Psychiatry Research 275 (2019) 181–188

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Childhood sexual abuse as a potential predictor of psychotic like experiences in Tunisian college students

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ARTICLE INFO

Keywords:
CAPE
Psychosis
Sexual abuse
Childhood trauma
Early intervention

ABSTRACT

Background: Current research has shown that experiencing childhood trauma may predispose individuals for psychosis and expression of Psychotic like experiences (PLEs). We aimed to examine the prevalence and characteristics of PLEs and depressive and negative experiences in a sample of Tunisian college students, and to evaluate the impact of childhood traumas in the occurrence and severity of these experiences at the time of the survey.

Method: A total of 482 college students (63.7% female; aged 18–32) participated in a cross-sectional survey. The Positive Subscale of Community Assessment of Psychotic Experiences (CAPE) was used to measure PLEs. The Childhood Trauma Questionnaire was used to assess childhood trauma and neglect.

Results: 53.5% (n = 258) of the students reported at least one positive PLE 'nearly always', and 40.9% (n = 197) reported at least one negative PLE with this frequency. After controlling for demographic variables (gender, age) and psychosocial factors (drug use, depression, anxiety and stress), sexual abuse significantly contributed to PLEs.

Conclusion: There is a need for further cross-cultural research regarding the phenotypal expression of PLEs and its associated variables. Child sexual abuse victims should receive systematic and complete psychological screening during their adolescence/ early adulthood including, among others, PLEs and psychotic symptoms.

1. Introduction

Psychotic like experiences (PLEs) have been defined as subclinical positive symptoms of psychosis (Sun et al., 2015), which are commonly experienced in childhood (Poulton et al., 2000) and adulthood (Johns et al., 2004), causing in some cases distress or impairment. The presence of PLEs in childhood and adolescence has been found to increase the risk of later full clinical psychoses (Kaymaz et al., 2012), suggesting that psychosis could be a continuous phenotype. Thus, PLEs symptoms would be quantitatively less severe but qualitatively similar to the symptoms seen in psychosis (Fonseca-Pedrero et al., 2011), with a phenomenological and temporal continuity between PLEs and psychotic disorder (Linscott and Van Os, 2013).

Fonseca-Pedrero et al. (2011) suggested that PLEs may be considered as the behavioral expression of vulnerability to psychotic disorders. The outcome of PLEs might be altered (persistence of psychotic symptoms and need for clinical care) by exposure to additional environmental risk factors, particularly trauma (Fonseca-Pedrero et al., 2011). The early detection of subjects at risk for psychotic disorders and the elucidation of factors related to the presence or exacerbation of PLEs may lead to the establishment of early intervention programs in a period of risk for the development of psychopathology as in adolescence/early adulthood. Systematic reviews and meta-analyses showed that individuals experiencing PLEs share multiple risk factors with those experiencing psychotic disorders (Linscott and Van Os, 2013), including stressful or traumatic events.

Current research has consistently shown that experiencing a childhood traumatic event may predispose individuals for psychosis (Varese et al., 2012), and expression of PLEs (Read et al., 2005; Misiak et al., 2017). A number of studies in a range of samples found that physical abuse, unwanted sexual experiences, exposure to domestic violence, and bullying were associated with the occurrence and severity of PLEs (Read et al., 2005; Fisher et al., 2013; Gibson et al., 2016; Grivel et al., 2018). A meta-analysis of patient-control, prospective- and cross-sectional cohort studies examining the effect of specific adverse experiences found that, with the exception of parental death, statistically significant associations were observed between all types of childhood adversity (sexual abuse, physical abuse, emotional/

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https://doi.org/10.1016/j.psychres.2019.03.034
Received 2 January 2019; Received in revised form 19 March 2019; Accepted 19 March 2019
Available online 20 March 2019
0165-1781/

psychological abuse, neglect, bullying) and psychosis (Varese et al., 2012). Prevalence estimates indicated that 89.7% of a national sample of 2953 U.S. adults reported exposure to some sort of trauma and adverse events (Kilpatrick et al., 2013), and that PLEs are present in about 8% of the general population (Van Os et al., 2009). Moreover, higher rates of childhood victimization were reported across the spectrum of psychosis compared to the general population (Hardy, 2017).

