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EVIDENCE BASED HEALTHCARE

What are the mental health effects of community quarantine in the pediatric population, in the context of the COVID-19 pandemic?

Authors: Joan Camille C. Sta. Ana, MD, jcstaana1@up.edu.ph, Maria Emma A. Llanto, MD, mtallesnallanto@up.edu.ph, Renee Anne Karmela G. Feliciano, MD, rfeliciano@up.edu.ph, Leonila F. Dans, MD, MSc, leonila.dans@gmail.com, leonila.dans@gmail.com

Date of Review: 25-AUGUST-2020 (version #4)

Last Updated: 25-AUGUST-2020 (version #4)

This rapid review explores the available evidence on the possible mental health effects of community quarantine in the pediatric population, in the context of the ongoing COVID-19 pandemic.

KEY FINDINGS

Children and adolescents may manifest with regressive and maladaptive behaviors during quarantine in this time of the COVID-19 pandemic.

- During quarantine in the context of the COVID-19 pandemic, young children may show signs of regression and other maladaptive behaviors, such as increased irritability, restlessness, nervousness, and even symptoms of depression and anxiety.
- During the COVID-19 pandemic, adolescents in quarantine exhibited fear, nervousness, annoyance, and felt stigmatization against them compared to non-quarantined children.
- Adolescents belonging to families who were facing more stressors (e.g. financial losses in the family, loss of a parent's job) during the COVID-19 pandemic were the ones who were more likely to feel worried, helpless, scared, restless, anxious, and frustrated.
- Worsening of ADHD symptoms during the COVID-19 quarantine period may be associated with the child's and parent's current mood states.
- Indirect evidence shows that among the quarantined children who received mental health services during the A(H1N1) and SARS outbreaks, anxiety disorder, adjustment disorder, and posttraumatic stress disorder were the most common diagnoses.
- Various health organizations agree that parents have a major role in assisting the child during this crisis.

Disclaimer: The aim of these rapid reviews is to retrieve, appraise, summarize and update the available evidence on COVID-related health technology. The reviews have not been externally peer-reviewed; they should not replace individual clinical judgement and the sources cited should be checked. The views expressed represent the views of the authors and not necessarily those of their host institutions. The views are not a substitute for professional medical advice.

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RESULTS

OUTCOMES

Impact on early childhood

A study done in Italy showed that 4 year-olds particularly showed signs of regression during the quarantine period such as enuresis, sleeping in their parents' bed again (previously could sleep in their own beds), and deterioration in vocabulary. (2)

Impact on middle childhood

In the study by Pisano, *et. al* (2), they found that Italian children aged 4 to 10 years manifested various behavioral changes during the quarantine period that may reflect psychological distress. One in four children asked to sleep in their parents' bed. Other regressive behaviors found were general worsening of vocabulary and bedwetting. In addition, because of the sudden change in routine brought about by the pandemic, half of those children showed increased irritability, intolerance to rules, and had excessive demands, while one in five children showed continuous changes in mood and sleep problems. Exposure to media showing news of the pandemic also seemed to increase nervousness in about one of three children, especially in those aged 8 to 9 years. (2) This data is consistent with another the study done in Italy and Spain showing that children during quarantine tended to be more nervous, irritable, and restless. (1)

Although most of the children (92.57%) seemed able to adapt to the limitations during the pandemic, it should be noted that symptoms of psychological distress were also present in the same set of children, such as increased irritability, intolerance to rules, excessive demands, signs of regression, and fears that were not observed prior to the pandemic. (2) Hence, the adaptive behaviors noted in this population should be paid attention to as it might mask symptoms of mental illness. Furthermore, children were found to be more restless, anxious, and nervous whenever their parents had higher levels of stress or in families with more difficult living conditions. (1)

Impact on adolescence

The physical and emotional changes that adolescents go through makes them all the more vulnerable to the effects of this pandemic. Studies done in India, Italy, and Spain showed that children in quarantine more often exhibited fear, nervousness, and annoyance. (1, 4) Children who were isolated also felt stigmatization against them when people would act differently towards them compared to those who were not quarantined. (4) In addition, a cross-sectional survey done in Wuhan and Huangshi China showed that grade school students experienced depressive and anxiety symptoms during quarantine. Depressive symptoms were noted more in children who were not optimistic about the contagion, while those who were less worried about being infected had significantly less depressive symptoms. (3)

Moreover, during this pandemic, children in an Indian neighborhood felt worry, helplessness, and fear – associated with socioeconomic conditions such as financial losses in the family, loss of a parent's job, and the insecurity of obtaining essential needs. (4) This is also reflected in the study by Orgiles, *et al.* wherein they found higher rates of emotional unease (i.e. more restless, more anxious, more nervous, more likely to argue with the family, more frustrated, angrier, more difficulty concentrating) in children of parents with more stressors during this disease outbreak. (1)

