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Psychosocial dysfunction of children and adolescents during the COVID-19 lockdown in Ecuador: a cross-sectional study

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ABSTRACT

Objective Although the risk of morbidity and mortality of children and adolescents was lower during the COVID-19 pandemic, it appears that their mental health was strongly impacted. The goal of this study is to document psychological dysfunction among children and adolescents who underwent confinement due to COVID-19 in Ecuador.

Design A cross-sectional, internet-based questionnaire.

Setting Ecuador.

Participants A total of 1077 caregivers of children and adolescents (4–16 years old).

Outcome measures Caregivers responded to Pediatric Symptom Checklist-35 to assess psychosocial dysfunction.

Results The prevalence of psychosocial dysfunction was 20.8%, with internalising symptoms being the most common (30.7%). The prevalence of psychosocial dysfunction was higher in children who had a poor family relationship during confinement (prevalence ratio (PR) 2.23; 95% CI 1.22 to 4.07), children who never helped with housework (PR 2.63; 95% CI 1.13 to 6.14) and those whose caregivers were worried about children's need for emotional therapy (PR 2.86; 95% CI 1.97 to 4.15). Never playing video games (PR 0.34; 95% CI 0.17 to 0.69) or playing video games infrequently (PR 0.39; 95% CI 0.20 to 0.79) was a protective factor for the psychosocial problems of children and adolescents.

Conclusion Our study demonstrates that children and adolescents have experienced a deterioration of mental health due to the pandemic. Family factors played an important role in the mental health of children during the lockdown. When a public crisis occurs, supportive mental health policies should be developed and implemented to promote children's psychological welfare.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study is one of few to investigate the psychosocial dysfunction of children and adolescents during the COVID-19 lockdown in Ecuador and in developing countries.
⇒ The Spanish version of the Pediatric Symptom Checklist has proven to have strong validity and reliability as a screening tool for psychosocial dysfunction in Hispanic children.
⇒ This was a convenience sample and as such may not be representative of all children and adolescents in Ecuador.

INTRODUCTION

The 2019 novel coronavirus illness (COVID-19) outbreak has severely affected most of the world's population. Ecuador reported its first case on 29 February 2020, and the Ministry of Health declared a State of Emergency on 11 March due to its rapid spread and mortality burden. Consequently, a national lockdown and quarantine period was imposed on 16 March to prevent the spread of the virus.[1] In this context, non-essential activities were suspended, including the closure of educational institutions at all levels.[2] Ecuador was one of the countries in the region that kept schools closed for the longest time during the pandemic (>40 weeks until January 2022).[3]

The quarantine modified the children's daily routines, healthy behaviours, physical activity, diet and sleep habits.[4 5] Confinement negatively influenced their academic performance, social-emotional learning and the social interaction necessary for their overall well-being and development.[4 5] Although children and adolescents are the groups that are less affected by the virus in terms of morbidity and mortality,[6] the pandemic strongly impacted their mental health. The fear of infection, death of relatives and family financial loss have all contributed to increasing the feeling of anxiety and stress among this vulnerable age group.[4 5]

Previous systematic reviews and meta-analyses have looked at the impact of the lockdown during the COVID-19 pandemic on the mental health of children and adolescents.[7–11] High levels of anxiety and depression, insomnia, emotional disorders or post-traumatic stress disorders have been identified. Some studies have been carried

out in Ecuador on the general population[12 13] and adolescents[1 14]; however, to the best of our knowledge, there are no studies that have focused on the impact of confinement on children's mental health. Therefore, this study aims to investigate the psychosocial functioning of children and adolescents during the COVID-19 lockdown in Ecuador. A better understanding of how the government restrictions during the COVID-19 pandemic affected children and adolescents' mental health can help guide current and future interventions.

METHODS

An online cross-sectional survey was conducted with residents of Ecuador aged 18 or older who had at least one child between the ages of 4 and 16 years. The study was carried out in 2020 (July and August) while Ecuador was under a strict COVID-19 lockdown. The method used was snowball sampling starting with the authors' networks. Using the Google survey tool (Google Forms), a structured questionnaire was created, and the resulting link was distributed to the public on social media (ie, Facebook, WhatsApp, Instagram and Twitter). Participants were informed that the study was completely anonymous and participation was voluntary. Participants had access to the questionnaire after confirming their willingness to participate and completing two screening tasks to verify their age and place of residence.

Patient and public involvement

This study was designed and conducted without patient and public involvement. Our results will be disseminated to the public through publication in this journal.

