The Psychological Impact of COVID-19 Lockdown on Children and Adolescents in Tunisia: A Cross-Sectional Study

Оценка психологического воздействия изоляции в период пандемии COVID-19 на детей и подростков в Тунисе: поперечное исследование

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Original research

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ABSTRACT

BACKGROUND: During the COVID-19 pandemic, Tunisia implemented a national lockdown between March and May 2020. This disrupted daily life and limited access to essential services. The restrictions significantly reduced social interactions and outdoor activities for children and adolescents, raising concerns about the psychological impact on this population.

AIM: To assess the psychological impact of the COVID-19 lockdown on children and adolescents in Tunisia.

METHODS: A cross-sectional study using a telephone survey was conducted among 514 Tunisian households in August 2020. We included parents of children aged five to 15 years. The collected data included sociodemographic characteristics, general information, and details on the establishment of routines and adaptive containment measures. A 26-item questionnaire was developed to assess anxiety and emotional and behavioral symptoms. Data were analyzed using descriptive statistics and chi-square tests.

RESULTS: Parents reported depressive symptoms, anxiety symptoms and behavioral manifestations in 38.7%, 69.8% and 61.9% of their children, respectively. Among children, female sex was associated with significantly greater levels of depressive symptoms, sleep disturbances, and eating disturbances (p=0.002, p=0.034 and p=0.011, respectively). Children who had somatic chronic illnesses or whose parents had such conditions reported significantly greater levels of somatic complaints (p=0.037). Those whose fathers continued to work during the lockdown had a more positive attitude toward the COVID-19 pandemic (p=0.027). Children with anxiety symptoms had more positive attitudes towards the COVID-19 pandemic (p=0.002); however, those with depressive symptoms did not (p=0.19).

CONCLUSION: The COVID-19 lockdown had a substantial psycho-logical impact on children and adolescents in Tunisia, as indicated by high rates of anxiety, depression, and behavioural disturbances. These findings may contribute to the formulation of evidence-based recommendations aimed at safeguarding the mental health of children and adolescents in future pandemic scenarios, thereby minimizing adverse psychological outcomes.

АННОТАЦИЯ

ВВЕДЕНИЕ: Пандемия COVID-19 привела к введению общенациональной изоляции во многих странах, в том числе в Тунисе, где она действовала с марта по май 2020 г. Это нарушило повседневную жизнь и затруднило доступ к социально значимым услугам. Ограничения, введенные в этот период, значительно сократили социальное взаимодействие и возможности активного отдыха детей и подростков, что вызвало опасения по поводу психологического воздействия на эту популяцию.

ЦЕЛЬ: Оценить психологическое воздействие изоляции, введенной в связи с пандемией COVID-19, на детей и подростков в Тунисе.

МЕТОДЫ: В период с 10 по 24 августа 2020 года было проведено поперечное исследование, в ходе которого по телефону опросили 514 тунисских домохозяйств. В исследование были включены родители детей в возрасте от 5 до 15 лет. Собранные данные включали социально-демографические характеристики, общую информацию, а также сведения о внедрении распорядка дня и об адаптивных карантинных мероприятиях. Для оценки симптомов тревоги, эмоциональных и поведенческих симптомов был разработан опросник, состоящий из 26 пунктов. Анализ взаимосвязей между симптомами у детей и социально-демографическими факторами проводился с использованием описательных аналитических методов и критерия хи-квадрат.

РЕЗУЛЬТАТЫ: Родители сообщали о наличии у своих детей депрессивной симптоматики (38,7%), симптомов тревоги (69,8%) и поведенческих симптомов (61,9%). Среди девочек наблюдался значительно более высокий уровень депрессивной симптоматики, нарушений сна и расстройств пищевого поведения (p=0,002, p=0,034 и p=0,011 соответственно). У детей с хроническими соматическими заболеваниями, и детей, имеющих родителей, которые страдали этими заболеваниями, отмечался достоверно более высокий уровень жалоб на соматическое состояние (p=0,037). Дети, отцы которых продолжали работать во время изоляции, чаще демонстрировали позитивное отношение к пандемии COVID-19 (p=0,027). Позитивный настрой также чаще встречался среди детей с симптомами тревоги (p=0,002), тогда как у детей с депрессивной симптоматикой такой связи не наблюдалось (p=0,19).