Other changes in behavior noted during quarantine were increase in screening time, less physical activity, and longer sleeping hours compared to the pre-quarantine period. (1)

Impact on children with special needs

Children with previously diagnosed intellectual disabilities or developmental problems are also particularly susceptible to the psychological repercussions of this pandemic and its disease containing measures. (18, 19) Some may be more prone to getting infected due to their limited mental capacity in understanding disease dynamics. ADHD, the most commonly diagnosed mental disorder in children and adolescents in the US (24), will be put in focus for this report.

ADHD is characterized by inattention, hyperactivity, and impulsivity that interfere with a child's functioning. (24) There is limited data available that looks into this population about the effects of quarantine. One study showed that there was a worsening of symptoms in children diagnosed with ADHD during quarantine. (5) Although the study did not explore whether other factors such as medication use was contributory, quarantine measures such as school closures may heighten the difficulties that parents and caregivers encounter when caring for their child; the parent's and the child's mood state also had an impact on the children's ADHD symptoms. (5) The same study also found that online study time in children with ADHD was negatively associated with aggravating their symptoms. This may be explored as a potential strategy for managing ADHD symptoms at home. (5) It is also important for healthcare professionals tending to these children to be proactive in reaching out and following up with their families, so as to maintain continuity of care.

CONCLUSION

Based on a few low quality studies, children and adolescents may manifest with regressive and maladaptive behaviors during quarantine in this time of the COVID-19 pandemic. Moreover, adolescents, especially those belonging to families who are socioeconomically disadvantaged, may feel more worried, nervous, helpless, anxious, scared, restless, and frustrated. In children with ADHD, worsening of symptoms was seen during the pandemic quarantine period. During past disease outbreaks such as the A (H1N1) and SARS, the most common diagnoses in children who received mental health services were anxiety disorder, adjustment disorder, and posttraumatic stress disorder.

Recommendations:

Although the studies included in this paper only suggest that children may have symptoms of different psychological disorders while on quarantine, it is still prudent for family units and national agencies to provide ample support during the pandemic.

Families must nurture resilience and provide an encouraging environment in their homes. National agencies, by utilizing local government units and mass media, must shift resources towards the following: 1) regular and accurate dissemination of information regarding COVID-19 to alleviate fear and panic, 2) provision of essential needs such as food, clean water, and sanitation measures, especially in disadvantaged and marginalized communities, and 3) provision of reinforcements for formal education to have a wider reach.

This rapid review highlights the lack of literature on children and adolescents during these unprecedented times, especially in the local setting. The psychological impact of quarantine during the pandemic should be explored further, as it bears weight on the nation's future: the children.

Declaration of Conflict of Interest

No conflict of interest.

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Appendix 1. Characteristics of included studies

No.	Title/Author	Study design	Country	Population	Intervention Group(s)	Comparison Group(s)	Outcomes	Key findings
1	<p>Compliance and psychological impact of quarantine in children and adolescents due to COVID-19 pandemic</p> <p>Saurabh, K. and Ranjan, S.</p>	Case control	India	252 children 9-18y/o	121 children quarantined at home or in a facility	131 children not quarantined (but within the neighborhood)	<ul style="list-style-type: none"> Understanding of rationale of quarantine and measures (mask usage, living in separate room with door closed, restriction of activities) Socioeconomic and psychological impact 	<p>73.55% understood that quarantine was imposed to protect their community, but only half (51.23%) of the adolescents were able to comprehend that this was also done to protect their household members. Even less than half (44.63%) appreciated the quarantine measures as a means of protecting themselves as well.</p> <p>Only 7% were compliant to all quarantine behaviors (community and household); the hardest compliance measure among the children was staying within the confines of their homes and not socializing with relatives and friends.</p> <p>The quarantined group of children had psychological distress symptoms statistically significant compared to the nonquarantined group; they felt fear, nervousness, and annoyance the most.</p> <p>The most common feelings experienced during quarantine was worry, helplessness, and fear – tied up to the loss of a parent's job, family's financial losses, and unavailability of essential needs.</p> <p>The quarantined group of children felt some sort of stigmatization against them.</p> <p>Increased knowledge on the nature of COVID-19 and a better understanding of the rationale of quarantine measures may positively affect compliance in this population.</p>
2	<p>Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei province, China</p> <p>Xie, X., BA, <i>et al.</i></p>	Cross-sectional (online survey)	China	1784 students in grades 2 to 6	Students in home confinement from 8 to 11 weeks	None	<ul style="list-style-type: none"> Depressive symptoms (Children's Depression Inventory-Short Form) Anxiety (Screen for Child Anxiety Related Emotional Disorders) symptoms 	<p>22% had depressive symptoms while 19% had anxiety symptoms</p> <p>Children who were not optimistic about the disease had more depressive symptoms.</p> <p>Children who were not worried about disease infection had less depressive symptoms.</p>