Measures

The psychosocial functioning of children and adolescents was assessed by employing the Pediatric Symptom Checklist (PSC),[15] which is made up of 35 items divided into three subscales that identify specific types of child psychosocial problems: internalising/anxiety/depression symptoms, externalising/conduct symptoms and attention symptoms.[16] Each question has three alternative responses: never (scored 0), sometimes (scored 1) and frequently (scored 2). Item scores are summed, and the total score is recoded in a dichotomous variable. For children aged 6–16 years, the cut-off score is 28 or higher. For 4 and 5-year-old children, the PSC cut-off is 24 or higher.[15] A positive score for each subscale is as follows: 5 or greater for the internalising subscale and 7 or greater for the externalising subscale and attention subscale. The Spanish version of PSC-35[16] has been proven to have high validity and reliability as a screening tool for psychosocial dysfunction in Hispanic children.[17–20] The survey also collected demographic and socioeconomic data, as well as family, household and lockdown information.

Statistical analysis

Descriptive statistics were used to summarise PSC scores according to age and gender and to determine the prevalence of psychological dysfunction in the study population. We computed prevalence ratios (PR) for the association between the psychological problems and independent variables using generalised linear models with a binomial family and a log link with robust SEs. All significant variables at p<0.20 were included in the multivariable model to obtain adjusted PR with their 95% CIs. Finally, only significant variables (p<0.05) were maintained for the final model. The analysis was conducted using Stata V.15.0.

RESULTS

Sample characteristics

In this survey, 1124 caregivers answered the questionnaire and 1077 were included in the study. We excluded 27 children and adolescents who had been receiving treatment for any mental problem before the pandemic. In addition, participants with missing data for any of the variables were excluded from the study (2%). As table 1 shows, the study participants comprised 513 females (47.63%) and 564 males (52.37%), and 68.99% were less than 11 years old. Most of the caregivers lived in urban areas (81.06%), had university studies (75.02%) and had a partner (74.28%). The children belonged primarily to nuclear families (74.09%). More than half of the families lived in a house (60.91%) and most of the families had three or fewer children in the household (94.06%). The percentage of families earning less than two minimum wages was 38.90%.

Table 2 shows the descriptive analysis of the PSC score by sex and age. The mean of the total score was 18.40 (SD: 10.57) and the highest mean was for attention symptoms (3.60, SD: 2.10). When the data were examined for female and male children separately, we found statistically significant differences in mean values of PSC internalising symptoms (p<0.005). The highest mean of externalising and attention scores was observed in children between 4 and 7 years old (3.64, SD: 2.83 and 3.84, SD: 2.15, respectively). On the other hand, the mean of the internalising score was higher in children between 8 and 10 years old (2.58, SD: 2.09).

Psychosocial functioning of children and adolescents and associated factors

Psychosocial dysfunction was present in 20.8% of the children (21.8% in females and 19.9% in males) and the lowest proportion (18.9%) was observed in children between 11 and 16 years of age (figure 1). However, no statistically significant differences were observed by sex and age. Internalising symptoms were the most prevalent (30.73%), followed by externalising symptoms (14.30%) and attention symptoms (9.56%).

Table 3 shows the bivariate association between independent variables and psychosocial dysfunction. The

Table 1 Bivariate analysis of the association between children and caregiver's characteristics and psychosocial dysfunction in children and adolescents, Ecuador, 2020 (N=1077)

Variables	Total n (%)	Psychosocial dysfunction n (%)	PR (95% CI)	p-value
Children's characteristics				
Area of residence				
Urban	873 (81.06)	190 (21.76)	1.0	
Rural	204 (18.94)	34 (16.67)	0.76 (0.54 to 1.06)	0.115
Gender				
Female	513 (47.63)	112 (21.83)	1.0	
Male	564 (52.37)	112 (19.86)	0.91 (0.72 to 1.14)	0.426
Age (years)				
4–7	445 (41.32)	99 (22.25)	1.0	
8–10	298 (27.67)	62 (20.81)	0.93 (0.71 to 1.24)	0.641
11–16	334 (31.01)	63 (18.86)	0.84 (0.64 to 1.12)	0.252
Caregivers' characteristics				
Gender				
Female	825 (76.60)	178 (21.58)	1.0	
Male	252 (23.40)	46 (18.25)	0.85 (0.61 to 1.17)	0.312
Age (years)				
20–29	237 (22.00)	54 (22.78)	1.0	
30–39	350 (32.50)	78 (22.29)	0.98 (0.69 to 1.38)	0.900
40–49	375 (34.82)	72 (19.20)	0.84 (0.59 to 1.20)	0.342
≥50	115 (10.68)	20 (17.39)	0.76 (0.46 to 1.27)	0.302
Education level				
University or college	808 (75.02)	179 (22.15)	1.0	
Complete secondary	148 (13.74)	26 (17.57)	0.79 (0.54 to 1.15)	0.222
Complete primary or incomplete secondary	54 (5.01)	8 (14.81)	0.66 (0.34 to 1.28)	0.227
Illiterate or incomplete primary	67 (6.22)	11 (16.42)	0.74 (0.42 to 1.29)	0.291
Nationality				
Ecuadorian	1047 (97.21)	1047 (20.53)	1.0	
Others (Colombian, Venezuelan)	30 (2.79)	9 (30)	1.46 (0.83 to 2.55)	0.184
Marital status				
With partner	800 (74.28)	167 (20.88)	1.0	
No partner	277 (25.82)	57 (20.58)	0.98 (0.75 to 1.28)	0.916
Work type during lockdown				
Business at home	60 (5.57)	12 (20.00)	1.0	
Work out of home every day	260 (24.14)	51 (19.62)	0.98 (0.55 to 1.77)	0.946
Mixed (teleworking and office)	267 (24.79)	61 (22.85)	1.14 (0.65 to 1.98)	0.637
Teleworking	241 (22.4)	52 (21.58)	1.08 (0.62 to 1.89)	0.791
Unemployed	249 (23.12)	48 (19.28)	0.96 (0.54 to 1.69)	0.899
Health worker				
No	701 (65.09)	132 (18.83)	1.0	
Yes	376 (34.91)	92 (24.47)	1.29 (1.02 to 1.64)	0.029
Family and household characteristics				
Family structure				
Traditional nuclear family	798 (74.09)	168 (21.05)	1.0	
Others different from parents	264 (24.51)	51 (19.32)	0.91 (0.69 to 1.21)	0.549

