



# Psychopathology in Children and Adolescents in Lebanon Study (PALS): a national household survey

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## Abstract

**Introduction** Psychiatric disorders are among the leading causes of disability in children and adolescents globally. In Lebanon, a country that has endured a prolonged history of conflict and economic and political uncertainty, mental health surveys in children and adolescents have been limited to specific disorders or specific settings or cities. PALS (Psychopathology in Children and Adolescents in Lebanon Study) is the first study to screen a nationally representative sample of children and adolescents for psychiatric disorders and estimate the national prevalence of children and adolescents at risk of having a psychiatric disorder.

**Methods** A nationally representative household sample of 1517 children and adolescents (aged 5 years 0 months to 17 years 11 months) was recruited through a multi-stage stratified proportionate sampling technique between February 2018 and November 2018. Parents and adolescents completed a battery of self-reported scales including the Strengths and Feelings Questionnaire (SDQ), Mood and Feelings Questionnaire (MFQ), Screen for Child Anxiety and Emotional Related Disorders (SCARED), the Peer Relations Questionnaire (PRQ), General Health Questionnaire (GHQ), and Conflict Behavior Questionnaire (CBQ), Child Revised Impact of Events Scale (CRIES), and a demographic/clinical information questionnaire. Logistic regression models were used to examine the correlates of screening positive for psychiatric disorders.

**Results** About a third of children and adolescents (32.7%,  $n = 497$ ) screened positive for at least one psychiatric disorder, of whom only 5% ( $n = 25$ ) reported ever seeking professional mental health help. Academic performance, having a chronic physical illness, higher parental GHQ scores, and involvement in bullying were associated with a higher odds of screening positive for a psychiatric disorder. Higher family income was negatively associated with screening positive for a psychiatric disorder.

**Conclusion** This first national study shows a high prevalence of psychiatric symptoms in Lebanese children and adolescents and an alarming treatment gap. School-based primary prevention programs or screening in primary care settings are key for early detection and management of psychiatric symptoms, and prevention of psychiatric disorders.

**Keywords** Epidemiology · Prevalence · Psychiatric disorders · Children · Adolescents

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## Introduction

Psychiatric disorders are among the most ubiquitous disorders, affecting almost 1 billion individuals worldwide [1]. Studies have shown an early age of onset for most psychiatric disorders [2, 3], which, if left unrecognized and untreated, can cause significant psychosocial impairment and an increased risk of developing another mental disorder [4].

There is poor “coverage” (proportion of the target population represented by the available data) of child and adolescent mental disorders prevalence data in the Middle East and North Africa region [5]. This includes Arab countries that have also shown to produce only 1% of the world output of peer-reviewed publications in mental health [6]. This dearth in mental health research in the Arab region may be a contributor to the shortage of policies and services targeted toward mental health, especially in children and adolescents [7]. In Lebanon, a country in the Middle East that has endured a prolonged history of conflict and economic and political uncertainty, epidemiological data on the prevalence of psychiatric disorders in children and adolescents remain limited. Given the role of armed conflict in the development of mental disorders in children [8] and the cultural stigma associated with reporting mental disorders in the Arab culture [9], it is crucial to assess the prevalence of mental health problems in Lebanese children and adolescents to guide public health prevention efforts. Previous research in Lebanon reported only on specific disorders [10, 11] or was limited to specific geographic areas [12]. Our group investigated the prevalence of psychiatric disorders in adolescents residing in the capital Beirut, and found a 30-day prevalence of 26% for any psychiatric disorder [12]. Having a psychiatric disorder was associated with parental marital status, not attending school, having a chronic medical condition, family history of psychiatric disorders, as well as being involved in bullying. Among children and adolescents with at least one psychiatric disorder, only 6% reported seeking professional mental health help [12]. While the study findings addressed a clear research gap, the sample was representative of Greater Beirut area only and was limited to adolescents.

In the present study, the Psychopathology in Children and Adolescents in Lebanon Study (PALS), we screened a nationally representative sample of children and adolescents for psychiatric disorders to (1) determine the prevalence of mental health problems (i.e., percentage of participants who screen positive for psychiatric disorders), (2) study the correlates of screening positive for different psychiatric disorders across different age groups (5–7 years and 11 months; 8 years to 11 years and 11 months; and

12–17 years and 11 months), and (3) examine the proportion of those seeking mental health care among those who screened positive for any psychiatric disorder. This is the first national study to screen for psychiatric disorders in children and adolescents in Lebanon, and to examine the degree of service utilization and treatment seeking behavior. Our findings would help assess the service needs of this population and identify high-risk groups to be prioritized for interventions.

## Methods

### Sampling and recruitment

A nationally representative household sample of non-institutionalized Arabic speaking children and adolescents (5 years 0 months–17 years 11 months) were recruited between February 2018 and November 2018.

A multi-stage stratified proportionate sample was drawn from 26 districts in Lebanon based on the residents’ data published in the Statistical Bulletin of the Ministry of Public Health in 2013 [13]. Each district was then divided into sampling units. The number of subareas (villages/towns) to be sampled from each district was proportionate to the population size of the district. The subareas in each district were randomly chosen and the number of participants to be recruited from each district was equally divided among the chosen subareas of the district.

In each subarea, multi-stage probability sampling was used. The first stage consisted of selecting relevant neighborhoods inside each subarea (village/town). Within each neighborhood, an important landmark (i.e., church, mosque, major establishment, etc.) was identified and the streets surrounding the landmark in all directions (North, South, East, and West) were covered. This was done given the lack of street sampling frames in Lebanon. The number of participants to be recruited from each selected village/town was equally distributed among the neighborhoods/streets.