A very few studies have examined the unique contributions of childhood trauma on PLEs, particularly in our Arab Muslim context. Given the higher rates of childhood trauma among individuals with psychosis and early evidence suggesting its impact on psychotic disorders occurrence and severity, we proposed to explore whether history of traumatic experiences may be predictive of other clinically-relevant outcomes, especially PLEs. Thus, the main objectives of this work were to examine the prevalence and characteristics of PLEs and depressive and negative experiences in a sample of Tunisian college students, and to evaluate the impact of childhood traumas in the occurrence and severity of these experiences at the time of the survey.

2. Method

2.1. Sample

We conducted a cross-sectional study among students of three major universities of Tunis ("Faculty of law and Political sciences of Tunis", "University of Human and Social Sciences of Tunis" and "National Engineering School of Tunis"). All the students gathered at these universities, between February 1st and May 31st 2018, were invited to answer an anonymous, self-administered questionnaire. Exclusion criteria for the study include participants with history of any psychiatric conditions (according to the socio-demographic information in the questionnaires) and who had data missing.

Forty students refused to participate. Five-hundred-and-two students correctly answered the questionnaires, and 20 were excluded due to incomplete information. Finally, 482 students were enrolled in the study: 27.6% ($n = 133$) were from the Faculty of law and Political sciences of Tunis, 46.1% ($n = 222$) were from the University of Human and Social Sciences of Tunis, and 26.3% ($n = 127$) were from the National Engineering School of Tunis; with a participation rate of 88.9%.

All participants gave voluntary informed consent for the study, and had the right to refuse to participate in the research without prejudice to them. In general, it took 45 min for the students to fill in the questionnaires. The survey and the scales were written in French and self-completed by each student who has agreed to participate in the study. The language of the survey is not a barrier to the students' completion of the survey because it is the language of all university studies in the country.

The study was approved by the Institutional Review Board of The three universities.

2.2. Instruments

Socio-demographic information to be collected included: gender, age, marital status, living arrangements, parents' educational level, parents' occupation, family income, habitation, residence, substance use, pastime, stressful life events experienced during the previous 12 months, family history of suicide attempts, and past history of any psychiatric conditions for participants.

The ***"Community Assessment of Psychic Experiences" (CAPE)*** was used to evaluate the lifetime PLEs in our sample (Stefanis et al., 2002; Konings et al., 2006). This self-report instrument consists of 42 items covering positive, depressive and negative dimensions (PD, DD and ND) on Likert scales for both frequency (1 = never, 2 = sometimes, 3 = often, 4 = nearly always) and a distress (1 = not distressed, 2 = a bit distressed, 3 = quite distressed, 4 = very distressed) levels. It includes 20 items of positive psychotic experiences derived from Peters et al. Delusions Inventory (PDI-21) (Peters et al., 1999), 14 items exploring negative experiences derived from an instrument of subjective experience of negative symptoms (SENS) (Selten et al., 1998), and 8 cognitive depressive experiences (Kibel et al., 1993). Previous results have indicated the CAPE to be stable, reliable and valid (Konings et al., 2006). In this study, we used the French version of the CAPE (Brenner et al., 2007).

Students have been assessed for the history of a childhood maltreatment using the "***Childhood Trauma Questionnaire" (CTQ)*** (Bernstein et al., 1994). The CTQ is a retrospective self-report questionnaire that examines the traumatic experiences during childhood and adolescence (Bernstein et al., 1997). The CTQ was designed to evaluate five types of traumatic childhood experiences of adults and adolescents: (1) emotional abuse, (2) physical abuse, (3) sexual abuse, (4) emotional neglect, and (5) physical neglect. It comprises 28 items and each item is rated from 1 (never) to 5 (very often). Scores range from 5 to 25 for each type of abuse. The sumscores of the subscales are classified for severity on four levels according to Bernstein' classification (Bernstein et al., 2003). The CTQ has demonstrated excellent test-retest reliability with values ranging from 0.79 to 0.81 (Bernstein et al., 1994). We used the 28-item CTQ french version that has been standardised and validated in 2004 (Paquette et al., 2004).