Continued

Table 1 Continued

Variables	Total n (%)	Psychosocial dysfunction n (%)	PR (95% CI)	p-value
Single parent	15 (1.39)	5 (33.33)	1.58 (0.76 to 3.28)	0.216
Housing type				
House	656 (60.91)	135 (20.58)		
Apartment	421 (39.09)	89 (21.14)	1.02 (0.81 to 1.30)	0.825
Number of bedrooms				
>3	251 (23.31)	48 (19.12)	1.0	
3	543 (50.42)	118 (21.73)	1.14 (0.84 to 1.53)	0.404
1–2	283 (26.3)	58 (20.5)	1.07 (0.76 to 1.51)	0.692
Inhabitants in the household				
≤3	309 (28.69)	66 (21.36)	1.0	
>3	768 (71.31)	158 (20.57)	0.96 (0.74 to 1.24)	0.773
Children in the household				
≤3	1013 (94.06)	210 (20.73)	1.0	
>3	64 (5.94)	14 (21.88)	1.05 (0.65 to 1.70)	0.826
Family income (monthly minimum wage)				
≤1	197 (18.29)	71 (23.67)	1.0	
1 to <2	222 (20.61)	35 (22.29)	0.94 (0.65 to 1.34)	0.742
2 to <3	201 (18.66)	34 (16.92)	0.71 (0.49 to 1.03)	0.074
3 to <4	157 (14.58)	43 (19.37)	0.81 (0.58 to 1.14)	0.244
≥4	300 (27.86)	41 (20.81)	0.87 (0.62 to 1.23)	0.459
Pets in the household				
No	299 (27.76)	61 (20.4)	1.0	
Yes	778 (72.24)	163 (20.95)	1.02 (0.78 to 1.33)	0.843

PR, prevalence ratio.

prevalence of psychosocial dysfunction in children and adolescents was higher in families who reported a poor family relationship during lockdown (PR 2.44; 95% CI 1.47 to 4.06), children who used electronic devices for 4 or more hours/day (PR 1.68; 95% CI 1.09 to 2.58) and children who never helped with housework (PR 3.11; 95% CI 1.43 to 6.73). Children who never, sometimes or often played video games (VG) had a 55%, 48% and 58% lower prevalence of psychosocial dysfunction than children who always played.

Regarding attitudes towards COVID-19, children who were afraid of COVID-19 had a 1.56 (95% CI 1.23 to 1.97) times higher prevalence of psychosocial dysfunction than children who were not afraid. The highest prevalence of

Table 2 Mean scores of the Pediatric Symptom Checklist for all children separated by age and sex, Ecuador, 2020 (N=1077)

Variables	Total Score Mean (SD)	Externalising symptoms Mean (SD)	Internalising symptoms Mean (SD)	Attention symptoms Mean (SD)
Total	18.40 (10.57)	3.42 (2.83)	2.26 (2.01)	3.60 (2.10)
Gender				
Boys	18.06 (10.40)	3.40 (2.82)	2.11 (1.91)*	3.62 (2.08)
Girls	18.77 (10.74)	3.44 (2.85)	2.44 (2.11)	3.58 (2.12)
Age (years)				
4–7	18.32 (10.30)	3.64 (2.83)†	1.95 (1.91)†	3.84 (2.15)†
8–10	19.33 (10.83)	3.47 (2.76)	2.58 (2.09)	3.81 (2.00)
11–16	17.67 (10.62)	3.08 (2.87)	2.39 (2.02)	3.10 (2.05)

*T-test, p<0.005.
†Analysis of variance (ANOVA), p<0.005.