On each street, data collectors surveyed an equal number of households, starting on opposite ends and sides of the street; one team of data collectors started from one end and the other team started from the opposite end. The first building on the right of the data collectors was selected, followed by every other building. Within the selected buildings, sampling started with the first floor and then every other floor. If there was more than one apartment on the floor, the first unit to the right of the elevators/stairs was selected. Households were eligible if they included at least one Arabic speaking Lebanese child/adolescent between the ages of 5 and 17 years 11 months. At the household level, only one child aged 5–17 years was randomly selected for an interview, in addition to one parent/guardian. Random

selection of the child was conducted by listing all children in ascending order (youngest to oldest) and selecting a number randomly using dice. If the randomly selected child was not available at the time of the visit, data collectors returned at a later pre-scheduled date/time. For children aged 5–8 years, only one of the parents was interviewed. For the older age groups, both the child/adolescent and one of the parents were interviewed separately. A total of 7598 households were approached, among which 4404 (57.96%) were either ineligible or eligibility could not be determined. Among the eligible households, a total of 1517 (47.50%) households agreed to participate and completed the surveys. Among those that were eligible, 179 (5.60%) did not complete the entire questionnaires, 1279 (40.04%) had parents that refused to participate, and 219 (6.86%) had children that refused to participate.

## Data collection

Data collectors were recruited by a research company and were trained by our research team on the process of recruiting participants, obtaining informed consent, and collecting data for the present study. All fieldworkers successfully completed the Collaborative Institutional Training Initiative (CITI Program) certification as required by the Institutional Review Board (IRB). During the initial stages of data collection, and for data quality assurance purposes, a member of our research team shadowed and supervised the trained data collectors to ensure proper adherence to all procedures. Data collectors assisted participants who needed help in using the tablet when completing the self-rated scales, as well as helped children who needed assistance understanding certain questions.

## Ethical considerations

The study was approved by the local IRB. Parents/legal guardians signed an informed consent document and permission for their child/adolescent to participate in the research study and children/adolescent aged 8 years 0 months to 17 years 11 months signed written assent forms. Data were collected via tablets by 2 research staff; one staff working with the parent, while the other with the child in a separate area of the house. Families who participated received a stationary kit as a token of appreciation.

If a participant (child or parent) reported suicidality, the data collector would receive a notification on the tablet of a possible risk. A clinical psychologist on the study team would then be contacted to talk to the participant and the legal guardians to assess the situation. A protocol was followed. If the case was deemed a non-emergency, the legal guardians would be advised to seek care. If the case was

deemed an emergency, the legal guardians would be asked to go or take the participant to an emergency unit.

## Instruments and measures

### General information sheet

A general information sheet was first completed by a parent/legal guardian who provided information on basic demographics including family structure, family income, and parental level of education. The parent/legal guardian also completed questions regarding the selected child/adolescent's academic performance, medical, developmental, and psychiatric history, as well as prenatal and antenatal history.

### The Strengths and Difficulties Questionnaire (SDQ)-parent and child version

The SDQ, a 25-item, Likert scale, was used to screen for emotional, conduct, and hyperactivity difficulties in children aged 5–7 years and 11 months and for conduct and hyperactivity difficulties in children and adolescents between the ages of 8 years and 17 years and 11 months. We used an Arabic version of the SDQ that was validated in a sample of Yemeni children [14].

SDQ also measures the subjective impact of the problem, distress, and impairment. SDQ yields scores on Conduct Problems, Inattention-Hyperactivity, Emotional Symptoms, Peer Problems, Prosocial behavior, and Total Difficulties. A child/adolescent was considered having screened positive for an emotional disorder, hyperkinetic disorder, or conduct disorder if he/she had an abnormal score on the corresponding scales (either parent or child reported) along with an abnormal impact score as defined by the established cut-off points [15].

### The Mood and Feelings Questionnaire MFQ-parent and child version

The MFQ is a 33 item self-report measure of depressive symptoms among children/adolescents aged 8–18 [4]. Both child and parent forms consist of 33 one-sentence items, rated on a three-point Likert scale with the parent form including one additional item addressing the parent's observation of the child's response to praise. A validated Arabic version along with the established local cut-off scores for parents and children in a clinical setting in Lebanon was used [16]. A child or adolescent was considered having screened positive for depression if the child or parent scored higher than 26 and 22, respectively.

### Screen for Child Anxiety Related Emotional Disorders (SCARED)-parent and child version

The SCARED is a self-report scale that screens for anxiety disorders in children and adolescents. It screens for Panic Disorder, Generalized Anxiety Disorder, Separation Anxiety Disorder, Social Anxiety Disorder, and Significant School Avoidance. SCARED was completed by children and adolescents aged 8–18 and one parent/guardian and cut-off scores previously established in the Lebanese population were used [17]. A child or adolescent was considered having screened positive for an anxiety disorder if the child or parent/guardian scored higher than 26 and 24, respectively.

### Child Revised Impact of Events Scale (CRIES 8)

The Impact of Events Scale (IES) was originally developed to examine the re-experiencing of a traumatic event and of avoidance of that event and the feelings associated with it. The current version is designed for use with children aged 8 years and above, and consists of four items that measure intrusion and four items that measure avoidance. The CRIES 8 has been previously used to screen for post-traumatic stress disorder (PTSD) in a general population [18] with a cut-off score of 17 being considered as a positive screen [19, 20].

### Questionnaire on substance use

Adolescents aged 12 and above answered a questionnaire that assessed substance use and its frequency by the adolescent. Parent habits of substance use as perceived by the child were also assessed. Given the participants' age of less than 18, an adolescent was considered to screen positive for substance use disorder if she/he used more than few puffs of cigarettes or water pipe or few sips of alcohol in the past 30 days.