ЗАКЛЮЧЕНИЕ: Изоляция оказала существенное психологическое воздействие на детей и подростков в Тунисе, которое выражалось высокой частотой тревоги, депрессии и поведенческих нарушений. Эти результаты могут способствовать разработке научно обоснованных рекомендаций, направленных на защиту психического здоровья детей и подростков в сценариях будущих пандемий.

Keywords: *COVID-19 pandemic; lockdown; psychological impact; children and adolescents; Tunisia*
Ключевые слова: *пандемия COVID-19; изоляция; психологическое воздействие; дети и подростки; Тунис*

INTRODUCTION

COVID-19, also known as coronavirus disease 2019, is a contagious respiratory illness caused by the novel virus SARS-CoV-2[1]. The World Health Organization officially declared COVID-19 a pandemic on March 11, 2020 [1]. In response to the pandemic, the Tunisian government implemented a national lockdown from March to May 2020, which caused significant disruptions and major changes in the daily lives of families, enforced social distancing, and implemented restrictive measures [2]. By the end of the first year, the Ministry of Health reported over 144,796 confirmed cases and 4,896 deaths, with the fatality rate fluctuating between 2.5% and 3% during the early months [3]. The COVID-19 pandemic has had a significant effect on the mental health of both adults and children [4]. Children and adolescents, in particular, experienced several negative

[1] World Health Organization. Naming the coronavirus disease (COVID-19) and the virus that causes it [Internet]. Geneva: WHO; 2020 [cited 2025 June 5]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it

consequences due to restrictions in their usual activities, and they often faced separation from important figures such as peers, teachers and extended family members. In addition, uncertainty about the future, overcrowding, parental anxiety, fear of infection and economic consequences may further impact the mental health of children and adolescents [5].

The psychological impact of the COVID-19 pandemic lockdown on children and adolescents has been well documented in the scientific literature. Most of the studies used an indirect data collection method and were conducted mainly among parents with internet access [4]. A systematic review published in August 2021 aimed to review the impact of COVID-19 pandemic lockdown measures on the mental health of children and adolescents [4]. It included 61 articles with 54,999 children and adolescents (aged ≤19 years) and reported anxiety and depression as the most common outcomes, with reported symptom prevalence rates ranging between 1.8% and 49.5% for anxiety and between 2.2% and 63.8% for depression [4]. Several studies conducted in China, the UK, Canada, the USA, Turkey, and India have also shown significant increases in symptoms of depression, anxiety [4, 5], post-traumatic stress disorder, and fear among children and adolescents during lockdown compared with pre-lockdown levels [6–12].

In Tunisia, the definitions of children and adolescents generally align with international standards but are also shaped by local legal and policy frameworks; children are typically defined as individuals under 18 years of age, which is consistent with the United Nations Convention on the Rights of the Child (UNCRC)[2], to which Tunisia is a signatory, whereas adolescents are recognized as those aged approximately 10–19 years, reflecting the World Health Organization (WHO) classification[3]. To our knowledge, only a few studies have examined the initial impact of the COVID-19 pandemic on this young population within Tunisia [13]. An online study of 138 Tunisian parents conducted shortly after the implementation of curfew and lockdown measures revealed significant psychological effects on both parents and children as COVID-19 spread [13]. However, the small sample size was not representative of Tunisian households. Another study assessed the psychological profiles of 538 parents (464 mothers, 74 fathers) with children and adolescents under 18 years of age and used online surveys to measure anxiety and burnout levels [14]. This study highlighted the negative psychological impact of social isolation; however, its findings were limited by the use of a self-selected and targeted sample [14]. Importantly, the majority of studies were online-based surveys; thus, they were limited to those who had access to a smartphone device, meaning that the results are not generalizable to the whole population.

Understanding the mental health outcomes of children and adolescents within different cultural contexts and low-resource settings, such as Tunisia, is essential for providing appropriate support to both them and their families in the context of the COVID-19 pandemic [15]. This knowledge can also inform recommendations for mental health professionals and stakeholders. Therefore, the aim of the current study was to assess the psychological impact of the COVID-19 lockdown on children and adolescents in Tunisia. In particular, we sought to evaluate symptoms of anxiety and depression, as well as changes in daily routines and adaptive containment measures, among this population during the lockdown.

METHODS

Study design

We conducted a cross-sectional study using a telephone survey among Tunisian households between the 10th and 24th of August, 2020.

Data collection methods

Sampling method

A controlled quota sampling method was used on the basis of five selection criteria: geographical origin, sex, age, urban or rural residence, and socioeconomic status. The quotas were established proportionally, on the basis of the 2014 population census data[4], to ensure that the sample accurately reflected the distribution of these variables within the Tunisian population. Additionally, stratified sampling and weighting techniques were used to control for these variables and to achieve a representative sample.