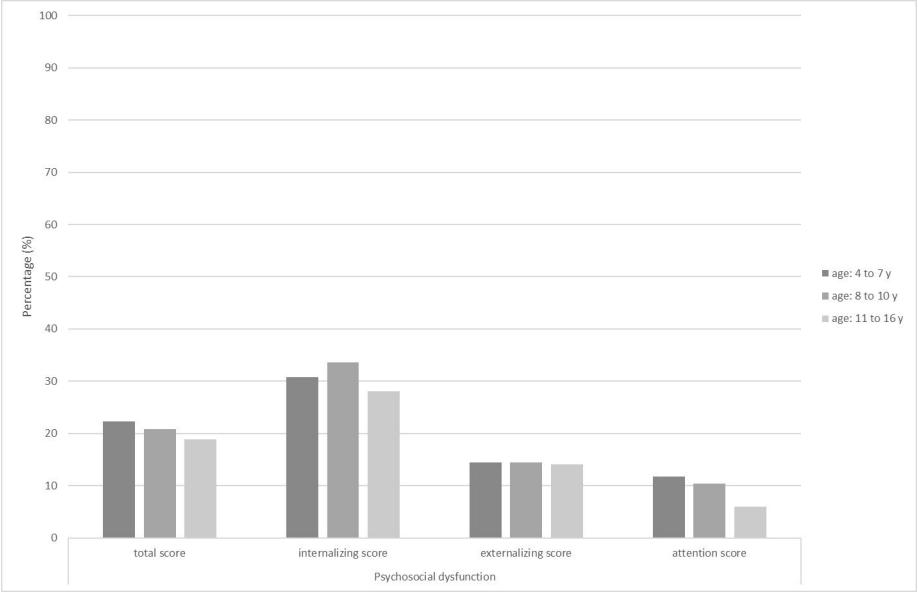

Figure 1 Prevalence of psychosocial dysfunction by age groups during the COVID-19 lockdown in Ecuador, 2020.

psychosocial problems occurred in children whose caregivers were worried about the need for (a) psychological aid (PR 3.04; 95% CI 2.21 to 4.16), (b) medication (PR 1.82; 95% CI 1.30 to 2.55), (c) emotional therapy (PR 3.58; 95% CI 2.64 to 4.85) and/or (d) inability to return to normal life (PR 2.94; 95% CI 2.17 to 4.00).

After the multivariable analysis was performed (table 4), psychosocial dysfunction was positively associated with good (PR 1.98; 95% CI 1.44 to 2.72) or poor (PR 2.23; 95% CI 1.22 to 4.07) family relationships during lockdown compared with those with excellent relationships. In addition, the prevalence of psychosocial dysfunction was three times higher in children who never (PR 2.63; 95% CI 1.13 to 6.14), sometimes (PR 2.76; 95% CI 1.44 to 4.29) or often (PR 2.68; 95% CI 1.39 to 5.17) helped with housework compared with those who always helped. The highest prevalence of psychosocial problems occurred in children whose caregivers were very worried (PR 2.86; 95% CI 1.97 to 4.15) and a bit worried (PR 2.37; 95% CI 1.75 to 3.21) that their children may need emotional therapy after lockdown compared with those who were not worried at all. Finally, not having played VGs (PR 0.34; 95% CI 0.17 to 0.69) or having played them infrequently (PR 0.39; 95% CI 0.20 to 0.79) was associated with a lower probability of psychosocial problems in children and adolescents.

DISCUSSION

The results obtained in this study show that 20.8% of the children suffered psychosocial dysfunction during the COVID-19 lockdown in Ecuador, and internalising symptoms were the most common. The prevalence of psychosocial dysfunction was higher in children who had a poor family relationship during confinement, children who never helped with housework and those whose caregivers were worried about the need for emotional therapy for their children. Never playing VGs or playing VGs infrequently was a protective factor against the psychosocial problems of children and adolescents.

Our study showed a higher prevalence of psychosocial dysfunction in children and adolescents compared with a study carried out in Mexico from February to May 2021 that showed a prevalence of 12% using the same evaluation instrument; attention symptoms were the most common, followed by internalising/anxiety/depression and externalising/conduct symptoms.[21] The differences in prevalence could be partially related to the period of the pandemic being studied. A study performed in Ecuador showed moderate to severe emotional distress levels (anxiety-depressive symptoms and stress) in adolescents.[1] Specifically, 40.6% of the adolescents suffered from severe or very severe symptoms of anxiety, 36.4% from depressive symptoms and 28.2% from stress 6 months after the beginning of the COVID-19 pandemic.[1] In addition, a study of Ecuadorian high school students (14–18 years old) showed a 16% occurrence of mental health problems during the COVID-19 quarantine.[14] In studies done before the COVID-19, it was found that 6.2% of Ecuadorian college students met the criteria for diagnosis of a major depressive episode[22]; this level of depression is substantially lower than the 30.7% rate of internalising symptoms reported in our study, suggesting that depression rates have increased as a consequence of the COVID-19 lockdown. Finally, the most common mental health issues reported in a review of 35 survey studies with 65 508 participants, ranging from 4 to 19 years of age, were anxiety (28%), depression (23%), loneliness (5%), stress (5%), fear (5%), tension (3%), anger (3%), fatigue (3%), confusion (3%) and worry (3%) as a result of the COVID-19 pandemic.[7] In our study, internalising/anxiety/depression symptoms were also the most prevalent.