### Conflict Behavior Questionnaire (CBQ)

The Conflict Behavior Questionnaire (CBQ) is a battery used to assess conflict and interaction behaviors as perceived by parents (CBQ-P) and adolescents (CBQ-A). The 20 item CBQ was used and it consists of 20 true–false items assessing conflict within the parent–child relationship. The CBQ 20 was completed by the adolescent about each parent and by the parent/legal guardian about his/her relationship with the adolescent; higher scores were indicative of higher parent–child conflict.

### The Peer Relations Questionnaire (PRQ)

The PRQ abbreviated version is a 12-item scale which assesses a child's peer relations. It is composed of three

subscales of 4 items each: victim subscale (PRQ-Victim), reflecting the degree to which the adolescent is bullied; bully subscale (PRQ-Bully), reflecting the degree to which the adolescent engages in bullying behavior; and prosocial behavior subscale (PRQ-Prosocal). Items are scored on a 4-point Likert type scale which are “0 = Never”, “1 = Once in a while”, “2 = Pretty Often”, or “3 = Often”. It is often administered to children and adolescents aged 12–18 years, but has also been used in children aged 8 and above [9]. As such children aged 8 and above completed the scale. Participants who responded with “pretty often” or “often” on at least one item of the PRQ-Victim subscale were categorized as “Victims of bullying”. A similar approach was used to identify “Bullies”. Participants were then categorized as bullies only, victims only, or both victims and bullies [21].

### The General Health Questionnaire (GHQ-28)

The 12-item General Health Questionnaire (GHQ-28) screens for the current mental health status of the respondent (parent) [16]. It is scored on a 4-point Likert scale ranging from “better than usual” to “much less than usual”. The GHQ has been shown to have good validity and to be equally useful in developing countries as well as when translated to different languages [22].

### Data analysis

Based on the different battery of scales they completed, participants were stratified into three age groups: 5 years to 7 years and 11 months; 8–11 years and 11 months; and 12–17 years and 11 months. This was done given that not all children across all age groups completed the same battery of tests.

For children aged 5–7 years 11 months, a child was considered to have a positive screen for a psychiatric disorder if he/she screened positive for having a hyperactivity disorder, conduct disorder, and/or emotional disorder based on the SDQ. Children between the ages of 8–11 years 11 months were considered to screen positive for any psychiatric disorder if they screened positive for hyperactivity disorder (based on SDQ), conduct disorder (based on SDQ), anxiety disorder (based on SCARED), depressive disorder (based on MFQ), and/or PTSD (based on CRIES). Participants between the ages of 12 years and 17 years–11 months were considered to screen positive for a psychiatric disorder if they screened positive for hyperactivity disorder, conduct disorder, anxiety disorder, depressive disorder, PTSD, and/or substance use disorder. Weighted analysis was conducted to account for sampling weights, based on the Central Administration of Statistics (CAS) estimates of the distribution of the Lebanese population across each district [23].

Mann–Whitney *U* tests and Kruskal–Wallis tests were used to compare non-normally distributed continuous variables across categorical variables. Associations between categorical variables were assessed using Pearson's Chi-square test and Fisher's exact test. For each age group, a multistep approach was followed to study the correlates of screening positive for any psychiatric disorder. First, Chi-square test and binary logistic regression were used to examine the bivariate associations between the various sociodemographic variables and screening positive for a psychiatric disorder. Next, variables statistically significant associated with the outcome variable [at  $p < 0.05$ ] at the bivariate level were grouped as follows: "Sociodemographic characteristics" (age, gender, family structure, parental education and employment and family income), "scholastic characteristics" (school performance, history of repeating grades and needing private tutoring or special accommodation at school as reported by parents), "parent and peer relationships" (bullying and conflict with parents), and finally "clinical characteristics" (psychiatric family history, having a chronic physical illness and parental mental health as measured by the GHQ). Next, within each of these categories, multivariate models were generated to explore adjusted associations with the outcome variables. Variables associated with the outcome at  $p < 0.05$  were retained in the final multivariate models as a final step. This final step was done for "8 years to 11 years 11 months" and "12–17 years and 11 months" age groups separately but not for the "5–7 years and 11 months" age group given the smaller number of participants who screened positive in the latter group. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 25.0. All analyses were weighted (including sampling weights).

## Results

### Population characteristics

Table 1 shows the sociodemographic characteristics of the sample. The sample included almost equal percentage of boys (50.22%) and girls (49.78%). The average age of the participants was 11 years ( $SD = 3$  years). Out of the total sample of 1517 participants, 15.4% ( $n = 234$ ) were 5–7 years 11 months old, 47.7% ( $n = 724$ ) were 8–11-year 11 months old and 36.8% ( $n = 559$ ) were 12–17 years 11 months year-old. Almost (44.4%;  $n = 674$ ) of participants came from households whose monthly family income was less than 1000\$. The majority of mothers (86.74%,  $n = 1304$ ) and fathers (84.3%,  $n = 1156$ ) had high school-level education or higher. At the time of the study, 14.4% of fathers ( $n = 241$ ) were not living with the participants.