The ***"Depression, Anxiety and Stress Scales" (DASS-21)*** (Lovibond and Lovibond, 1995) were used to assess students' psychological distress. It is a self-administered scale composed of 21 items of self-assessment under three scales: depression, anxiety and stress. The subject indicates to what extent each item corresponds to it, on a scale of Likert ranging from 0 (no symptoms) to 3 (symptom present intensively). An overall score is obtained by multiplying the scores by 2. The internal consistency of the DASS (Lovibond and Lovibond, 1995) scales have all been estimated to be good to excellent. The French version of the DASS-21 was used in this study (Lovibond and Lovibond, 1995).

2.3. Analyses

Data were analyzed using SPSS in its 18th version. Descriptive statistics were performed for sociodemographic group characteristics and CAPE, CTQ and DASS scores. The prevalence was calculated both at the level of "at least sometimes" and "nearly always" respectively in all three dimensions. Frequency of each item was also counted. The distribution of continuous variables was compared to a normal distribution by a Shapiro–Wilks test. The variables in our study were normally distributed. Thus, correlation analysis was conducted through Pearson's correlation coefficient to investigate associations between frequency scores among the three dimensions, and then between frequency and distress scores.

In order to determine the unique impact of childhood trauma on PLEs (positive dimension), three sets of predictors: demographic (age and gender), psychosocial, and childhood trauma were entered in steps into a hierarchical multiple regression model.

The demographic variables were included in the first step. Psychological symptoms and drug use have previously been linked to presence of PLEs and the experience of trauma and thus were included as psychosocial potential confounds in the second step (Brady et al., 2004; Chapman et al., 2004; Gibb et al., 2007; Freeman and Fowler, 2009; Kelleher and Cannon, 2011). In the third step, we entered all 5 subscales of childhood trauma. In the first model, collinearity was not significant, with a Variance Inflation Factor <2 for the second and third blocs' variables. We considered p-value less than 0.05 to be statistically significant.

Table 1
Characteristics of the study sample.

		N (%)	Mean (SD)	Min	Max
Age (years)			22.1 (2.7)	18	32
Gender	Male	175 (36.3%)			
	Female	307 (63.7%)			
University	Humanities	222 (46.1%)			
	Law and Political sciences	133 (27.6%)			
	Engineering	127 (26.3%)			
Marital status	Married	8 (1.7%)			
	Single	471 (97.7%)			
	Widowed/Divorced	3 (0.6%)			
Living arrangements	With parents	267 (55.4)			
	With father	4 (0.8)			
	With mother	32 (6.6)			
	With friends	83 (17.2)			
	Academic home	54 (11.2)			
	alone	38 (7.9)			
Parents	Parents are alive	431 (89.4%)			
	Father is dead	41 (8.5%)			
	Mother is dead	10 (2.1%)			
	Parents live together	401 (83.2%)			
	Parents are divorced/separated	44 (9.2%)			
Tobacco use	Yes	155 (32.2%)			
	No	327 (67.8%)			
Alcohol use	Never	312 (64.7%)			
	Occasional use	164 (34.0%)			
	Daily use	6 (1.2%)			
Drug use in the past year	Never	370 (76.8%)			
	Rarely	61 (12.7%)			
	Monthly	16 (3.3%)			
	Weekly	10 (2.1%)			
	Daily	25 (5.2%)			
CAPE scores	Positive dimension		36.1 (9.1)	20	65
	Negative dimension		28.2 (6.5)	14	45
	Depressive dimension		16.1 (4.1)	8	28
	Bizarre Experiences		10.3 (3.1)	6	20
	Perceptual Abnormalities		4.2 (1.8)	3	12
	Persecutory ideations		13.3 (3.7)	7	25
	Magical thinking		8.2 (2.5)	4	14
	Social withdrawal		6.0 (1.8)	3	11
	Affective flattening		6.2 (2.0)	3	12
	Avolition		16.1 (3.9)	8	26
	PLEs-frequency		79.5 (16.7)	42	136
	PLEs-distress		75.1 (19.7)	42	141
CTQ scores	Emotional abuse		8.4 (3.3)	5	20
	Physical abuse		7.5 (3.2)	5	23
	Sexual abuse		7.4 (3.3)	5	21
	Emotional neglect		15.1 (4.9)	7	25
	Physical neglect		11.0 (2.9)	5	21
	Minimization / Denial		9.1 (2.8)	3	15
DASS-depression			7.1 (4.7)	0	21
DASS-anxiety			6.3 (4.9)	0	21
DASS-stress			8.4 (4.8)	0	21