Table 3 Bivariate association between lockdown variables and psychosocial dysfunction in children and adolescents, Ecuador, 2020 (N=1077)

Variables	Total n (%)	Psychosocial dysfunction n (%)	PR (95% CI)	p-value
Characteristics of lockdown				
Family relationship				
Excellent	462 (42.8)	54 (11.69)	1.0	
Good	566 (52.55)	156 (27.56)	2.35 (1.77 to 3.13)	<0.001
Poor	49 (4.55)	14 (28.57)	2.44 (1.47 to 4.06)	0.001
Children's homework time				
Decreased	187 (17.36)	39 (20.86)	1.0	
Equal	271 (25.16)	41 (15.13)	0.72 (0.48 to 1.07)	0.113
Increased	619 (54.47)	144 (23.26)	1.11 (0.81 to 1.52)	0.495
Children's time with electronic devices (hour)				
≤1	135 (12.53)	20 (14.81)	1.0	
2–3	329 (30.55)	51 (15.5)	1.04 (0.64 to 1.68)	0.852
≥4	613 (56.92)	153 (24.96)	1.68 (1.09 to 2.58)	0.017
During the lockdown, has your child exercised?				
Always	51 (4.74)	8 (15.69)	1.0	
Often	192 (17.83)	26 (13.54)	0.86 (0.41 to 1.79)	0.693
Sometimes	708 (65.74)	157 (22.18)	1.41 (0.73 to 2.71)	0.298
Never	126 (11.7)	33 (26.19)	1.66 (0.82 to 3.36)	0.152
During the lockdown, has your child played video games?				
Always	21 (1.95)	9 (42.86)	1.0	
Often	202 (18.76)	37 (18.32)	0.42 (0.24 to 0.75)	0.004
Sometimes	412 (38.25)	92 (22.33)	0.52 (0.31 to 0.88)	0.015
Never	442 (41.04)	86 (19.46)	0.45 (0.26 to 0.77)	0.003
During the lockdown, has your child played traditional games?				
Always	40 (3.71)	3 (7.5)	1.0	
Often	214 (19.87)	37 (17.29)	2.30 (0.74 to 7.11)	0.147
Sometimes	570 (52.92)	126 (22.11)	2.94 (0.98 to 8.85)	0.054
Never	253 (23.49)	58 (22.92)	3.05 (1.01 to 9.29)	0.049
During the lockdown, has your child played board games?				
Always	31 (2.88)	3 (9.68)	1.0	
Often	261 (24.23)	40 (15.33)	1.58 (0.52 to 4.82)	0.418
Sometimes	545 (50.6)	125 (22.94)	2.37 (0.79 to 7.02)	0.12
Never	240 (22.28)	56 (22.28)	2.41 (0.80 to 7.24)	0.117
During the lockdown, has your child watched movies or TV?				
Always	112 (10.4)	21 (18.75)	1.0	
Often	523 (48.56)	94 (17.97)	0.95 (0.62 to 1.47)	0.846
Sometimes	405 (37.6)	100 (24.69)	1.31 (0.86 to 2.01)	0.201
Never	37 (3.44)	9 (24.32)	1.29 (0.65 to 2.57)	0.458
During the lockdown, has your child helped with the housework?				
Always	127 (11.79)	10 (7.87)	1.0	
Often	432 (40.11)	86 (19.91)	2.52 (1.35 to 4.72)	0.004
Sometimes	469 (43.55)	116 (24.73)	3.14 (1.69 to 5.81)	<0.001

