 18.9 | 10.0 | 12.4 | 10.1 |
| Social avoidance (C2) | 39.8 | 16.6 | 7.3 | 20.0 | 16.2 |
| Difficulty remembering (C3) | 43.6 | 36.7 | 8.5 | 7.0 | 4.1 |
| Disinterest in activities (C4) | 15.4 | 39.0 | 18.0 | 14.5 | 13.1 |
| Sense of posting (C5) | 37.4 | 25.8 | 11.3 | 13.5 | 11.9 |
| Restriction of affects (C6) | 41.3 | 25.7 | 10.1 | 14.9 | 7.9 |
| Symptoms of over-activation | | | | | |
| Sleep interrupted (D1) | 9.2 | 44.0 | 18.4 | 12.1 | 16.4 |
| Irritability or tantrum (D2) | 61.9 | 9.8 | 9.9 | 9.8 | 8.7 |
| Difficulties of concentration (D3) | 27.8 | 40.0 | 9.8 | 10.8 | 11.7 |
| Exaggerated startle reaction (D5) | 39.0 | 31.0 | 9.0 | 12.5 | 8.5 |
| Associated symptoms | | | | | |
| Guilt | 55.9 | 9.0 | 10.2 | 14.6 | 10.3 |
| Regression | 75.0 | 7.7 | 6.7 | 5.7 | 4.9 |

Items A to D are included in the DSM-IV criteria (309.81 Post-Traumatic Stress Disorder, American Psychiatric Association, 1994).

certain situations or some people who recall the traumatic event), lack of interest in activities (having a marked decrease in interest or participation in important activities that teens were happy to do or no longer do after the event) and feeling of detachment (feeling detached or foreign to others and no one understands what happened to him).

D1 (Interrupted Sleep) was present in 28.5% of adolescents who had difficulty falling asleep or staying asleep.

The students also presented 25% for guilt because they felt guilty for not doing something they wanted to do, such as helping someone, etc., or doing something they would not have liked make.

The calculation of the students' CPTS-RI scores revealed that 557 (63.9%)

participants had PTSD with a severity level between low and very severe, while 314 (36.1%) did not presented a PTSD. **Table 4** shows the severity level of the post traumatic stress disorder given by the scores of CPTS-RI.

Students with PTSD found 40.2% of boys, while girls had 59.8%, so girls had a higher rate of PTSD than boys.

Comparing students with PTSD and students without PTSD, we found:

Students with PTSD were younger than students without PTSD ($t = 3.099$ and $p = 0.002$) and parents of these students with PTSD had lower monthly income than students without PTSD ($t = 2.700$ and $p = 0.007$).

Students with PTSD had more difficulty remembering things they learned at school or at home (because they thought about the event) than students without PTSD ($t = -4.261$ and $p = 0.000$) and these students with PTSD were less attentive and focused than students without PTSD ($t = -12.219$ and $p = 0.000$).

Students with PTSD had less fun at school than students without PTSD ($t = -2.158$ and $p = 0.031$).

Students with PTSD were more depressed than students without PTSD ($t = -2.963$ and $p = 0.003$) and those students with PTSD were more anxious than students without PTSD ($t = -3.295$ and $p = 0.001$).

Unfortunately, a high percentage of students (73%) reported that they had poor school results.

The gender difference was significant between the group with PTSD and the group without PTSD, which implies that girls are more likely than boys to develop PTSD ($\chi^2 = 13.653$ and $p = 0.000$).

The difference between the group with PTSD and the group without PTSD was significant at the level of the event type ($\chi^2 = 27.917$ and $p = 0.022$) and at the level of the environment ($\chi^2 = 74.639$ and $p = 0.000$). Students who skip the group with PTSD are more likely than students in the group without PTSD ($\chi^2 = 6.090$ and $p = 0.014$).

A correlation was found between the following variables:

The higher the age, the higher the frequency of tobacco ($r = 0.334$ and $p = 0.000$), the frequency of alcohol ($r = 0.151$ and $p = 0.000$) and the frequency of illicit drugs ($r = 0.243$ and $p = 0.000$) increased.