**Table 1** Sociodemographic characteristics of the overall sample ( $N = 1517$ )

	$n = 1517$
Age	10.57 (3.27) <sup>a</sup>
Age group	
5–7.11 years	234 (15.42)
8–11.11 years	724 (47.73)
12–17.11 years	559 (36.85)
Gender	
Male	762 (50.22)
Female	755 (49.78)
Total monthly family income	
Prefer not to answer	178 (11.72)
Up to 1000\$	674 (44.41)
1000–2000\$	502 (33.09)
More than 2000\$	163 (10.78)
Parental marital status	
Not married	116 (7.61)
Married	1401 (92.39)
Mother's employment	
Unemployed	1083 (72.01)
Employed	421 (27.99)
Father's employment	
Employed	1385 (91.29)
Prefer not to answer	132 (8.71)
Mother's education	
Elementary or less	199 (13.26)
High school or less	1033 (68.7)
University or more	271 (18.04)
Father's education	
Elementary or less	341 (22.77)
High school or less	921 (61.54)
University or more	235 (15.69)
Mother not living at home	45 (2.95)
Father not living at home	217 (14.31)
Total number of individuals living at home	5.09 (1.78)
Parental assessment of child's academic performance at school	
Good—passes all classes without any problems	1163 (76.65)
Acceptable—does well but has occasional difficulties with some subjects	297 (19.6)
Sub-optimal—fails some subjects or classes	57 (3.75)
Repeated at least one school grade	244 (16.07)
Ever received home tutoring	175 (11.53)
Ever received accommodation at school	57 (3.75)
Child has chronic physical illness	124 (8.34)
Child ever sought mental health care	48 (3.23)
Positive psychiatric family history	99 (6.52%)
PRQ bully score	1.09 (1.72)*
PRQ victim score	1.12 (1.80)*
Parent GHQ total score	19.38 (10.30)*
Child reported CBQ score pertaining to father	8.57 (22.73)*
Child reported CBQ score pertaining to mother	9.26 (20.24)*

**Table 1** (continued)

	<i>n</i> = 1517
CBQ parent score	4.60 (4.30)*

\*Mean and standard deviation

### Prevalence of a positive screen for psychiatric disorders and treatment seeking behavior

About a third (32.7%, *n* = 497) of the sample of children and adolescents screened positive for at least one psychiatric disorder. The prevalence estimate was distributed as follows in the three age categories: 3.0% (*n* = 7) of the children aged 5 to – 7 years and 11 months, 31.6% (*n* = 229) in children aged 8–11 years and 11 months, and 46.6% (*n* = 261) in adolescents aged 12–17 years 11 months (Table 2). Among those who screened positive for a psychiatric disorder, 58.8% screened positive for one disorder and 41.2% screened positive for two or more disorders.

Screening positive for depression and PTSD was statistically significantly higher in the 12–17 years 11 months age group than in the 8–11 years 11 months age group. No age differences were noted for the prevalence of other psychiatric disorders. Gender differences in screening positive for specific psychiatric disorders only existed in children aged 12 and above where 27.41% of girls (*n* = 29) screened positive for anxiety disorders compared to 15.6% of boys (*n* = 42, *p* = 0.001). There were no other gender differences in screening positive for a specific psychiatric disorder in the other age groups.

Only 5% (*n* = 25) of children and adolescents who screened positive for a psychiatric disorder ever sought professional mental health help, though 74 (14.9%) of the children who screened positive were perceived by their interviewed parent to possibly need professional mental health care.

### Correlates of screening positive for a psychiatric disorder

The final adjusted multivariate regression models delineated several correlates for screening positive for psychiatric disorders. These are listed below per age group (Tables 3, 4, 5):

#### Children aged 5–7 years 11 months

Repeating at least one school grade (OR 14.809; 95% CI [2.967, 73.915]), having a chronic physical illness (OR 12.929; 95% CI [2.601, 64.227]), having positive psychiatric family history (OR 20.286; 95% CI [4.130, 99.638]), and higher parental GHQ scores (OR 1.079; 95% CI [1.016, 1.146]) were associated with screening positive for a psychiatric disorder. Higher level of paternal education was negatively associated with screening positive for a psychiatric disorder in this age group (OR 0.613; 95% CI [0.411, 0.915]) (Table 3).

#### Children aged 8–11 years and 11 months

Having a chronic physical illness (OR 1.945; CI [1.052, 3.595]), higher parental GHQ scores (OR 1.058; CI [1.038, 1.078]), and higher PRQ victim scales indicating increased peer victimization (OR 1.325; CI [1.200, 1.4600]) were associated with screening positive for a psychiatric disorder. Higher family income was negatively associated with screening positive for a psychiatric disorder (OR 0.402; CI [0.225, 0.720] and 0.381 [0.180, 0.806] for the income ranges 1000–2000 and more than 2000\$, respectively) (Table 4).

#### Children aged 12–17 years and 11 months

For children in the oldest age group, older age (OR 1.203; CI [1.072, 1.352]), female gender (OR 1.696; CI [1.143, 2.517]), suboptimal school performance (OR 2.990, CI [1.043, 8.568]), having a chronic physical illness (OR

**Table 2** Prevalence of positive screens for psychiatric disorders across age groups

	All age groups ( <i>n</i> = 1517)	Gender		5–7 years ( <i>n</i> = 234, 15.42%)	8–11 years ( <i>n</i> = 724, 47.73%)	12–17 years ( <i>n</i> = 559, 36.85%)
		Male ( <i>n</i> = 762; 50.22%)	Female (755 (48.78%)			
Any psychiatric disorder	497 (32.74)	236 (30.94)	261 (34.57)	7(3.02)	229 (31.63%)	261 (46.63%)
Emotional disorder	5 (2.15)	3 (2.50)	2 (1.77)	5 (2.15)		
Conduct disorder	40 (2.65)	24 (3.16)	16 (2.13)	4 (1.74)	15 (2.08)	21(3.75)
Hyperactivity disorder	38 (2.51)	22 (2.89)	16 (2.13)	3 (1.30)	14 (1.94)	21(3.77)
Depressive disorder	79 (6.16)	40 (6.24)	39 (6.07)		34 (4.7)	45 (8.05)
Anxiety disorder	290 (22.58)	123 (19.25)	167 (25.91)		169 (23.3)	121(21.66)
PTSD	253 (19.72)	120(18.77)	133 (20.67)		118 (16.31)	135 (24.14)
Substance use	101 (18.13)	57 (20.97)	44 (15.44)			101(18.13)