Continued

Table 3 Continued

Variables	Total n (%)	Psychosocial dysfunction n (%)	PR (95% CI)	p-value
Never	49 (4.55)	12 (24.49)	3.11 (1.43 to 6.73)	0.004
Attitudes regarding COVID-19				
Someone had or died from COVID-19				
No friend or family member	215 (19.96)	40 (18.60)	1.0	
A friend	766 (71.12)	161 (21.02)	1.13 (0.83 to 1.54)	0.443
A relative	96 (8.91)	23 (23.96)	1.29 (0.82 to 2.06)	0.274
As an adult, are you afraid of COVID-19?				
Definitely not.	22 (2.04)	3 (13.64)	1.0	
No, as long as I am at home everything will be fine.	135 (12.53)	21 (15.56)	1.14 (0.37 to 3.51)	0.818
Yes, but it is normal.	601 (55.8)	118 (19.63)	1.43 (0.49 to 4.17)	0.502
I am very afraid.	319 (29.62)	82 (25.71)	1.88 (0.64 to 5.48)	0.245
Is your child afraid of COVID-19?				
No	790 (73.35)	143 (18.10)	1.0	
Yes	287 (26.65)	81 (28.22)	1.56 (1.23 to 1.97)	<0.001
Are you worried that your child may need psychological aid after the lockdown?				
I am not worried at all.	514 (47.73)	59 (11.48)	1.0	
I am a bit worried.	391 (36.3)	105 (26.85)	2.33 (1.74 to 3.12)	<0.001
I am very worried.	172 (15.97)	60 (34.88)	3.04 (2.21 to 4.16)	<0.001
Are you worried that your child may need medication for any mental problem after the lockdown?				
I am not worried at all.	811 (75.3)	140 (17.26)	1.0	
I am a bit worried.	174 (16.16)	55 (31.61)	1.83 (1.40 to 2.38)	<0.001
I am very worried.	92 (8.54)	29 (31.52)	1.82 (1.30 to 2.55)	<0.001
Are you worried that your child may need emotional therapy after the lockdown?				
I am not worried at all.	625 (58.03)	73 (11.68)	1.0	
I am a bit worried.	335 (31.1)	102 (30.45)	2.61 (1.99 to 3.41)	<0.001
I am very worried.	117 (10.86)	49 (41.88)	3.58 (2.64 to 4.85)	<0.001
Are you worried that your child may not be able to go back to normal life?				
I am not worried at all.	519 (48.19)	64 (12.33)	1.0	
I am a bit worried.	393 (36.49)	100 (25.45)	2.06 (1.55 to 2.74)	<0.001
I am very worried.	165 (15.32)	60 (36.36)	2.94 (2.17 to 4.00)	<0.001

PR, prevalence ratio.

Our results indicate that the presence of psychosocial problems was higher in children who did not have a good family relationship during confinement and in children who did not share family activities like housework. Previous studies showed that family characteristics, particularly parent–child interactions, were directly associated with children's mental health in situations when bad life events such as hurricanes, earthquakes, migrations and terrorist attacks occurred.[23 24] A study in Northwest China reported that frequent parent–child communication and better parent–child relationships improve children's psychological status associated with children's home isolation.[25] A study conducted by Liu *et al* on 5000 Chinese children found that a poor parent–child relationship resulted in depression and anxiety in children during quarantine.[26] While confined together, families have more time to work through difficulties, which may result in better and more meaningful relationships. Contrarily, family conflicts might also easily occur when families are isolated in their homes for an extended period of time.[27]

Table 4 Multivariate regression of the association between independent variables and psychosocial dysfunction in children and adolescents, Ecuador, 2020 (N=1077)

Variables	PR (95% CI)	p-value
Family relationships during lockdown		
Excellent	1.0	
Good	1.98 (1.44 to 2.72)	<0.001
Poor	2.23 (1.22 to 4.07)	0.009
During the lockdown, has your child played video games?		
Always	1.0	
Often	0.36 (0.17 to 0.76)	0.007
Sometimes	0.39 (0.20 to 0.79)	0.008
Never	0.34 (0.17 to 0.69)	0.003
During the lockdown, has your child helped with housework?		
Always	1.0	
Often	2.68 (1.39 to 5.17)	0.003
Sometimes	2.76 (1.44 to 4.29)	0.002
Never	2.63 (1.13 to 6.14)	0.025
Are you worried that your child may need emotional therapy after the lockdown?		
I am not worried at all.	1.0	
I am a bit worried.	2.37 (1.75 to 3.21)	<0.001
I am very worried.	2.86 (1.97 to 4.15)	<0.001

PR, prevalence ratio.

In those circumstances, the stressful confined environment may exacerbate pre-existing issues or perhaps lead to the development of new ones. A study in the USA reported a high level of closeness between parents and children during the pandemic as well as increased conflicts, discipline and harsh words.[28] Research in Australia found a decrease in positive family expressiveness during the pandemic.[29] Families can reduce stress during a pandemic by keeping open lines of communication, participating in common activities, seeking out social support and cultivating thankfulness.[30]

Considering the family factors, our study found a higher prevalence of psychosocial problems in those children whose caregivers were concerned about the children's mental health. In a Canadian study, parents with children <18 at home reported unique pressures, including worrying about their children's health, mental health and education, and being stressed about looking after their children while continuing to work.[27] Higher parent stress has been associated with elevated child anxiety during the COVID-19 pandemic.[31] In addition, higher levels of parenting stress have been associated with an increased use of harsh parenting practices.[32] Therefore, interventions should also be focused on the mental health of parents since they affect the well-being of their children.