Also, the higher the number of siblings, the higher the frequency of tobacco (r

Table 4. The Severity Level of Post Traumatic Stress Disorder (PTSD) by CPTS-RI score.

| | Effective | Percentage (%) |
|------------------|-----------|----------------|
| Without PTSD | 314 | 36.1 |
| Low PTSD | 170 | 19.5 |
| Moderate PTSD | 219 | 25.1 |
| Severe PTSD | 158 | 18.1 |
| Very severe PTSD | 10 | 1.2 |

Without PTSD < 12; 12 - 24: Low PTSD; 25 - 39: Moderate PTSD; 40 - 59: severe PTSD; Very severe PTSD > 60.

= 0.121 and $p = 0.000$), the frequency of alcohol ($r = 0.143$ and $p = 0.000$) and the frequency of illicit drugs ($r = 0.121$ and $p = 0.000$) increased.

The higher the age, the more difficult the student had to remember things they learned at school or at home ($r = 0.072$ and $p = 0.035$), did not do their homework ($r = 0.130$ and $p = 0.000$) and poor school grades increased ($r = 0.131$ and $p = 0.000$).

The lower the monthly income, the worse the academic results ($r = -0.076$ and $p = 0.024$), the level of anxiety ($r = -0.087$ and $p = 0.010$) and the level of depression ($r = -0.070$ and $p = 0.039$) increased.

The higher the frequency of smoking, the higher the frequency of alcohol ($r = 0.337$ and $p = 0.000$), the frequency of illicit drugs ($r = 0.664$ and $p = 0.000$) and the poor school results ($r = 0.078$ and $p = 0.021$) increased. As well, the higher the incidence of alcohol, the higher the frequency of illicit drugs ($r = 0.522$ and $p = 0.000$).

The higher the frequency of smoking ($r = 0.072$ and $p = 0.032$), the frequency of alcohol ($r = 0.081$ and $p = 0.016$) and the frequency of illicit drugs ($r = 0.068$ and $p = 0.045$) increased, the more student does not play at school.

The more difficult the student had to remember things they learned at school or at home ($r = 0.107$ and $p = 0.002$), did not do their homework ($r = 0.082$ and $p = 0.016$) increased and the concentration ($r = -0.073$ and $p = 0.032$) decreased, the worse the school results were.

The lower the event date, the more difficult the student had to remember things they learned at school or at home ($r = -0.084$ and $p = 0.013$), the level of anxiety ($r = -0.079$ and $p = 0.020$) and the level of depression ($r = -0.070$ and $p = 0.039$) increased.

The higher the level of PTSD ($r = 0.213$ and $p = 0.000$), the level of anxiety ($r = 0.394$ and $p = 0.000$) and the level of depression ($r = 0.511$ and $p = 0.000$) increased, more the student's desire to commit suicide has increased.

The higher the level of PTSD, the more difficult it was for students to remember things they learned at school or at home ($r = 0.419$ and $p = 0.000$), concentration ($r = 0.367$ and $p = 0.000$), did not do his homework ($r = 0.090$ and $p = 0.008$) and the grades that were bad ($r = 0.083$ and $p = 0.014$) increased.

There was a correlation between the CPTS-RI score and the STAIY and CDI scores ($r = 0.389$ and $p = 0.000$) and ($r = 0.327$ and $p = 0.000$) respectively.

Comorbid disorders anxiety and depression are the most common pathologies associated with PTSD and are evaluated by the STAIY and CDI scales that have shown that 735 (84.4%) students have anxiety and 8 (15, 6%) students without anxiety. While, 481 students (55.2%) have depression and 390 (44.8%) students do not have depression. **Table 5** demonstrates the different levels of anxiety and depression in students.

For the group with PTSD, there were 293 girls (52.6%) who had anxiety, while there were only 182 boys (32.7%) with anxiety.