[2] The United Nations Convention on the Rights of the Child [Internet]. London: UNISEF; 1989 [cited 2025 June 5]. Available from: https://www.unicef.org.uk/wp-content/uploads/2016/08/unicef-convention-rights-child-uncrc.pdf

[3] World Health Organization. Adolescents: health risks and solutions. Geneva: WHO; 2020 [cited 2025 June 5]. Available from: https://web.archive.org/web/20200411122817/https://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions

[4] National Institute of Statistics. [Statistical Yearbook of Tunisia, 2017–2021] [Internet]. Tunis: INS; 2021 [cited 2025 June 5]. French, Arabian. Available from: https://www.ins.tn/sites/default/files-ftp3/files/publication/pdf/annuaire-2021avec%20lien_3.pdf

Sample size

Our study is part of a larger national research project that assessed the impact of the COVID-19 pandemic on parents' mental health and family functioning. The original study was conducted on a representative sample of 1,003 Tunisian households from all 24 governorates. From this larger sample, a final subsample of 514 participants was drawn while maintaining the proportional distribution across the control variables described above. The sample size was calculated on the basis of a 95% confidence level and a margin of error of ±5%, which aligns with standard practices in social science research.

Eligibility criteria

Participants were eligible for inclusion if they were parents of one child aged between five and 15 years and if they had completed the questionnaire in full. Participants were excluded if they had more than one child or if their responses to the questionnaire were incomplete.

Survey administration

The data were collected via computer-assisted telephone interviewing (CATI), and the households were selected in four stages via telephone exchange codes for landlines and operator differentiator numbers for mobile phones:

- *Stage 1.* The data used included two-digit area codes for landline numbers, each uniquely identifying a specific geographic region, as well as two-digit prefixes indicating different mobile operators.
- *Stage 2.* On the basis of this information, the system generated a telephone file. The entire file was divided into lists and entered into the CATI system one by one during the fieldwork period. Since cell phones are not linked to any geographic location, the numbers were generated on the basis of the mobile operators' identities.
- *Stage 3.* The CATI system dials the exchanges and numbers randomly selected in the Stage 2. The interviewers had no discretion over which number to call, and no new numbers were used unless the first batch was exhausted.
- *Stage 4.* During the fieldwork, the interviewers first determined whether the telephone number in the landline sample belonged to a household. If not, the CATI system automatically dials the next randomly selected telephone number. For the mobile sample, only respondents' eligibility was checked.

The participants who were reached received information about the study and were asked to give their oral consent to participate, with the understanding that they could withdraw at any time without providing any justification. A 20- to 30-minute questionnaire was then completed by experienced interviewers who had received specialized training from child psychiatrists.

The parents were asked to report their sociodemographic and general characteristics, including age, sex, number of children, socioeconomic status, educational level, and sex. A few short questions were included to explore changes in family dynamics and parents' employment status related to the lockdown.

Additionally, a self-developed 26-item questionnaire (see Table S1 in the Supplementary), which is based on the criteria of the Diagnostic and Statistical Manual of mental disorders, fifth edition (DSM-5) was developed for this study to assess the following symptoms: depressive symptoms (items 1 to 3), anxiety symptoms (items 4 to 9), behavioral manifestations (items 10, 11, 13, 14 and 15), positive attitudes towards the COVID-19 pandemic (item 16), attention disorders (item 12), sleep disturbances (items 19 to 21), eating disturbances (item 22), sphincter disorders (item 23), somatic disorders (items 17 and 18), problematic use of the internet (items 24 to 26). The answers to these items were collected via a 4-point Likert scale: "Never", "Sometimes", "Often" or "Always". The items were considered positive if the parents' answer was "Often" or "Always". Symptoms were judged to be present if the answer to one of the corresponding items was "Often" or "Always", except for problematic use of the internet, where the answer to all the items had to be "Often" or "Always".

Two focus groups with six parents in each group were carried out in July 2020 to assess the relevance of the items and topics explored. A preliminary survey among 20 people was carried out to adjust the parents' questionnaire. Following this preliminary phase, no changes were made to the questionnaire.

Statistical analysis

The analysis was carried out via SPSS software on Windows. Frequencies and percentages were used to present descriptive data. Chi-square tests were used to assess relationships between reported child symptoms and sociodemographic factors. The significance level was set at 0.05.