In our study, children who sometimes or never played VGs showed a reduced prevalence of psychological deterioration during COVID-19. Playing VGs for prolonged periods of time is a major risk factor for the emergence of pathological behavioural signs.[33] Some studies support suggestions that the COVID-19 pandemic will lead children and adolescents to be more engaged in playing VGs because of their decreased access to social activities.[34 35] A longitudinal study showed that VG use and internet gaming disorder severity increased significantly among adolescents during the COVID-19 pandemic.[35] Theoretically, during home confinement, children and teens spent more time playing VGs to prevent boredom and loneliness, which led to an increase in use and, ultimately, pathological gaming. Effective monitoring techniques that can assist in preventing the emergence of VG addiction should be rapidly adopted by parents of children and teenagers.

Our research has some limitations. The cross-sectional study design restricts the ability to demonstrate causality. The study represents a short time-lapse of exploration during the strict COVID-19 lockdown in Ecuador; therefore, the results could have been influenced by situational factors. We did not conduct a more detailed analysis of the risk factors for psychosocial problems across different age groups. Understanding the impacts on different age cohorts can provide valuable insights for age-specific interventions and policies. Another potential limitation is that our data only include a proxy report of the child/adolescent's psychosocial problems, as the PSC was completed by caregivers. Using the PSC-Youth self-report version for adolescents aged 11–18 could enhance sensitivity in detecting psychosocial problems within this age group. In addition, parents who were more concerned about their children's mental health were more motivated to participate, which could have influenced the symptoms that were reported. Finally, the use of social networks may lead to a bias in selection and the lack of representation of vulnerable groups.

CONCLUSION

Prolonged school closures and confinement during the COVID-19 pandemic had a remarkable impact on children and adolescents' mental well-being in Ecuador. There is a need to further explore the long-term consequences of the lockdown on the mental health of these vulnerable groups and to develop structured strategies that focus on parent–child relationships when facing adverse events such as pandemics. To better maximise these efforts, future studies should investigate how services, such as virtual mental health support, may be implemented.