For the same group with PTSD, there were 213 girls (38.2%) who had depression,

Table 5. Level of Anxiety (STAIY) and Level of Depression (CDI) according to the scores.

| Level of anxiety | Effective | Percentage (%) |
|----------------------------|-----------|----------------|
| Without anxiety (<35) | 136 | 15.6 |
| Low anxiety (35 - 45) | 259 | 29.7 |
| Moderate anxiety (46 - 55) | 232 | 26.7 |
| High anxiety (56 - 65) | 150 | 17.2 |
| Very high anxiety (>66) | 94 | 10.8 |
| Level of depression | | |
| Not depressed (<15) | 390 | 44.8 |
| Depressive (> or equal 15) | 481 | 55.2 |

while there were only 110 boys (19.8%) with depression.

The majority of students with PTSD are anxious, which involves a combination of behaviors such as avoidance, hesitation, nervousness, worry, uncertainty, withdrawal, ritualized actions and the emotional component of fear.

We also found a correlation between the following variables:

The higher the level of anxiety, the more difficult the student had to remember things they learned at school or at home ($r = 0.296$ and $p = 0.000$), did not do their homework ($r = 0.230$ and $p = 0.000$), school grades that are poor ($r = 0.184$ and $p = 0.000$) and age ($r = 0.207$ and $p = 0.000$) have increased.

The higher the level of depression, the more difficult it was for students to remember things they learned at school or at home ($r = 0.289$ and $p = 0.000$) and age ($r = 0.125$ and $p = 0.000$) increased.

Also, the higher the level of depression, the more the student does not do his homework ($r = 0.374$ and $p = 0.000$), does not play at school ($r = 0.231$ and $p = 0.000$) and the school grades that are bad ($r = 0.286$ and $p = 0.000$) have increased.

There is a correlation between the STAIY score and the CDI score, the higher the level of anxiety, the higher the level of depression ($r = 0.694$ and $p = 0.000$).

4. Discussion

The aim of our study was the evaluation of PTSD post-traumatic stress disorder in adolescents in public schools in the Salé prefecture of Morocco.

The post-traumatic stress disorder of international classifications is not the only type of observable disorder in children and adolescents as a result of trauma, but it is the most characteristic and frequent form psychotraumatic involvement [17] [18] [19].

In 1987, the DSM-III Revised took into consideration the diagnostic elements specific to children and adolescents [17]. Since then, the reality of PTSD in school-aged children and adolescents has been confirmed by numerous studies [20] [21], some of which have verified the adequacy of the diagnostic criteria of

the DSM-III-R [22] [23] [24].

The age of the participating teenagers is from 12 to 17 years, our main questionnaire the CPTS-RI is interested in the age group of 6 ans to 16 ans but according to the scientific literature, one can go up to 17 and [25] [26] and also to have students from the last year of high school in our survey whose teenagers are over 16 years old.

The majority of PTSD studies generally address an adult population [27] [28] [29] [30]. While work in children and adolescents are few: PubMed referenced 13,420 articles on PTSD in adults, against 4830 for children.

While the literature is abundant for adult patients, it remains much more restricted for children and adolescents [31]. While in recent years, the various traumas in childhood and adolescence are the subject of new research and studies in this direction are increasing.

The clinical picture of post-traumatic stress disorder in children and adolescents is comparable to that observed in adults, although there are some developmental features related to age [32] [33] [34].

In our study, the percentage of students who were at least exposed to a traumatic event in their lifetime is 88.69%. We also note that a high rate of students who have developed a state of post-traumatic stress, with different levels of severity, after a traumatic event or during the traumatic event. There were 63.9% of school-aged adolescents who had PTSD (19.5% PTSD low, 43.2% PTSD moderate and severe, and 1.2% very severe), which gives a high rate of PTSD this is due to a young age population and also the country where the survey was conducted. According to studies by Chossegros *et al.*, 2011 and Ma *et al.*, 2011 [35] [36], youth in high-income countries have lower PTSD rates than those living in medium or low income as developing countries. That's why these teens are more likely to develop PTSD.