Ethical considerations

Ethical approval was obtained on May 18, 2020, from Mongi Slim Hospital (No. 11/2020), the affiliation of the Child and Adolescent Psychiatry Department's researchers.

RESULTS

Respondent characteristics

The final sample consisted of 514 participants. Approximately half of the respondents (51%) were mothers, and 51.6% of the children were male. More than one-third of the parents (36.2%) were aged between 36 and 45 years and had a high school education (37%). Most respondents were married (95.7%) and lived in nuclear families (91.2%). Almost two-thirds of the households (76.9%) belonged to the middle-income class, as defined on the basis of the 2014 population census data[5], and 74.5% lived in urban areas. Somatic chronic illnesses were reported in nearly half of the cases (49.8%), whereas 10.5% of parents reported a psychiatric history (see Table 1).

Table 1. Participants' sociodemographic profile (*n*=514)

Variable	*n* (%)
Sex of the respondent	
Male	252 (49%)
Female	262 (51%)
Age of the respondent (years)	
≤35	107 (20.8%)
36–45	186 (36.2%)
46–55	174 (33.9%)
≥56	47 (9.1%)
Region	
Urban	383 (74.5%)
Rural	131 (25.5%)
Socioeconomic Status (Income in Tunisian Dinar per month)	
Lower class <400	102 (19.8%)
Lower middle class (400–1,200)	284 (55.3%)
Higher middle class (1,200–3,000)	111 (21.6%)
Affluent class >3,000	17 (3.3%)
Sex of the child concerned by the study	
Female	249 (48.4%)
Male	265 (51.6%)
Age of the child concerned by the study (years)	
≤6	152 (29.6%)
>6 and ≤12	202 (39.3%)
>12	160 (31.1%)
Chronic illness in the family (parent or child)	
Yes	256 (49.8%)
No	258 (50.2%)
Having a mental health illness needed psychiatric intervention (parent or child)	
Yes	54 (10.5%)
No	460 (89.5%)
Educational status of responding parent	
Illiterate	28 (5.4%)
Primary education	150 (29.2%)
High School	190 (37%)
Undergraduate and Postgraduate	146 (28.4%)
Marital status	
Married	492 (95.7%)
Separated, divorced, widowed	22 (4.3%)
Household living	
Nuclear family	469 (91.2%)
Extended family	45 (8.8%)

Descriptive results

Our results are organized into two main sections. First, we present findings on children's behavior during the COVID-19 lockdown, followed by an examination of its effects on family dynamics. This is followed by an analysis of the psychological impact on children and adolescents. This structured approach is designed to offer a comprehensive understanding of how the pandemic affected young individuals and their families during this period.

Children's behavior and family dynamics during the COVID-19 lockdown

Most children were perceived by their parents as having been interested in following news updates about the pandemic (74.5%). The main sources of information were TV and radio (42.8%), social media (22.5%) and mothers (22.2%). Only 3.7% of the participants reported having had a family member or a friend diagnosed with COVID-19. Approximately one quarter of fathers (23.9%) and 8.6% of mothers worked during the lockdown as they had prior to COVID-19, whereas 2.9% of fathers and 1.8% of mothers started working remotely. Owing to workplace closures, professional activity was completely suspended during the lockdown for both fathers and mothers in 45.7% and 19.3% of the cases, respectively. Changes in family dynamics were also noted in relation to lockdown. A third of the families

[5] National Institute of Statistics. [Statistical Yearbook of Tunisia, 2017–2021] [Internet]. Tunis: INS; 2021 [cited 2025 June 5]. French, Arabian. Available from: https://www.ins.tn/sites/default/files-ftp3/files/publication/pdf/annuaire-2021avec%20lien_3.pdf

(35%) had to endure the absence of one parent due to travel restrictions. Almost eighty percent (79.2%) of the participants reported feeling that their families had gotten closer or ended up reconciling (7.6%), whereas 7.4% of the families were separated by the end of the lockdown (Table 2).

Psychological impact of the COVID-19 lockdown on children and adolescents

The parents reported depressive symptoms, anxiety symptoms and behavioral disorders in 38.7%, 69.8% and 61.9% of the children, respectively. More than half of the parents reported sleep disturbances (57.6%), 35.4% reported eating disturbances, and 5.7% reported sphincter disorders. Attention problems in children were reported in 17.5%, and somatic complaints were reported in 14.6%. Only 11.5% of parents reported problematic use of the internet among their children. However, 54.7% of the children were perceived by their parents as having had a positive attitude toward the COVID-19 pandemic by having shown responsible and organized behavior (being ready to help, caring about their belongings, and taking care of their health) (Table 3).