SD: standard deviation; CAPE: Community Assessment of Psychic Experiences; CTQ: Childhood Trauma Questionnaire; DASS: Depression Anxiety Stress Scales.

3. Results

3.1. Descriptive statistics

The students included in this study had a mean ± SD age of 22.1 ± 2.7 years, with a predominance of female gender (63.7%); 97.7% were single. Table 1 shows some of the other social-demographic and psychological characteristics of the study sample.

Table 2 presents the prevalence of each CAPE item, showing both the frequency of presentation of any positive response ('at least sometimes') and the prevalence of highly frequent responses ('nearly always'). Prevalence rates substantially decreased when the frequency increased to "nearly always" (Table 2).

To evaluate the prevalence of PLEs, answers were recoded to 0 (never) and 1 (at least sometimes). Among the positive items, those assessing Persecutory Ideation (PI) had the highest prevalence (93.6%), followed by items measuring magical thinking (91.9%).

Bizarre Experiences (BE) and Perceptual Abnormalities (PA) were reported at least sometimes by 87.1% and 46.1% of the students, respectively. Additionally, 53.5% (n = 258) of the students reported at least one positive PLE 'nearly always', and 40.9% (n = 197) reported at least one negative PLE with this frequency.

Correlations between frequency scores in the positive and negative dimensions were positive and significant ($p < 0.001$) (Table 3). The positive correlation between frequency and distress scores for entire CAPE was significant and very strong ($r = 0.854$, $p < 0.001$).

There was a significant difference between males and females in Bizarre Experiences ($p < 0.001$), Perceptual Abnormalities ($p < 0.001$), Social withdrawal ($p = 0.049$) and Affective flattening ($p = 0.009$), with higher scores in males (see Table 4).

Table 2
Frequency of each item in the three dimensions of the CAPE.

	Prevalence	Never	At least sometimes	Nearly always
Positive dimension (PD)				
Bizarre Experiences (BE)				
17	25.9	74.1	18.7	0.4
24	57.7	42.3	42.1	2.9
26	66.8	33.2	46.7	3.3
28	60	40	37.8	8.1
30	60	40	38	6
31	40	60	30.1	2.1
Perceptual Abnormalities (PA)				
33	32.4	67.6	25.1	2.5
34	21.8	78.2	13.7	1.7
42	28.8	71.2	16.4	4.1
Persecutory ideation (PI)				
2	77	23	53.3	5.8
5	28.6	71.4	22.2	3.9
6	84.9	15.1	34.6	14.7
7	63.5	36.5	39.8	5.4
10	44.8	55.2	31.5	5.8
22	46.5	53.5	32.8	5.4
41	27.4	72.6	18.7	2.5
Magical thinking (MT)				
11	70.7	29.3	27.6	13.7
13	73.2	26.8	33.8	13.5
15	67	33	39.8	9.1
20	42.8	57.1	25.1	7.5
Depressive dimension (DD)				
1	92.7	7.3	63.5	3.7
9	74.9	25.1	51.5	5
12	49.8	50.2	33.2	4.4
14	46.9	53.1	35.3	1.7
19	63.3	36.7	28.8	13.3
38	69.3	30.7	48.8	4.1
39	77.6	22.4	56.6	4.1
40	85.9	14.1	42.1	12.2
Negative dimension (ND)				
Social withdrawal (SW)				
3	79.9	20.1	51.5	10
4	64.9	35.1	33.4	12
29	58.3	41.7	42.5	1.7
Affective flattening (AF)				
8	72	28	44	9.3
27	76.3	23.7	45.2	8.3
32	68.7	31.3	47.5	6.2
Avolition				
16	69.1	30.9	45.6	6.6
18	77.2	22.8	50.8	8.1
21	84	16	51.5	6.6
23	53.3	46.7	42.5	3.3
25	89	11	51.5	9.5
35	38.6	61.4	34.2	8
36	86.8	17.2	55.6	5.8
37	64.3	35.7	38.4	8.3

CAPE: Community Assessment of Psychic Experiences.