According to Giaconia and colleagues (1995) [37], children and adolescents are more likely to experience trauma than adults. Following traumatic exposure, the percentage of children developing PTSD remains high compared to adults, ranging from 25% to 50%, depending on the age and type of trauma experienced [38] [39] [40] [41].

Adolescents are growing individuals and particularly sensitive to psychological shocks [42]. They are less well prepared than adults socially and psychologically for dealing with trauma [43]. For these reasons, they are more likely than themselves to develop PTSD [44].

In our study, the most significant and stressful event was the sudden and unexpected death of a loved one with 27.7% of adolescents.

For children and adolescents, a longitudinal study that uses a wide range of injuries reports that before age 16, nearly 68% of youth will have been exposed to at least one traumatic event, while the prevalence in the course of a lifetime would approach 100% [37] [45] [46] [47]. The most reported child and youth events are the death of a family member, the threat of violence, physical bullying

at school, near-drowning and road crashes [46]. Adolescents are more likely to be traumatized than children because of the level of risk involved in their activities and possibly because of decreased parental supervision as a function of age.

All events are not equivalent. Some traumas are extreme and others intentional. The results are very variable according to the studies. The prevalence of PTSD in children and adolescents is generally high and may affect up to 70% or 80% of subjects after a major traumatic event such as sexual assault [48].

On the other hand, when the young person is exposed to a traumatic event, the risks of developing PTSD increase. A meta-analysis of 2697 trauma survivors shows that 36% of them have developed PTSD [49]. This prevalence varies by age: 39% in preschool children (under six years of age), 33% in school-aged children (6 to 12 years) and 27% in adolescents (13 to 17 years). It should be noted that the prevalence of PTSD in traumatized adults is around 24% [50].

People who have been injured, have lost a loved one (parent, friend ...) or have lost their home, have a higher percentage of PTSD, and more symptoms than people who have experienced less violence [36]. These results were also highlighted in the study by Yang *et al.* (2011) [51]. According to these authors, a serious injury (for oneself or for others) or the loss of a loved one is risk factors for developing PTSD. Adolescence is also a critical period, characterized by problems in emotional regulation and behavior. This leads to an increased risk of experiencing a potentially traumatic event and the risk of developing PTSD [52].

Belonging to a minority or poor ethnic community would result in a higher risk of developing PTSD [35] [36]. Prevalence studies report that between 5% and 90% of individuals exposed to trauma will develop post-traumatic stress disorder [50] [53] [54] [55].

In her thesis, C. Berthiaume [56] emphasized that the prevalence varies according to the instruments used, the differences between the studied populations (sex, age, environment, ethnic origin, etc.), and the type of trauma, severity and chronicity of symptoms [57] [58].

According to the results of our study, students who had PTSD had found 40.2% of boys, while girls had 59.8%, so girls had a higher rate of PTSD than boys.

In British youth who were traumatized after being rescued from a sinking ship, teenage girls had higher scores than teens for all factors and for the total PTSD score [59]. The diagnosis of post-traumatic stress disorder appears more frequently in girls than in boys [34] [60]. Some authors show that there is no difference between girls and boys in the number or types of traumatic events they experience [37] [61]. Others argue, however, that boys cope more frequently than girls with these types of incidents, but that girls develop more PTSD [62] [63].

In anxiety disorders, social phobia or social anxiety and a post-traumatic stress episode would be involved in the early onset of consumption and the early

evolution of this consumption towards abuse/dependence on a psychoactive substance [64] [65] [66] [67].

In terms of tobacco, alcohol and illicit drug use, 27% of tobacco, 3.23% of alcohol and 11.85% of illicit drugs were found, with boys dominating for all psychoactive substances.

According to Tian *et al.* (2014) [68], the most common symptoms of PTSD in adolescents are relapses, difficulty concentrating and permanent fear.