The relationships between the psychological impact of the lockdown and the COVID-19 pandemic on children and adolescents and socioeconomic factors are presented in Table 4. Mothers reported more depressive symptoms, sleep disturbances and eating disturbances than fathers did (p=0.001, p=0.046 and p=0.007, respectively). Among children, female sex was associated with significantly greater levels of depressive symptoms, sleep disturbances, and eating disturbances (p=0.002, p=0.034 and p=0.01, respectively). Children who had somatic chronic illnesses or whose parents had such conditions reported significantly greater levels of somatic complaints (p=0.037). Children whose fathers continued to work during the lockdown showed a more positive attitude towards the COVID-19 pandemic (p=0.027). No significant association was found between parental remote work (mother or father) and child symptoms or with the adoption of a positive attitude. Children with anxiety symptoms had more positive attitudes towards the COVID-19 pandemic (p=0.002). However, those with depressive symptoms did not (p=0.19) (Table 4).

Table 2. Children's behavior related to the COVID-19 lockdown and its impact on parents' employment and family dynamics (n=514)

Variable	*n* (%)	
The child followed the information on the COVID-19?		
Yes	383 (74.5%)	
No	128 (24.9%)	
NS	3 (0.6%)	
The main source of child information about COVID-19 was		
Parents	165 (32.1%)	
Classic Media (TV, radio)	220 (42.8%)	
Social media	116 (22.5%)	
Others	11 (2.1%)	
Unknown or without response	2 (0.4%)	
A family member or friend had contracted COVID-19		
Yes	19 (3.7%)	
No	495 (96.3%)	
Parents employment status during lockdown	**Mother**	**Father**
Unemployed prior to COVID-19	341 (66.3%)	102 (19.8%)
Continued to work as prior to COVID-19	44 (8.6%)	123 (23.9%)
Working remotely	9 (1.8%)	15 (2.9%)
Work suspended during lockdown	99 (19.3%)	235 (45.7%)
Lost his job	13 (2.5%)	21 (4.1%)
NS	8 (5.2%)	18 (3.5%)
The father or mother could not join the family during the lockdown		
Yes	180 (35%)	
No	334 (65%)	
The lockdown led the family to		
Get closer	407 (79.2%)	
Reconciliation	39 (7.6%)	
Separation	38 (7.4%)	
NS	30 (5.8%)	

Note: NS — not stated.

DISCUSSION

A total of 514 Tunisian households were included in the study. According to parental reports, 38.7% of children exhibited depressive symptoms, 69.8% experienced anxiety symptoms, and 61.9% demonstrated behavioural issues. Depressive symptoms, sleep disturbances, and eating disturbances were significantly more prevalent among female children (p=0.002, p=0.034, and p=0.011, respectively). The presence of chronic somatic illness — whether in the child or their parents — was significantly associated with a higher frequency of somatic complaints in children (p=0.037). Moreover, children whose fathers continued to work during the lockdown were more likely to exhibit

Table 3. Psychological impact of the COVID-19 lockdown and pandemic on children and adolescents