Table 4
Descriptive statistics for CAPE total and subscales. Correlation with sex.

	Male Mean (SD)	Female Mean (SD)	*P* value
Bizarre Experiences	11.01 (3.3)	9.90 (3.0)	**<0,001**
Perceptual Abnormalities	4.65 (2.1)	3.92 (1.5)	**<0,001**
Persecutory ideations	13.52 (4.2)	13.11 (3.3)	0,237
Magical thinking	8.17 (2.5)	8.30 (2.5)	0,590
Social withdrawal	6.18 (1.8)	5.93 (1.7)	**0.049**
Affective flattening	6.53 (2.1)	6.03 (1.9)	**0.009**
Avolition	15.49 (3.9)	16.22 (3.9)	0.137

SD: standard deviation.

3.2. Association of the CAPE positive and negative subscales with childhood trauma

Emotional neglect was the most commonly reported type of childhood trauma (90.7%), followed by physical neglect (84.9%) and sexual abuse (61.4%) (Table 5).

Pearson product moment correlations (matrix found in Table 6) indicated that previous traumatic experiences (particularly emotional abuse, physical abuse and sexual abuse) significantly and strongly correlated with PLEs in the overall sample ($p < 0.001$).

Students' age was not significantly correlated with PLEs, trauma and depression.

Table 7 shows results from the reduced multivariate linear regression analysis. This analysis would predict childhood trauma's additional and unique contribution, above and beyond demographic and psychosocial variables, to the variance in PLEs. We entered demographic variables into the model at step 1. Only gender contributed significantly to PLEs (positive dimension). Demographic variables accounted for 1.6% of the variance in PLEs. Psychosocial variables were added in step 2. Depression, anxiety and stress represented significant contributors to PLEs. They accounted for 22.1% of the variance in PLEs. In step 3, we added the five subscales of childhood trauma. Only sexual abuse represented a significant contributor to PLEs and explained an additional 10.2% of the variation.

4. Discussion

A very few previous studies have examined the effects of prior traumatic experience on PLEs. To our knowledge, this is the first study to analyze the phenotypal expression of subclinical psychotic symptoms in the young adult population, and the unique contributions of childhood trauma on PLEs, in an Arab country of the MENA region.

After accounting for confounding variables, sexual abuse was significantly associated with the presence of PLEs. Anxiety and stress symptoms remained significant, highlighting the importance of continuing to examine the role of psychological variables irrespective of other variables in the presence of PLEs, as suggested by

Table 3
Pearson correlations between CAPE positive and negative subscales.

	1	2	3	4	5	6	7	8	9
1- Positive dimension	–								
2- Negative dimension	0.557**	–							
3- Bizarre Experiences	0.864**	0.510**	–						
4- Perceptual Abnormalities	0.709**	0.317**	0.605**	–					
5- Persecutory ideations	0.869**	0.550**	0.628**	0.515**	–				
6- Magical thinking	0.712**	0.322**	0.481**	0.311**	0.486**	–			
7- Social withdrawal	0.385**	0.689**	0.314**	0.190**	0.486**	0.137**	–		
8- Affective flattening	0.492**	0.835**	0.469**	0.351**	0.453**	0.250**	0.509**	–	
9- Avolition	0.497**	0.919**	0.464**	0.260**	0.460**	0.343**	0.432**	0.640**	–

CAPE: Community Assessment of Psychic Experiences.
** Significant at $p < 0.01$.

Table 5
Descriptive statistics for childhood trauma subscales in our sample.