**Table 3** Correlates of positive screens for psychiatric disorders in 5–7-year-old children

	Screened negative ( <i>n</i> = 227; 96.98%) Count (%)	Screened positive ( <i>n</i> = 7; 3.02%) Count (%)	Unadjusted OR [CI]
Age <sup>a</sup>	5.88 (0.83)	6.01 (0.57)	1.201 [0.488, 2.957]
Gender			
Male	117 (51.45)	5 (71.92)	
Female	110 (48.55)	2 (28.08)	0.414 [0.078, 2.181]
Total monthly family income			
Prefer not to answer	26 (11.55)	1 (14.36)	
Up to 1000\$	110 (48.32)	3 (42.48)	0.707 [0.071, 7.000]
1000–2000\$	56 (24.71)	2 (28.8)	0.938 [0.083, 10.633]
More than 2000\$	35 (15.42)	1 (14.36)	0.840 [0.046, 12.320]
Parental marital status			
Not married	23 (10.18)	0 (0)	0 [0, 0]
Married	204 (89.82)	7 (100)	
Mother's employment			
Unemployed	140 (62.75)	5 (71.24)	1.470 [0.282, 7.677]
Employed	83 (37.25)	2 (28.76)	
Father's employment			
Employed	210 (92.56)	6 (85.64)	0.479 [0.055, 4.163]
Prefer not to answer	17 (7.44)	1 (14.36)	
Mother's education			
Elementary or less	33 (14.65)	3 (43.12)	
High school or less	129 (57.36)	2 (28.12)	0.167 [0.027, 1.037]
University or more	63 (27.99)	2 (28.76)	0.349 [0.056, 2.168]
Father's education			
Elementary or less	52 (23.19)	2 (28.76)	
High school or less	123 (54.98)	4 (56.88)	0.613 [0.411, 0.915]*
University or more	49 (21.84)	1 (14.36)	0.249 [0.132, 0.470]***
Mother not living at home	12 (5.3)	0 (0)	0 [0, 0]
Father not living at home	40 (17.72)	5 (71.24)	1.874 [0.354, 9.912]
Total number of individuals living at home <sup>a</sup>	4.91 (1.79)	5 (1.50)	0.938 [0.605, 1.353]
Parental assessment of child's academic performance at school			
Good—passes all classes without any problems	185 (81.37)	3 (42.48)	
Acceptable—does well but has occasional difficulties with some subjects	35 (15.5)	3 (43.16)	5.335 [1.040, 27.367]*
Sub-optimal—fails some subjects or classes	7 (3.13)	1 (14.36)	8.790 [0.818, 94.389]
Repeated at least one school grade	11 (4.88)	3 (43.16)	14.809 [2.967, 73.915]**
Ever received home tutoring	22 (9.78)	1 (14.4)	1.551 [0.181, 13.276]
Ever received accommodation at school	15 (6.65)	0 (0)	0 [0, 0]
chronic physical illness	12 (5.41)	3 (42.48)	12.929 [2.601, 64.227]*
Positive psychiatric family history	14 (6.17)	4 (57.14)	20.286 [4.130, 99.638]**
Parental GHQ total score <sup>a</sup>	20.87(95.56)	30.86 (13.81)	1.079 [1.016, 1.146]*

<sup>a</sup>Mean (SD)\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001

2.158; CI [1.020, 4.565]), having a positive psychiatric family history (OR 3.186; CI [1.401, 7.241]), higher PRQ bully score indicating increased bullying behavior (OR 1.165; CI [1.037, 1.309]), and higher PRQ victim score

indicating increased victimization (OR 1.247; CI [1.079, 1.442]) were associated with screening positive for a psychiatric disorder. Higher family income was negatively