3	<p>Acute stress, behavioural symptoms and mood states among school-age children with attention-deficit/hyperactive disorder during the COVID-19 outbreak</p> <p>Zhanga, J., <i>et al.</i></p>	Cross-sectional (survey)	China	241 parents of school aged children with ADHD	Children with ADHD (mean age 6-15 years old)	None	<ul style="list-style-type: none"> • ADHD behavioral symptoms (Swanson, Nolan, and Pelham scale – parent form) • Acute responses of children in the event of the 2019-nCoV outbreak (Child Stress Disorders Checklist) • Time allocation of children's activities • Mood state of the children and parents • Attention to media coverage of the 2019-nCoV outbreak 	<p>Children's ADHD behaviors significantly worsened compared to their baseline state pre-pandemic.</p> <p>School closures may heighten difficulties and stress to both the caregiver and the child.</p> <p>The parents' and children's overall mood state predicted the children's ADHD behaviors.</p> <p>Online study time was negatively associated with the ADHD symptoms; it may be explored as a potential strategy for decreasing ADHD symptoms at home.</p>
4	<p>A qualitative report on exploratory data on the possible emotional/behavioral correlates of COVID-19 lockdown in 4-10 years children in Italy.</p> <p>Pisano, L., <i>et al.</i></p>	Cross-sectional (online survey)	Italy	5989 parents of children 4-10 years old	Children between 4-10 years old	None	<ul style="list-style-type: none"> • Regressive behavior of children • Child's opposing behavior against the sudden change in lifestyle • Adaptation behavior of children and adaptation to restrictions 	<p><u>Regressive behavior:</u></p> <p>One-fourth (26.48%) of children asked to sleep in their parents' bed (especially children aged 4 years). 2.84% manifested enuresis (especially from 4-6 years old). 5.48% had a general worsening of their vocabulary.</p> <p><u>Opposite behavior from sudden change in routines:</u></p> <p>Half (53.53%) showed increased irritability, intolerance to rules, whims, and excessive demands. One-fifth (21.17%) showed continuous mood swings. Sleep problems were common in one-fifth (19.99%) of the children. 34.26% were nervous about the pandemic when watching TV or because of restrictions, becoming more frequent at 8 and 9 years of age.</p> <p><u>Adaptive behaviors</u></p> <p>Children, especially those aged 8-9 years, seemed calmer (31.38%), wiser and more thoughtful (49.57%) during the pandemic than before it. Most (92.57%) seemed able to adapt to the pandemic restrictions (mainly 4 and 9 years). 43.26% exhibited increased listlessness to the activities they were doing before the pandemic (especially in 8-10 years old).</p>

5	<p>Immediate psychological effect of the COVID-19 quarantine in youth from Italy and Spain</p> <p>Orgiles, M, PhD, <i>et al.</i></p>	Cross-sectional (online survey)	Italy and Spain	Primary caregivers (18-66 years old) of children aged 3 to 18 years	Children aged 3-18 years in quarantine	None	<ul style="list-style-type: none"> • Immediate psychological responses in children and adolescents during the quarantine • Emotional impact of the quarantine on the child's primary caregiver • Relationship between the parents' emotional state and their children's immediate psychological responses • Change in children's habits 	<p><u>Most parents (85.7%) noted changes in their children's behavior; among the most prominent changes were 1) having more difficulty concentrating, 2) feeling more bored than usual, and 3) being more irritable, restless, and nervous).</u></p> <p><u>Half of the parents (55.4%) perceived the situation to be very serious and about 1 in three parents (35.4%) reported to be stressed or very stressed.</u></p> <p><u>In families where coexistence during the quarantine was more difficult and in parents who had higher levels of stress brought about by the situation, there were higher rates of reporting of children's emotional unease such as: being more restless, more anxious, more nervous, more likely to argue with the family, more frustrated, angrier, more frustrated, and had more difficulty concentrating.</u></p> <p><u>During quarantine, children also had increased screen time, spent less time doing physical activities, and had longer sleeping compared to the period before.</u></p>
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Appendix 2. Critical appraisal of included studies