	Emotional abuse *N* (%)	Physical abuse *N* (%)	Sexual abuse *N* (%)	Emotional neglect *N* (%)	Physical neglect *N* (%)
None to minimal	290 (60.2%)	315 (65.4%)	186 (38.6%)	45 (9.3%)	73 (15.1%)
Slight to moderate	134 (27.8%)	78 (16.2%)	136 (28.2%)	176 (36.5%)	74 (15.4%)
Moderate to severe	36 (7.5%)	51 (10.6%)	114 (23.7%)	152 (31.5%)	163 (33.8%)
Severe to extreme	22 (4.6%)	38 (7.9%)	46 (9.5%)	109 (22.6%)	172 (35.7%)

Table 6
Pearson correlations between CAPE dimensions and study variables.

	1	2	3	4	5	6	7	8	9	10	11
1- Positive dimension	–										
2- Negative dimension	0.557*	–									
3- Depressive dimension	0.537*	0.677*	–								
4- Emotional abuse	0.290*	0.403*	0.435*	–							
5- Physical abuse	0.297*	0.212*	0.243*	0.615*	–						
6- Sexual abuse	0.415*	0.303*	0.284*	0.551*	0.423*	–					
7- Emotional neglect	0.117**	0.075	0.083	0.288*	0.187*	0.136*	–				
8- Physical neglect	0.090**	0.003	0.018	0.073	0.058	0.046	0.244*	–			
9- Age	−0,033	−0,063	0,014	−0,018	0,036	0,001	0,008	0,017	–		
10- Depression (DASS-D)	0.328*	0.501*	0.635*	0,333*	0,204*	0,256*	0,135*	−0,067	0.028	–	
11- Anxiety (DASS-A)	0.384*	0.344*	0.475*	0.333*	0.199*	0.260*	0.175*	0.095**	0.098**	0.546*	–
12- Stress (DASS-A)	0.374*	0.387*	0.522*	0.284*	0.196*	0.171*	0.143*	0.146*	0.110**	0.635*	0.779*

CAPE: Community Assessment of Psychic Experiences; DASS: Depression Anxiety Stress Scales.
* Significant at $p \leq 0.01$.
** Significant at $p \leq 0.05$.

Table 7
Hierarchical multiple regression model correlating PLEs (positive dimension) to childhood trauma.

Variables	Positive dimension of the CAPE (PD)		
	Step 1	Step 2	Step 3
Age	−0.046	−0.104*	−0.100**
Gender	−0.122**	−0.236***	−0.236***
Drug use in the past year	–	0.037	0.037
Depression (DASS)	–	0.130*	0.056
Anxiety (DASS)	–	0.263***	0.180**
Stress (DASS)	–	0.151*	0.208**
Emotional abuse	–	–	0.076
Physical abuse	–	–	0.078
Sexual abuse	–	–	0.343***
Emotional neglect	–	–	0.001
Physical neglect	–	–	0.044
F	3.82*	0.10***	14.41***
R^2	0.016	0.237	0.338
ΔR^2	0.016*	0.221***	0.102***

Note. Standardized β weights reported at each step evaluate changes in weights with the inclusion of additional predictors.
CAPE: Community Assessment of Psychic Experiences; PLEs: Psychotic-Like Experiences; DASS: Depression Anxiety Stress Scales.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Andorko et al. (2018).

4.1. Prevalence of PLEs

The principal objective of this work was to analyze the prevalence of the PLEs in a sample of college students aged 18–32. The results indicated that 53.5% of the participants reported having experienced at least one PLE 'nearly always'.

The rates of PLEs found in our work were comparable to those found in previous international studies. Epidemiological studies estimated the mean prevalence of subclinical psychotic experiences at about 5% in the adult population (Cannon et al., 2002). Similar rates were found in the adolescent population. Using a nationally representative sample of 1261 Australian adolescents aged 13–17 years; Scott et al. (2009) found that hallucinations were reported by 8.4% of adolescents. Barragan et al. (2011), using the CAPE in a community sample of 777 adolescents (50.9% girls: mean age 14.4 years), found that 39% reported at least one positive PLE 'nearly always'. Another study, using the CAPE among 5427 adolescents aged between 10 and 16, found that 95.7% reported more than one episode of PLEs, while 17.2% reported "nearly always" having PLEs (Sun et al., 2015). A study conducted among 420 undergraduate students aged 20.10 ± 3.22 found that 81.5% endorsed at least one attenuated symptom of psychosis within the past four weeks. These results were consistent with findings from others studies (Read et al., 2011; Fonseca-Pedrero et al., 2016).