**Table 4** Correlates of positive screens for psychiatric disorders in 8–11-year-old children

	Screened negative ( <i>n</i> = 495; 68.37%) Count (%)	Screened positive ( <i>n</i> = 229; 31.63%) Count (%)	Unadjusted OR [CI]	Adjusted OR [CI]
Age <sup>a</sup>	9.31 (1.14)	9.28 (1.17)	0.977 [0.852, 1.120]	0.920 [0.785, 1.078]
Gender				
Male	254 (51.33)	114 (49.78)		
Female	241 (48.67)	115 (50.22)	1.064 [0.778, 1.455]	1.166 [0.809, 1.679]
Total monthly family income				
Prefer not to answer	50 (10.1)	36 (15.76)		
Up to 1000\$	180 (36.36)	129 (56.29)	0.992 [0.611, 1.610]	0.705 [0.410, 1.213]
1000–2000\$	204 (41.15)	48 (20.97)	0.327 [0.192, 0.556]***	0.402 [0.225, 0.720]*
More than 2000\$	61 (12.4)	16 (6.98)	0.361 [0.180, 0.724]*	0.381 [0.180, 0.806]*
Parental marital status				
Not married	28 (5.58)	15 (6.48)	1.171 [0.611, 2.247]	
Married	467 (94.42)	214 (93.52)		
Mother's employment				
Unemployed	363 (73.37)	164 (72.9)		
Employed	132 (26.63)	61 (27.1)	0.977 [0.685, 1.393]	
Father's employment				
Employed	463 (93.56)	212 (92.72)		
Prefer not to answer	32 (6.44)	17 (7.28)	0.875 [0.474, 1.618]	
Mother's education				
Elementary or less	46 (9.31)	37 (16.21)		
High school or less	344 (70.33)	156 (68.5)	0.559 [0.348, 0.898]*	
University or more	100 (20.36)	35 (15.29)	0.431 [0.241, 0.770]*	
Father's education				
Elementary or less	83 (16.99)	67 (29.46)		
High school or less	320 (65.46)	131 (57.71)	0.508 [0.347, 0.744]***	
University or more	86 (17.55)	29 (12.83)	0.422 [0.248, 0.716]**	
Mother not living at home	15 (2.98)	8 (3.52)	1.189 [0.496, 2.847]	
Father not living at home	50 (10.08)	39 (16.98)	1.825 [1.161, 2.869]*	1.3455 [0.867, 2.441]
Total number of individuals living at home <sup>a</sup>	5.00 (1.66)	5.14 (1.82)	1.050 [0.959, 1.150]	
Parental assessment of child's academic performance at school				
Good—passes all classes without any problems	416 (84.06)	162 (70.92)		
Acceptable—does well but has occasional difficulties with some subjects	74 (14.98)	53 (22.93)	1.815 [1.220, 2.700]*	1.380 [0.860, 2.214]
Sub-optimal—fails some subjects or classes	5 (0.97)	14 (6.14)	7.541 [2.630, 21.619]***	2.594 [0.816, 8.245]
Repeated at least one school grade	35 (6.99)	40 (17.36)	2.797 [1.720, 4.547]***	
Ever received home tutoring	43 (8.78)	38 (16.52)	2.055 [1.288, 3.279]*	
Ever received accommodation at school	12 (2.41)	12 (5.23)	2.239 [0.988, 5.070]	
Chronic physical illness	24 (4.92)	40 (17.58)	4.119 [2.408, 7.047]***	1.945 [1.052, 3.595]*
Positive psychiatric family history	10 (2.02)	23 (10.04)	5.415 [2.532, 11.580]***	1.819 [0.765, 4.323]
GHQ total score <sup>a</sup>	15.47 (9.45)	23.1 (12.05)	1.070 [1.052, 1.087]***	1.058 [1.038, 1.078]***
PRQ bully score <sup>a</sup>	1.01 (1.59)	1.21 (1.84)	1.072 [0.979, 1.174]	
PRQ victim score <sup>a</sup>	1.05 (1.54)	2.06 (2.47)	1.297 [1.194, 1.410]***	1.324 [1.200, 1.460]***

<sup>a</sup>Mean(SD)\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001



**Table 5** Correlates of positive screens for psychiatric disorders in 12–17-year-old adolescents

	Screened negative ( <i>n</i> = 298; 53.37%) Count (%)	Screened positive ( <i>n</i> = 261; 46.63%) Count (%)	Unadjusted OR [CI]	Adjusted OR [CI]
Age	13.91 (1.63)	14.46 (1.69)	1.218 [1.100, 1.348]***	1.203 [1.072, 1.352]*
Gender				
Male	155 (52.06)	117 (44.75)		1.696 [1.143, 2.517]*
Female	143 (47.94)	144 (55.25)	1.341[0.961, 1.872]	
Total monthly family income				
Prefer not to answer	31 (10.48)	33 (12.72)		
Up to 1000\$	106 (35.61)	146 (56.02)	1.296 [0.749, 2.243]	0.681 [0.354,1.309]
1000–2000\$	127 (42.49)	65 (25.08)	0.486 [0.274,0.862]*	0.478 [0.252, 0.905]*
More than 2000\$	34 (11.42)	16 (6.17)	0.445[0.206,0.959]*	0.543 [0.230, 1.283]
Parental marital status				
Not married	22 (7.4)	28 (10.7)	1.499 [0.835, 2.690]	
Married	276 (92.6)	233 (89.3)		
Mother's employment				
Unemployed	214 (72.14)	198 (76.47)		
Employed	83 (27.86)	61 (23.53)	1.225 [0.855, 1.841]	
Father's employment				
Employed	264 (88.61)	229 (87.82)		
Prefer not to answer	34 (11.39)	32 (12.18)	0.927 [0.554, 1.551]	
Mother's education				
Elementary or less	32 (10.67)	49 (19.09)		
High school or less	221 (74.66)	180 (69.99)	0.524 [0.322, 0.854]*	
University or more	43 (14.67)	28 (10.92)	0.416 [0.217,0.799]*	
Father's education				
Elementary or less	58 (19.48)	80 (31.2)		
High school or less	186 (62.87)	157 (61.76)	0.613 [0.411, 0.915]*	1.113 [0.685, 1.874]
University or more	52 (17.65)	18 (7.04)	0.249 [0.132, 0.470]***	0.611 [0.278, 1.344]
Mother not living at home	2 (0.65)	8 (3.06)	0.4815[0.995,23.291]	
Father not living at home	40 (13.47)	46 (17.62)	1.373 [0.867, 2.176]	
Total number of individuals living at home <sup>a</sup>	5.20 (1.73)	5.28 (1.98)	1.023 [0.935, 1.119]	
Parental assessment of child's academic performance at school				
Good—passes all classes without any problems	240 (80.42)	157 (60.13)		
Acceptable—does well but has occasional difficulties with some subjects	53 (17.64)	80 (30.6)	2.320[1.552,3.468]***	1.452 [0.872, 2.417]
Sub-optimal—fails some subjects or classes	6 (1.94)	24 (9.27)	6.408[2.529,16.237]***	2.990 [1.043, 8.568]*
Repeated at least one school grade	56 (18.61)	100 (38.3)	2.715 [1.849, 3.985]***	1.645 [0.988, 2.739]
Ever received home tutoring	30 (10)	41 (15.56)	1.658[1.001, 2.748]*	
Ever received accommodation at school	6 (1.99)	12 (4.65)	2.396 [0.885, 6.485]	
chronic physical illness	13 (4.4)	33 (12.58)	3.127 [1.605, 6.090]**	2.158 [1.020, 4.565]*
Positive psychiatric family history	9 (3.02)	39 (14.94)	5.641 [2.676,11.890]***	3.186 [1.401, 7.241]*
GHQ total score <sup>a</sup>	19.42 (8..63)	21.91 (9.99)	1.029[1.011, 1.048]*	
PRQ bully score <sup>a</sup>	0.77 (1.47)	1.151 (1.99)	1.295 (1.164, 1.440)***	1.165 [1.037,1.309]*
PRQ victim score <sup>a</sup>	0.52 (1.12)	1.17 (2.47)	1.360 (1.195, 1.547)***	1.247 [1.079, 1.442]*
Child reported CBQ score pertaining to father*	8.64 (1.84)	8.48 (2.68)	0.968 [0.899, 1.041]	
Child reported CBQ score pertaining to mother <sup>a</sup>	9.12 (1.99)	9.41 (2.05)	1.073 [0.988,1.166]	
CBQ parent score <sup>a</sup>	3.99 (3.89)	5.30 (4.63)	1.075[1.033, 1.119]***	1.037 [0.990, 1.087]