In adolescents, substance abuse, antisocial behavior, social withdrawal, somatic complaints, decreased academic performance, sleep problems, suicidal ideation can be seen [69]. The literature reports that academic difficulties and poor performance may be at the forefront of children and adolescents with post-traumatic stress disorder [48]. In the longer term, the consequences of PTSD can be manifested by difficulty concentrating, dropping out of school, episodes of depression and suicidal attempts [70]. Adolescents with PTSD demonstrate several other issues such as problems in their interpersonal relationships, poor academic outcomes and health problems [37].

An internal attribution is a risk factor because the main feelings felt by those who have made an internal assignment are centers around shame and guilt [71]. As for memory, there is very little research that deals with the disorders that appear in teenagers in PTSD. One of them is about girls who have been sexually abused. The results show that they have more mnemonic difficulties than girls in the control group [72].

For our study, we found 17.41% of teenagers with PTSD who have difficulty remembering things that the teenager learned at school or at home. 72.5% of students with declining grades were found, 34.5% showed difficulty in concentrating and 5.75% of adolescents who want to commit suicide. As well as 38.8% of young people prove guilt.

As for social disability, in the general population suffering from PTSD increases the risk of divorce, school failure, early pregnancy and unemployment, specifically an individual with PTSD has a high probability of 40% of school failure at middle school and/or high school, 30% experience an early pregnancy (adolescence), 60% suffer from marital problems and 150% to be unemployed than those who do not have the symptomatology [73].

Many comorbid conditions can appear following the development of PTSD, such as anxiety, depression, the presence of suicidal ideation, attention deficit disorder with or without hyperactivity, eating disorders or somatic disorders [74].

In our study, high levels of anxiety (85.3%) and depression (58%) were found for adolescents with PTSD. Namely, boys have more comorbid disorders than girls.

It is estimated that 75% of adolescents have a comorbid disorder with PTSD [75]. Having a comorbid disorder, primarily an anxiety or depressive disorder, influences the intensity of PTSD symptomatology and the maintenance of PTSD [76] [77] [78].

Compared with adults, young people are more vulnerable to anxiety and depression [79]. Girls would tend to have more severe and chronic symptoms for both PTSD and related anxiety and depressive disorders [49] [80]. On the other hand, boys with PTSD have more comorbidities (88.3%) than girls (79%) with the same psychopathology [47].

5. Conclusions

We note that exposure to a traumatic event can develop in the teenager a post traumatic stress disorder.

The psychological impact of PTSD can persist for many years and usually worsens when it is not treated [80]. In the long term, PTSD can have negative consequences for self-esteem, self-efficacy, and affect regulation [81]. It can also interfere with the optimal development of the child by interfering with cognitive, academic and social abilities as well as with the variety of his repertoire of coping strategies [82] [83].

PTSD is often associated with other disorders that present comorbid disorders anxiety and depression. In this study, these post-traumatic stress disorders, anxiety, and depression have a direct and negative effect on students' school life.

After the development of PTSD, there are practical implications for coping with this post-traumatic stress disorder, which involves treating PTSD in these adolescents and the treatments commonly used and recommended are CBT (cognitive-behavioral therapies, CBT is one of the most effective psychotherapeutic treatments) and EMDR (Eye Movement Desensitization and Reprocessing or Eye Movement, Desensitization and Reprocessing (Information)) [84]. There are also other treatments that are pharmacotherapy (the most used drugs are antidepressants) by the intervention of a professional, psychoeducation and social and family support.

A PTSD treatment program for children aged 7 to 17 and their parent/guardian is offered over four sessions, during which the provider conducts an assessment, offers psychoeducation and teaches coping skills [38]. At the end of therapeutic sessions, nearly 90% of individuals are considered to be in partial or total remission for PTSD [85].

Conflict of Interests

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

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Abbreviations

PTSD: post-traumatic stress disorder

DSM-IV: Diagnostic and Statistical Manual for Mental Disorders fourth version

CPTS-RI: Children Post Traumatic Stress Reaction Index

STAIY: State Trait Inventory Anxiety forme Y

CDI: Children Depression Inventory

ICD: International Classification of Diseases