Men obtained a mean higher frequency scores than women on "Bizarre Experiences", "Perceptual Abnormalities", "Social withdrawal" and "Affective flattening". On the other hand, no statistically significant differences were found based on age. The results found based on gender were different from those found in previous investigations in community samples of children and adolescents (Cyhlarova and Claridge, 2005; Fonseca-Pedrero et al., 2005), and quite similar to those found in other studies performed in nonclinical adolescents (Fonseca-Pedrero et al., 2011).

In regards to age, our results were similar to previous studies, showing no significant association regarding PLEs evaluated with age in the general adolescent population (Scott et al., 2009; Fonseca-Pedrero et al., 2011). These results support the continuum model of psychosis phenotype in the general population and therefore the dimensional models of psychosis (Fonseca-Pedrero et al., 2011). The variability in the results emphasize the need for further cross-cultural research regarding the phenotypal expression of PLEs and its associated variables.

At Risk Mental State is a novel concept recently introduced in Tunisia; and there is not yet a unit caring for adolescents and young adults in Tunisia (Braham et al., 2014). Our findings would have allowed having empirical data about PLEs available in the general Tunisian population that can be used within the psychoeducational programs, especially in patients with schizophrenia or at clinical high risk, in order sensitize the community and to demystify the presence of psychotic symptoms only within psychoses. This study could also raise

awareness of the need for implementing an early intervention programme for young people in Tunisia.

4.2. Relationship between PLEs and childhood trauma

About two-thirds of the participants (61,4%) reported slight to extreme "sexual abuse", 39,8% reported "emotional abuse" and 34,6% reported "physical abuse" with the same level of severity. The rates of childhood trauma found in our sample were relatively high in comparison to those seen in college students in other countries, which ranges according to current research from the mid-20% to more than 40% (Welsh et al., 2017). Very little data is available on childhood trauma experiences in Tunisia, making comparison at the national level particularly difficult. The Multiple Indicator Cluster Survey (MICS4) published recently objectified a prevalence of physical and emotional violence against children in Tunisia of 93.2% (National Institute of Statistics, INS, 2012).

Our results build on previous literature that primarily focused on global childhood traumatic experiences, and consistently indicated an association between a specific dimension of trauma, which is sexual abuse, and PLEs. Child sexual abuse is a substantial risk factor for a range of mental disorders in both childhood and adulthood, including affective, anxiety, substance abuse, and personality disorders (Cutajar et al., 2010b).

The evidence for an association between child sexual abuse and subsequently developing psychotic disorders, however, remains unresolved (Cutajar et al., 2010a). Very few studies focused on the link between child sexual abuse and PLEs. A representative cross-sectional survey in a large representative general population sample of England (n = 7353) found that sexual abuse before the age of 16 was strongly associated with psychosis, particularly if it involved non-consensual sexual intercourse (Bebbington et al., 2011). A study examining the prevalence of trauma exposure and PTSD in 32 people with psychotic diagnoses found that sexual abuse was related to hallucinations (Kilcommons and Morrison, 2005). In a cohort of 2759 individuals who had documented childhood sexual abuse compared with a community-based control group matched on sex and age, Cutajar et al. (2010a,b) found that psychotic disorders were significantly higher among child sexual abuse subjects compared with controls (2.8% vs. 1.4%; odds ratio, 2.1; 95% confidence interval, 1.4–3.1; $P < 0.001$), particularly schizophrenic disorders (1.9% vs. 0.7%; odds ratio, 2.6; 95% confidence interval, 1.6–4.4; $P < 0.001$); with highest risks among those whose abuse involved penetration, occurred after age 12 years, and involved more than 1 perpetrator. Moreover, a longitudinal cohort study in 233 individuals at "Ultra High Risk" for psychosis found that of the individual trauma types, only sexual abuse was associated with transition to psychosis ($P = 0.02$) even after adjusting for potential confounding factors; with a transition risk 2–4 times higher in participants with higher sexual abuse scores (Thompson et al., 2014). The authors suggest that sexual trauma may be an important contributing factor in development of psychosis for some individuals (Thompson et al., 2014).