<sup>a</sup>Mean(SD)\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001

associated with screening positive for a psychiatric disorder (OR 0.478; CI [0.252, 0.905]) (Table 5).

## Discussion

The Psychopathology in Children and Adolescents in Lebanon Study (PALS) is the first study to screen for psychiatric disorders among children and adolescents in a representative national sample in Lebanon. Our data show that 1 in 3 Lebanese children and adolescents screened positive for at least one psychiatric disorder. Higher prevalence rates were associated with older age groups, lower family income, presence of a chronic physical illness, increased peer victimization, and higher parental risk for psychiatric disorders.

Our general prevalence rate for screening positive for any psychiatric disorder falls within the upper end of the reported range of 1.8–39% globally, which is rather wide given the heterogeneity in methodological approaches (e.g., the definition of impairment and severity may vary across surveys) [24]. Compared to similar national surveys that used screening tools, the general prevalence in our study remains higher [25–27]. Specifically, the percentage of Nepali children who scored in the clinical range on the child behavior checklist (CBCL) was 19% in a national survey [28], while in Germany, 14.5% of children and adolescents screened positive for psychiatric disorders in the national mental health and examination survey [27]. In a 2-stage epidemiological study using the SDQ in Saudi Arabia, however, the prevalence of any psychiatric disorder was 36% [26]. The fact that we used multiple screening tools (most other studies relied solely on the SDQ) and used both parent and child reports may have contributed to the higher estimate.

The prevalence of PTSD and anxiety symptoms in our sample is higher than the rates from neighboring Arab countries but comparable to those from countries that witness continuous conflict [29, 30]. This is not a surprising finding given that Lebanon has been witnessing ongoing conflict [31–33]. Despite the high prevalence of PTSD symptoms in our population, it should be noted that the CRIES 8 cut-off used has an estimated positive predictive value ranging between 0.3 and 0.8 [34]. This means that despite screening positive for PTSD, many participants may not fit the diagnostic criteria for having PTSD. Still, such high prevalence of PTSD symptoms warrants screening children and adolescents in primary healthcare settings for trauma exposure and its associated symptoms. This is particularly important given the possible effect of childhood trauma on development of adult psychopathology [35, 36]. Furthermore, early interventions should be designed to aid children who have been subjected to childhood trauma taking into consideration the cultural context [37].

Interestingly, our prevalence of conduct symptoms is similar to rates obtained using the SDQ in other surveys within the Middle East [38] and the global prevalence of 2.1% [39]. Studies have shown that almost 50% of the difference in the prevalence of conduct disorder among children can be attributed to environmental factors [40]. Prenatal and perinatal interventions thus can play a role in the prevention of conduct disorder. Our prevalence of ADHD symptoms is also similar to published data that used the SDQ in other countries [41–44]. Identifying children and adolescents with or at risk for conduct disorder and/or ADHD is of public health importance, since the former is associated with increased risk of substance abuse and criminal activity and the latter is associated with academic difficulty and increased risk for other psychiatric disorders.

Alarming, almost 1 in 5 (18%) of adolescents smoked cigarettes, drank alcohol, or used water pipe in the past 30 days in our study, in line with the most recent data (2017) from the Lebanon Global School-based Health Survey (GSHS) that reported a 30-day prevalence among 7th–12th graders of 35% for any tobacco product, and 18% for alcohol [45]. Data on alcohol and tobacco use among children and adolescents clearly indicate the need for stronger implementation of substance use policies, including effective regulation of availability, marketing (of alcohol), and minimum pricing of both alcohol and tobacco products [46].

Our results showed a negative association between higher family income and child mental health, consistently across all studied age groups, in line with previous research [47]. Given the cross-sectional nature of our study, we cannot ascertain whether the association observed is due to social causation or social drift or both [48, 49]. However, longitudinal studies have confirmed that children with low (vs. high) SES have higher parent-reported mental health problems and higher rates of unmet mental health needs [50], with extended exposure to poverty associated with worse outcomes [51]. These findings stress on the need to prioritize families of lower SES in governmental and non-governmental mental health initiatives and resource allocation.

Worse academic performance was also associated with higher odds of screening positive for a mental health disorder, corroborating findings from other published studies [25, 52, 53] with longitudinal studies showing a bidirectional effect [54]. Partnerships between mental health and educational systems to screen children with academic difficulties are vital to properly detect and address any possible mental health problems early on [55].

Having a chronic physical illness was associated with higher odds of screening for a psychiatric disorder across all age groups, similar to what we had found in the previous Beirut prevalence study [12]. This may be due to feelings of inadequacy or lack of control associated with the chronic illness, restrictions in positive activities, medication side

effects [56], and increased levels of peer victimization [57]. Such a finding calls for enhanced mental health screening practices in pediatric and primary healthcare facilities, particularly in children with chronic physical health issues.