Study/Country	Strengths	Weaknesses/Limitations	Remarks
<p>Compliance and psychological impact of quarantine in children and adolescents due to COVID-19 pandemic</p> <p>India</p>	<ul style="list-style-type: none"> • The study included a wide range of age group (9-18 years old) encompassing all stages of adolescence. • There was a control group of nonquarantined children coming from the community similar with the cohort which minimizes selection bias. • Since there was also psychological distress among the nonquarantined group, the study also provided insight in to the psychological effects of the pandemic as a whole in this population of children. • Study setting – a resource-limited country with strict quarantine measures – is similar to the Philippines. 	<ul style="list-style-type: none"> • The study had a relatively small sample size. • The duration of the quarantine period was not clearly stated in the study. • Analysis of household dynamics and composition was not done, which could show correlates among the variables studied. • Children were interviewed with their parents, which may have affected their responses to the questionnaire, especially those that ask for their feelings. • No analysis was done between those quarantined in facilities and those in their homes with their parents. • The study may be affected by recall bias and social desirability bias • The baseline characteristics of the cohort and 	<ul style="list-style-type: none"> • The results of this study is not conclusive because of multiple biases and potential confounders present in the study.

		<p>control groups were not provided, so we cannot assess if they are indeed comparable.</p> <ul style="list-style-type: none"> • No exclusion criteria was provided which is important since children with previous history of mental conditions or psychological distress prior the pandemic should be excluded. • Statistical analysis was crude only (Chi-square) which did not controlled for potential confounders. 	
<p>Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei province, China</p> <p>China</p>	<ul style="list-style-type: none"> • The study has a relatively large sample size and a high response rate, with a wide age range including students from grades 2 to 6. • The study covered a long quarantine period ranging from 8 to 11 weeks. • Several factors that may affect depression and anxiety symptoms were assessed. 	<ul style="list-style-type: none"> • The study is not able to assess whether the depressive and anxiety symptoms would have a long-lasting effect after the outbreak. • It was not clearly stated in the study whether it was the parents or the students themselves who answered the survey, only that online survey forms were made available through an online crowdsourcing platform and the survey link was sent to the guardian's cellular phone. • No other sociodemographic factor was taken into account, that may indicate correlates of stress factors during the time of quarantine. • No comparator group, thus the effect of quarantine on mental health status cannot be determined. • No exclusion criteria was provided, which is important since children with previous history of mental conditions or psychological distress prior to the pandemic should be excluded. 	<ul style="list-style-type: none"> • Long-term follow up on this population and perhaps inclusion of analysis of sociodemographic factors could give a better understanding of the aspects that can potentially be addressed in policy making during the quarantine period. • The depression and anxiety symptoms cannot be attributed to quarantine or home confinement since this is a cross-sectional study and no comparator group was present. It may be possible that some participants already had symptoms of depression and anxiety prior to the pandemic.
<p>Acute stress, behavioural symptoms and mood states among school-age children with attention-deficit/hyperactive disorder during the COVID-19 outbreak</p> <p>China</p>	<ul style="list-style-type: none"> • The study gave attention to a vulnerable set of pediatric patients. • The relationship between the child's ADHD behaviors and acute stress, attention to media coverage, time allocation, and the mood state of children and parents were assessed. 	<ul style="list-style-type: none"> • The study included a special population of pediatric patients, hence the results cannot be generalized. • Parent's distress may have had an effect on their perceptions of their children's worsening of symptoms. • One factor that was not explored was the relationship of medication use and compliance to the children's worsening ADHD symptoms. • Information was obtained from parents, hence they may be biased. The children may have different responses themselves. 	<ul style="list-style-type: none"> • The results of the study is not conclusive because of multiple biases and potential confounding present in the study. • The findings do not apply to children not diagnosed with ADHD.