Symptoms	Items		Never 0 *n* (%)	Sometimes +/- *n* (%)	Often + *n* (%)	Always ++ *n* (%)	Presence of symptoms *n* (%)
Depressive symptoms	1	He/she gets quickly irritated and easily angry	245 (47.7)	140 (27.2)	74 (14.4)	55 (10.7)	199* (38.7%)
	2	He/she cries easily and at the slightest motive	316 (61.5)	116 (22.6)	39 (7.6)	43 (8.4)	
	3	Activities and plays he/she enjoyed have less positive effect on him/her	312 (60.7)	117 (22.8)	60 (11.7)	25 (4.9)	
Anxiety symptoms	4	He/she often asks and looks for information about COVID-19 (symptoms, contamination, epidemic situation...)	186 (36.2)	137 (26.7)	98 (19.1)	93 (18.1)	359* (69.8%)
	5	Shows or expresses an extreme fear of being contaminated	255 (49.6)	110 (21.4)	76 (14.8)	73 (14.2)	
	6	Shows or expresses extreme fear for his/her family (contamination, death...)	214 (41.6)	125 (24.3)	81 (15.8)	94 (18.3)	
	7	Shows or expresses an important anxiety while separated of his/her family even short	279 (54.3)	111 (21.6)	67 (13.0)	57 (11.1)	
	8	Shows or expresses an extreme fear about situations or issues whose didn't worry him/her before (being alone, fear of darkness...)	333 (64.8)	95 (18.5)	44 (8.6)	42 (8.2)	
	9	Worries more than he/she is used to from any sounds he/she hears	357 (69.5)	108 (21.0)	29 (5.6)	20 (3.9)	
Behavioral manifestations	10	He/she moves all time and doesn't stop	190 (37.0)	110 (21.4)	72 (14.0)	142 (27.6)	318* (61.9%)
	11	Worries/gets fed up quickly and has difficulty to finish any activity he/she starts	244 (47.5)	131 (25.5)	91 (17.7)	48 (9.3)	
	13	He/she argues with authority figures and actively defies or refuses to comply with requests	235 (45.7)	157 (30.5)	69 (13.4)	53 (10.3)	
	14	He/she has violent reactions (cry, fight, break...)	320 (62.3)	129 (25.1)	42 (8.2)	23 (4.5)	
	15	Has regressive behavior not adapted with his/her age (excessive spoiled attitude, uses baby talk, asks for bottle, pacifier...)	365 (71.0)	93 (18.1)	39 (7.6)	17 (3.3)	
Attention disorders	12	He/she has difficulty sustaining attention and he/she easily distracted	283 (55.1)	141 (27.4)	56 (10.9)	34 (6.6)	90* (17.5%)
Positive reaction to COVID-19	16	Shows responsible and organized behavior (ready to help, preoccupied about property, take care of health...)	128 (24.9)	105 (20.4)	113 (22.0)	168 (32.7)	281* (54.7%)
Somatic disorders	17	Complains of multiple pains (head, stomach...)	383 (74.5)	87 (16.9)	31 (6.0)	13 (2.5)	75* (14.6%)
	18	Presents fearful states with signs (such as throbbing, swallowing difficulty, shaking, sweating...)	410 (79.8)	62 (12.1)	35 (6.8)	7 (1.4)	
Sleep disturbances	19	Noticeable change in sleep schedules (delay of more than two hours when falling asleep or waking up)	184 (35.8)	106 (20.6)	110 (21.4)	114 (22.2)	296* (57.6%)
	20	Has fearing dreams	365 (71.0)	105 (20.4)	31 (6.0)	13 (2.5)	
	21	Insists on sleeping with a family member (parents, siblings) when he/she was used to sleeping alone without difficulty	301 (58.6)	78 (15.2)	48 (9.3)	87 (16.9)	
Eating disturbances	22	Noticeable increase or decrease in appetite	208 (40.5)	124 (24.1)	90 (17.5)	92 (17.9)	182* (35.4%)
Sphincter disorder	23	Has started wetting the bed again	429 (83.5)	56 (10.9)	21 (4.1)	8 (1.6)	29* (5.7%)
Problematic use of internet	24	Excessive use of electronic devices (phone, computer, tablet, electronic games)	171 (33.3)	117 (22.8)	82 (16.0)	144 (28.0)	59** (11.5%)
	25	Gets angry or refuse reducing use of electronic devices	235 (45.7)	111 (21.6)	93 (18.1)	75 (14.6)	
	26	Use of electronic devices has a negative impact on him/her (behavior, relationship, sleeping, eating)	256 (49.8)	118 (23.0)	78 (15.2)	62 (12.1)	

Note: *Symptoms were judged to be present if the answer to at least one of the corresponding items was "Often" or "Always". **Symptoms were judged to be present if the answer to all the corresponding items was "Often" or "Always".

Table 4. Relationships between the psychological impact of the COVID-19 lockdown on children and adolescents and socioeconomic factors