Poorer parental mental health was associated with higher risk for an offspring to screen positive for a mental health disorder. Interestingly, this finding was significant in the 5–11 years age groups but not in adolescents highlighting the role of parental psychopathology in early onset psychiatric symptoms. Studies have consistently shown that children of mentally ill parents are more likely to develop internalizing and externalizing disorders [58, 59]. In addition to genetic factors [60], this may be due to difficulties in parent–child interactions leading to decreased monitoring, decreased family cohesion, and greater conflict [61]. Indeed, we also found that higher parent-reported conflict with the child was also associated with increased odds for screening positive for a psychiatric disorder. Parent–child conflict is known to be associated with behavioral and emotional problems [62, 63] and interventions that address this conflict may help mitigate the risk for psychopathology in the offspring.

Higher levels of peer victimization were associated with higher odds of risk for a psychiatric disorder highlighting the deleterious psychological effects of bullying which may extend well into adulthood [64, 65]. It is important to note, however, that many other factors come into play to moderate the deleterious effects of bullying. As such, addressing bullying as a public health concern may help mitigate its short- and long-term effects on mental health, suicidality, and criminality [65].

Only 5% of children who screened positive for a psychiatric disorder ever sought mental health help. Alarmingly, we had shown a similar treatment gap several years ago [12]. This trend continues to be much lower than the rate seen in developing countries [34, 66, 67], and may be due to lack of awareness or stigma surrounding mental health that is prevalent in the Arab world [6, 68]. Other probable barriers to treatment seeking may include lack of accessibility and affordability, since Lebanon relies predominantly on the private sector to provide mental health services. The fragmentation within the healthcare system also leads to disparities in mental health coverage across seven different financing intermediaries; creating both inefficiency and inequality [69]. Fortunately, since 2015, Lebanon has had a national mental health strategy reforming several mental health care-related issues including governance and increased access to care for all residents of Lebanon.

Our study has a number of limitations. First, the absence of a census since 1932 and therefore an accurate sampling frame for Lebanon may have affected the representativeness of the sample. Furthermore, our response rate of 47%, similar to the response rate of 51% obtained in a previous study conducted by our team in the Greater Beirut area [12], is

also lower than that observed in other international studies [70, 71], which may have introduced selection bias. Studies have shown that non-respondents in mental health surveys are usually individuals with more psychological distress or psychiatric disorders [72, 73]. One study that examined the extent to which prevalence estimates of adolescent health-related behaviors would be affected by sampling bias found that the resulting proportions would be underestimated almost by fourfold [74]. Together, these published findings on the impact of selection bias in mental health surveys indicate that it is highly likely that the percentage of children and adolescents who screened positive is biased toward the null. Nonetheless, it is important to note that the distribution of the basic demographic characteristics in our sample (gender, socioeconomic status, and percentage of fathers not living at home) was all comparable to 2018–2019 data published by the Central Administration of Statistics (CAS), a governmental body that disseminates national statistics to the public [23]. Another methodological limitation was the use of screening tools rather than diagnostic interviews, but we made sure to employ Arabic validated tools to maximize construct validity. While the Arabic versions of the Mood and Feelings Questionnaires (MFQ) and the Screen for Childhood Anxiety Related Disorders (SCARED) were previously validated by our team and showed good internal consistency and cut-off scores that differentiated depressed vs non-depressed groups (for the MFQ) and anxious vs non-anxious (for the SCARED) were established, the cut-off scores for the SDQ and CRIES 8 were not validated within the Lebanese community. This may have led to an underestimation or overestimation of the true prevalence of psychiatric disorders as measured by these two instruments. This highlights the need for greater efforts to cross culturally validate psychiatric instruments to guide child mental health research, especially in low- and middle-income countries [75].

Another limitation is the fact that we did not screen for childhood adversities. These have been repeatedly established as a risk factor for psychopathology in children and adolescents [76], and adults [77]. When cumulative, childhood adversities are more strongly associated with psychopathology [78]. While not all children exposed to adversities develop psychopathology, studies have found that parent–child conflict mediates this relationship [79]. While in our study, we used CRIES 8 which is an indirect indicator of recent trauma exposure, it is important for future research to include more comprehensive metrics on childhood adversities.

Despite these limitations, “PALS” remains the most comprehensive and only national study to date to assess the prevalence of mental health problems among youth in Lebanon, a country that has been hit by a series of calamities in the recent past. In fact, the percentage of youth affected

by mental health problems is likely to have increased given the most recent near-collapse of the Lebanese economy, the COVID-19 pandemic, and the most recent Beirut port explosion [80, 81]. Our findings clearly highlight the need for a concerted national effort to mitigate the impact of these recent and ongoing events on the mental health of children and adolescents. Efforts should employ all stakeholders including but not limited to the various ministries, non-governmental organizations working with youth, schools, public health and mental health professionals, and primary care physicians to work together to identify children and adolescents at risk for psychiatric disorders, develop preventive interventions, and improve access to care. Youth and their parents must be engaged in the process as the participatory-based approaches to finding solutions will allow for their success and sustainability.

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## Declarations

**Conflict of interest** Dr. Maalouf reports the following: advisory board member of Ayadi Health, and research grant from the Harvard Medical School Center for Global Health Delivery-Dubai. Dr. Brent reports the following: Royalties from Guilford Press, UpToDate, and eRT; consultant, Healthwise, on Scientifics Board of Klingenstein Third Generation Foundation and the American Foundation for Suicide Prevention, Funding from NIMH, AFSP, and the Once Upon A Time Foundation. All other authors disclose no conflict of interest.

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