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REFERENCES

1 Coello MF, Valero-Moreno S, Herrera JS, *et al*. Emotional impact in adolescents in Ecuador six months after the beginning of the COVID-19 pandemic. *J Psychol* 2022;156:381–94.
2 UNESCO. *Chidren out of school, primary/ data*. 2020.
3 UNICEF. Resultados de la Encuesta de Pulso de UNICEF de Marzo de 2022 Sobre Las Medidas para La Recueración del Aprendizaje. 2022. Available: https://www.unicef.org/media/118341/file/Snapshot%20:%20Latin%20America%20and%20the%20Caribbean%20(SP).pdf
4 Imran N, Zeshan M, Pervaiz Z. Mental health considerations for children & adolescents in COVID-19 pandemic. *Pak J Med Sci* 2020;36:S67–72.
5 Brooks SK, Webster RK, Smith LE, *et al*. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 2020;395:912–20.
6 Pavone P, Ceccarelli M, Taibi R, *et al*. Outbreak of COVID-19 infection in children: fear and serenity. *Eur Rev Med Pharmacol Sci* 2020;24:4572–5.
7 Theberath M, Bauer D, Chen W, *et al*. Effects of COVID-19 pandemic on mental health of children and adolescents: A systematic review of survey studies. *SAGE Open Med* 2022;10.
8 Ma L, Mazidi M, Li K, *et al*. Prevalence of mental health problems among children and adolescents during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders* 2021;293:78–89.
9 Samji H, Wu J, Ladak A, *et al*. Review: mental health impacts of the COVID-19 pandemic on children and youth - a systematic review. *Child Adolesc Ment Health* 2022;27:173–89.
10 Racine N, McArthur BA, Cooke JE, *et al*. Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: A meta-analysis. *JAMA Pediatr* 2021;175:1142–50.
11 Panchal U, Salazar de Pablo G, Franco M, *et al*. The impact of COVID-19 Lockdown on child and adolescent mental health: systematic review. *Eur Child Adolesc Psychiatry* 2021:1–27.
12 Mautong H, Gallardo-Rumbea JA, Alvarado-Villa GE, *et al*. Assessment of depression, anxiety and stress levels in the Ecuadorian general population during social isolation due to the COVID-19 outbreak: a cross-sectional study. *BMC Psychiatry* 2021;21:212.
13 Gómez-Salgado J, Adanaque-Bravo I, Ortega-Moreno M, *et al*. Psychological distress during the first phase of the COVID-19 pandemic in Ecuador: cross-sectional study. *PLoS One* 2021;16:e0257661.
14 Asanov I, Flores F, McKenzie D, *et al*. Remote-learning, time-use, and mental health of Ecuadorian high-school students during the COVID-19 quarantine. *World Dev* 2021;138:105225.
15 Jellinek MS, Murphy JM, Robinson J, *et al*. Pediatric symptom checklist: screening school-age children for Psychosocial dysfunction. *J Pediatr* 1988;112:201–9.
16 Wagner WG. Assessing children's well-being: A handbook of measures. Sylvie Naarking, Deborah A. Ellis, and Maureen A. Frey; Lawrence Erlbaum, Mahwah, NJ, 2004, 307 pages. *Child Abuse & Neglect* 2004;28:478–80.
17 Jutte DP, Burgos A, Mendoza F, *et al*. Use of the pediatric symptom checklist in a low-income, Mexican American population. *Arch Pediatr Adolesc Med* 2003;157:1169–76.
18 Navon M, Nelson D, Pagano M, *et al*. Use of the pediatric symptom checklist in strategies to improve preventive behavioral health care. *Psychiatr Serv* 2001;52:800–4.
19 Guzmán J, Kessler RC, Squicciarini AM, *et al*. Evidence for the effectiveness of a national school-based mental health program in Chile. *J Am Acad Child Adolesc Psychiatry* 2015;54:799–807.
20 Weigel MM, Armijos RX. Household food insecurity and Psychosocial dysfunction in Ecuadorian elementary schoolchildren. *Int J Pediatr* 2018;2018:6067283.
21 Leon Rojas D, Castorena Torres F, Garza-Ornelas BM, *et al*. Parents and school-aged children's mental well-being after prolonged school closures and confinement during the COVID-19 pandemic in Mexico: a cross-sectional Online survey study. *BMJ Paediatr Open* 2022;6:e001468.
22 Torres C, Otero P, Bustamante B, *et al*. Mental health problems and related factors in Ecuadorian college students. *Int J Environ Res Public Health* 2017;14:530.
23 Cobham VE, McDermott B, Haslam D, *et al*. The role of parents, parenting and the family environment in children's post-disaster mental health. *Curr Psychiatry Rep* 2016;18:53.
24 Garfin DR, Silver RC, Gil-Rivas V, *et al*. Children's reactions to the 2010 Chilean earthquake: the role of trauma exposure, family context and school-based mental health programming. *Psychological Trauma: Theory, Research, Practice, and Policy* 2016;6:563–73.
25 Jin X, Dong Y, Du W. The impact of family factors on children's mental health during home quarantine: an empirical study in Norhwest China. *Sustainability* 2022;14:7202.
26 Liu Y, Yue S, Hu X, *et al*. Associations between feelings/behaviors during COVID-19 pandemic Lockdown and depression/anxiety after Lockdown in a sample of Chinese children and adolescents. *Journal of Affective Disorders* 2021;284:98–103.
27 Thomson KC, Jenkins E, Gill R, *et al*. Impacts of the COVID-19 pandemic on family mental health in Canada: findings from a multi-round cross-sectional study. *Int J Environ Res Public Health* 2021;18:12080.
28 University of Michigan Parenting in Context Research Lab. *Research Brief: Stress and Parenting during the Coronavirus Pandemic*. Ann Arbor, MI, USA, 2020. Available: https://bit.ly/2O84btj
29 Westrupp EM, Bennett C, Berkowitz T, *et al*. Child, parent, and family mental health and functioning in Australia during COVID-19: comparison to pre-pandemic data. *Eur Child Adolesc Psychiatry* 2023;32:317–30.
30 Gayatri M, Irawaty DK. Family resilience during COVID-19 pandemic: A literature review. *Fam J Alex Va* 2022;30:132–8.
31 Lee SJ, Ward KP, Chang OD, *et al*. Parenting activities and the transition to home-based education during the COVID-19 pandemic. *Child Youth Serv Rev* 2021;122:105585.
32 Chung G, Lanier P, Wong PYJ. Mediating effects of parental stress on harsh parenting and parent-child relationship during Coronavirus (COVID-19) pandemic in Singapore. *J Fam Violence* 2022;37:801–12.
33 Paulus FW, Ohmann S, von Gontard A, *et al*. Internet gaming disorder in children and adolescents: a systematic review. *Dev Med Child Neurol* 2018;60:645–59.
34 Zhu S, Zhuang Y, Lee P, *et al*. Leisure and problem gaming behaviors among children and adolescents during school closures caused by COVID-19 in Hong Kong: quantitative cross-sectional survey study. *JMIR Serious Games* 2021;9:e26808.
35 Teng Z, Pontes HM, Nie Q, *et al*. Depression and anxiety symptoms associated with Internet gaming disorder before and during the COVID-19 pandemic: A longitudinal study. *J Behav Addict* 2021;10:169–80.