Variable	DS	BM	AS	PA to COVID-19	AD	SD	ED	Sph D	Sm D	PU internet
Responding parent										
Father	32.7	59.4	37.5	53.0	15.1	53.8	29.5	6.0	16.3	12.4
Mother	46.7	65.9	38.6	55.7	19.9	62.6	41.1	5.3	12.6	10.2
p	**0.001**	0.135	0.789	0.545	0.161	**0.046**	**0.007**	0.738	0.237	0.441
Rural vs Urban										
Urban	38.1	62.9	38.6	56.7	17.0	57.4	34.7	6.0	14.9	11.7
Rural	40.5	58.8	36.6	48.9	19.1	58.0	37.4	4.6	13.7	10.7
p	0.635	0.399	0.684	0.121	0.583	0.909	0.580	0.542	0.749	0.742
Sex										
Female	45.6	64.7	39.3	56.3	20.2	62.3	40.9	5.2	12.3	10.7
Male	32.1	59.2	37.0	53.1	14.9	53.1	30.2	6.1	16.8	12.2
p	**0.002**	0.198	0.597	0.453	0.110	**0.034**	**0.011**	0.641	0.149	0.594
Socioeconomic level										
<800 tnd	37.4	59.9	38.9	55.6	54.2	54.5	35.4	3.5	14.0	8.9
(800–2000) tnd	43.4	69.2	35.8	54.7	20.1	61.0	37.7	8.8	18.2	13.2
>2000 tnd	28.3	54.7	45.3	52.8	11.3	66.0	34.0	5.7	9.4	13.2
p	0.130	0.077	0.468	0.928	0.345	0.191	0.843	0.271	0.246	0.337
Having a chronic illness (parent or child)										
Yes	37.9	62.5	35.5	57.0	16.4	58.6	35.2	4.3	11.3	9.4
No	39.4	61.2	40.7	52.3	18.6	56.6	35.7	7.0	17.8	13.6
p	0.702	0.769	0.229	0.284	0.512	0.646	0.905	0.188	**0.037**	0.136
Having a Mental Health illness needed psychiatric intervention										
Yes	50.0	66.7	38.9	63.0	22.2	53.7	29.6	1.9	11.1	5.6
No	37.4	61.3	38.0	53.7	17.0	58.0	36.1	6.1	15	12.2
p	0.072	0.443	0.904	0.196	0.335	0.542	0.348	0.346	0.444	0.149
Employment status of the mother during lockdown										
Continued to work as prior to COVID-19	36.4	56.8	36.4	38.6	18.2	56.8	31.8	4.5	20.5	9.1
Working remotely	44.4	55.6	22.2	44.4	0.0	33.3	11.1	0.0	11.1	0.0
p	0.649	0.944	0.701	1.000	0.324	0.278	0.418	1.000	1.000	1.000
Employment status of the father during lockdown										
Continued to work as prior to COVID-19	41.5	61	41.5	56.9	18.7	56.1	36.6	1.6	14.6	13.0
Working remotely	33.3	66.7	26.7	26.7	6.7	53.3	26.7	13.3	6.7	6.7
p	0.545	0.669	0.269	**0.027**	0.246	0.839	0.449	0.058	0.693	0.694

Note: AD — attention disorders, AS — anxiety symptoms, BM — behavioral manifestations, DS — depressive symptoms; ED — eating disturbances, PA to COVID — positive attitude towards COVID-19 pandemic; PU internet — problematic use of internet, SD — sleep disturbances; Sph D — sphincter disorder; Sm D — somatic disorders; tnd — Tunisian Dinar. Numbers in bold indicate significant *p*-values ($p \leq 0.05$) obtained with *χ2 test*.

a positive attitude toward the COVID-19 pandemic (p=0.027). A positive attitude was also more common among children presenting with anxiety symptoms (p=0.002), whereas no such association was observed in those with depressive symptoms (p=0.19).

The COVID-19 pandemic has had a profound global impact, triggering widespread uncertainty and anxiety. During lockdown, both parents and children reported heightened fear and anxiety specifically related to the pandemic. Numerous studies have documented the adverse effects of this period on mental health. For example, research by Morgül et al. indicated that over half of caregivers in the UK reported moderate to severe psychological distress during lockdown [16]. A 2020 meta-analysis of 17 studies conducted across the general population reported a global prevalence of pandemic-related anxiety symptoms of 31.9%, and the prevalence of depressive symptoms was 33.7% on the basis of data from 14 studies [17].

Studies focusing on children and adolescents, such as the study by Luijten et al., revealed higher levels of anxiety, depression, anger, and sleep disturbances during lockdown than before the pandemic [18]. Other studies have similarly reported increases in depressive and anxiety symptoms, general stress and reduced quality of life among children and adolescents during this period, particularly associated with school closures and disruptions to their daily routines and activities [19, 20]. The stress experienced during this time may negatively affect both learning outcomes and mental health, potentially leading to anxiety, depression and other psychological disturbances [6, 7, 11].