Putative psychological processes and mechanisms through which childhood sexual abuse impacts on individuals and contributes to the development of psychosis remains unclear (Reininghaus et al., 2016). Research suggested that high levels of subjective stress sensitivity (Gibson et al., 2016), high dissociation (Anglin et al., 2014), negative schemas (about the self-involving vulnerability, humiliation and subordination) (Garety et al., 2001) and anxiety (Freeman and Fowler, 2009) consequent to trauma mediate the link between traumatic experiences in childhood and PLEs. Since individual responses to trauma vary considerably due to differences in coping styles and resilience (Southwick and Charney, 2012) we can speculate that sexual abuse may not only be correlated with a greater risk of trauma, but perhaps also with lower levels of resilience, due to stigma, shame and silence surrounding this particular dimension of childhood adversity, especially in our context (Fekih-Romdhane et al., 2018). Indeed, Reininghaus et al. (2016) found that lack of resilience to socio-environmental stress mediates the association between childhood sexual abuse and psychosis. Thus, the type of trauma experienced by an individual could determine specific symptoms in mental illness, emphasizing the importance of considering separately the different forms of trauma. Among the different types of adversities, sexual abuse seems to have the most negative impact on subjects with psychosis and those at clinical high risk for psychosis.

Otherwise, a number of gaps ought to be mentioned. Research has been focused in subjects with psychotic disorders or at "Ultra High Risk" for psychosis, and limited data are available regarding the link between previous sexual abuse and PLEs. Besides, most studies assessed European, Asian or American adults, thus the influence of childhood sexual abuse remains unclear regarding youth in other parts of the world, particularly in Arab Muslim countries. Consequently, international studies are necessary to better understand the associations between these variables.

Our results add support to the usefulness of probing previous sexual abuse during initial mental health screening. Child sexual abuse victims should receive systematic and complete psychological screening during their adolescence and early adulthood including, among others, PLEs and psychotic symptoms. In addition to striving to develop interventions that can prevent/reduce child sexual abuse occurrence, interventions are needed to enhance psychological support and improve social integration of these children by reducing stigma attached to these experiences. These measures may facilitate access to psychological health services in schools and communities, especially in our context.

4.3. Study limitations

The cross-sectional design of this study prevents from reporting definitive temporal or causal relationships. Regardless of causal relation, or direction of effects, the implication that PLEs may be partially attributed to the occurrence of childhood sexual abuse is an interesting research question with possible clinical implications. Future studies might consider expanding on this work by utilizing longitudinal designs.

Our population of study only included young individuals attending universities at the time of recruitment. Those who weren't, because of emotional or behavioral disorders might have presented different characteristics from those included in the study. Nevertheless, college students present at an age of elevated risk for PLEs, thus, making them a relevant population for this type of research.

Childhood trauma was collected retrospectively using the CTQ, which may have influenced the results. However, retrospective information on childhood trauma is a frequently used measure with high reliability and validity in community samples (Scher et al., 2001). In addition, the psychological impact of the childhood traumatic events (particularly posttraumatic stress disorder) was not measured, and thus, was not considered in our results. Previous epidemiological studies have shown that about one quarter of abused children developed PTSD (Green, 1994). Choi et al. (2015) found that posttraumatic stress symptoms partially mediated the relationship between childhood abuse and psychotic symptoms. Further studies should be conducted to address this issue.

Role of the funding source

All authors declare that they received no source of funding for this study.

Conflict of interest

All authors declare that they have no conflicts of interest to disclose.

Acknowledgments

None.

Declaration of interest

None of the authors has any conflict of interests to declare.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.03.034.

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