<p>A qualitative report on exploratory data on the possible emotional/behavioral correlates of COVID-19 lockdown in 4-10 years children in Italy.</p> <p>Italy</p>	<ul style="list-style-type: none"> The study has a large sample size (5,989). 	<ul style="list-style-type: none"> Since it is an online survey, there was no way to countercheck whether the parents answered for one particular child or more, if they had any. Not generalizable since the population only included those who adept at using devices and navigating through Whatsapp/Facebook. Lacking information that could affect the parents' responses to the surveys such as parental stress, socioeconomic condition of the family, parent-child relationships, and other psychophysical conditions of the child. High non-response rate (actual value not given) because some parents may not know how to navigate thru the online questionnaire. This could result to non-generalizability of findings. Important variables were not assessed such as the response rate of parents to the pandemic, the psychological and physical condition of the children before the distressing situation, the quality of parent-child interaction before and during the pandemic, and the presence of resilience factors. 	<ul style="list-style-type: none"> The study is a qualitative report only, which is descriptive in nature. Also, the presence of bias and confounding make the results inconclusive in terms of correlating the changes in emotion or behavior with quarantine.
<p>Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain</p> <p>Italy and Spain</p>	<ul style="list-style-type: none"> Included a wide age range of pediatric population (3 to 18 years old) with a relatively large sample size (1,143). The study was done in countries greatly affected by the pandemic with relatively longer quarantine times (at least 3 weeks for Italy, longer for Spain). The study included correlations between the parents' emotional state and their perceived symptoms of emotional unease in their children. 	<ul style="list-style-type: none"> Information was only gathered from parents and primary caregivers, which may be prone to recall bias. The study employed a snowball sampling strategy, which is non-randomized, hence results may not be representative of the entire population of the two countries. The children's change in behavior and emotional states were not correlated with age; the age range of 3 to 18 years old represents different stages in development of the pediatric population. No comparator group evaluating children who were not subjected to lockdown measures. Statistical analysis was crude, only using t-test, which did not account for confounding variables. 	<ul style="list-style-type: none"> The psychological effects cannot be attributed to quarantine or home confinement since this is a cross-sectional study and no comparator group was present.

Appendix 3. Summary of critical appraisal of included studies

	Selection	Comparability	Outcome	Score
<p>Compliance and psychological impact of quarantine in children and adolescents due to COVID-19 pandemic</p>	<p>1) Representativeness of the exposed cohort: <i>Somewhat representative of the average in the target population*</i></p> <p>2) Selection of the non-exposed cohort: <i>Taken from the same community as the</i></p>	<p>Comparability of the cohorts on the basis of the design or analysis: <i>Not established</i></p>	<p>1) Assessment of outcome: <i>Self report</i></p> <p>2) Was follow-up long enough for the outcomes to occur? <i>No</i></p> <p>3) Adequacy of follow-up of cohorts: <i>No statement</i></p>	<p>2</p>

India	<p><i>exposed cohort*</i></p> <p>3) Ascertainment of exposure: <i>N/A</i></p> <p>4) Demonstration that outcome of interest was not present at the start of the study: <i>Not done</i></p>			
<p>Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei province, China</p> <p>China</p>	<p>1) Representativeness of the sample: <i>Somewhat representative of the average in the target population*</i></p> <p>2) Sample size: <i>Justified and satisfactory*</i></p> <p>3) Non-respondents: <i>The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.</i></p> <p>4) Ascertainment of the exposure: <i>Not applicable</i></p>	<p>The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled: <i>Not established</i></p>	<p>1) Assessment of the outcome: <i>Self report</i></p> <p>2) Statistical test: <i>Incomplete analysis</i></p>	2
<p>Acute stress, behavioural symptoms and mood states among school-age children with attention-deficit/hyperactive disorder during the COVID-19 outbreak</p> <p>China</p>	<p>1) Representativeness of the sample: <i>Selected group only</i></p> <p>2) Sample size: <i>Justified and satisfactory*</i></p> <p>3) Non-respondents: <i>The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.</i></p> <p>4) Ascertainment of the exposure: <i>Not applicable</i></p>	<p>The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled: <i>Not established</i></p>	<p>1) Assessment of the outcome: <i>Self report</i></p> <p>2) Statistical test: <i>Incomplete analysis</i></p>	1
<p>A qualitative report on exploratory data on the possible emotional/behavioral correlates of COVID-19 lockdown in 4-10 years children in Italy.</p> <p>Italy</p>	<p>1) Representativeness of the sample: <i>Somewhat representative of the average in the target population*</i></p> <p>2) Sample size: <i>Justified and satisfactory*</i></p> <p>3) Non-respondents: <i>The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.</i></p> <p>4) Ascertainment of the exposure: <i>Not applicable</i></p>	<p>The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled: <i>Not established</i></p>	<p>1) Assessment of the outcome: <i>Self report</i></p> <p>2) Statistical test: <i>Incomplete analysis</i></p>	2
<p>Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain</p> <p>Italy and Spain</p>	<p>1) Representativeness of the sample: <i>Somewhat representative of the average in the target population*</i></p> <p>2) Sample size: <i>Justified and satisfactory*</i></p> <p>3) Non-respondents: <i>The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.</i></p> <p>4) Ascertainment of the exposure: <i>Not applicable</i></p>	<p>The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled: <i>Not established</i></p>	<p>1) Assessment of the outcome: <i>Self report</i></p> <p>2) Statistical test: <i>Incomplete analysis</i></p>	2