In children and adolescents, risk factors associated with a decline in mental health during lockdown, including parental stress and female sex, have been identified. In fact, it was found that children's symptoms were positively correlated with those of their parents. A study by Spinelli et al. suggested that the impact of quarantine on children's behavioral and emotional problems is influenced by parental stress levels [21]. Our findings revealed that children with chronic physical illnesses, whether they had the illness themselves or their parents did, reported more physical complaints, as individuals with physical health conditions may experience heightened anxiety regarding their vulnerability to the virus in the context of the pandemic [21]. In the present study, depressive symptoms, sleep disturbances and eating disturbances were significantly associated with female sex, whereas anxiety symptoms were not. A systematic review reported increased levels of anxiety and depressive symptoms among girls [8]. In a study conducted by Zhou et al., females between the ages of 12–18 years reported higher rates of anxiety and depression, whereas among younger children (aged 7–12 years), girls presented significantly greater levels of fear than boys did [10].

In our study, children whose fathers continued to work during the lockdown were more likely to have a positive attitude towards the COVID-19 pandemic. Additionally, children who exhibited anxiety symptoms were more likely to have a positive attitude towards the pandemic. During the COVID-19 pandemic, children and their families were exposed to direct or indirect factors that could lead to stress and emotional disturbance [21]. The prolonged period of home confinement forced many parents to work from home, while many families faced financial insecurity due to job losses [21]. Children are worried not only about contracting the virus themselves or their parents but also about the impact on their parents' ability to work [21].

In Tunisia, to address the urgent need for support among the general population, the Ministry of Public Health launched a psychological support cell on March 30, 2020, in collaboration with the Psychological Support Unit (CAP) [22]. Accordingly, a new psychological crisis intervention model was developed, and a nationwide helpline was established. In addition to adult psychiatrists, psychologists and social services, this initiative involved child and adolescent psychiatrists and psychologists to provide psychosocial intervention to children, adolescents and parents [22]. Telephone assistance and telemedicine are examples of interventions that could support these populations, as implemented in some child and adolescent psychiatry facilities [23]. With these scientifically grounded recommendations, psychosocial interventions during pandemics will be more effective in addressing the needs of at-risk individuals. Moreover, these at-risk populations — those negatively impacted during pandemics — will be better identified. As we are not invulnerable to other pandemics, it is imperative that we prepare ourselves to handle them more effectively.

One of the strengths of this study is that, to our knowledge, it is the only study conducted on a representative sample by telephone in Tunisia. Conducting the survey via telephone offers several key advantages over online surveys. First, it allows for reaching a broader and more diverse population, including individuals who may not have reliable internet access or who are less familiar with digital technologies.

This helps ensure that the sample accurately reflects the entire population, reducing sampling bias. Second, telephone surveys tend to have higher response rates than online questionnaires do, as they involve direct interaction with trained interviewers, who can clarify questions and encourage participation. This method also enables real-time engagement and can ensure better data quality, as interviewers can follow up on ambiguous responses or clarify misunderstandings immediately.

However, the study also has several limitations. First, it was carried out three months after the lockdown, which could have introduced recall bias. Assessing participants at the peak of the outbreak might have exaggerated certain reactions that were not truly pathological. Second, reliance on parent reports for assessing psychological symptoms may have led to an underestimation of anxiety and depression, as these internalized symptoms are often unnoticed by parents. Studies have indicated that parent-reported rates of anxiety and depression tend to be lower than self-reported rates among children [20]. Third, the survey was based on a single-item measure of mental health, and the questionnaire used was not validated. Nevertheless, it was designed according to the DSM-5 criteria and was reviewed by five specialists in child and adolescent psychiatry. This limitation is not unique to our study; a systematic review of 17 articles on child and family outcomes postpandemic identified the lack of validated measurement tools as the most common quality issue in such assessments [6].

The findings of our study highlight the necessity for longitudinal research to better understand the long-term psychological effects of the COVID-19 lockdown on children and adolescents in Tunisia. Future studies should investigate evolving mental health trajectories over time and identify protective factors that mitigate adverse outcomes. Additionally, intervention-based research is needed to develop and evaluate targeted mental health support programs, including school-based counselling, family interventions, and community outreach initiatives. Practically, policymakers and healthcare providers should prioritize integrating mental health services into emergency response plans to ensure accessible psychological support for young populations during and after crises.

CONCLUSION

The results of our study indicate that the measures implemented in response to COVID-19 caused fear, emotional distress, and anxiety among children and adolescents in Tunisia. These results may inform future recommendations for interventions by social and mental health professionals during pandemics, aiming to mitigate negative psychological effects and improve support for at-risk individuals.

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Supplementary data

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