

# Association between suicide behaviours in children and adolescents and the COVID-19 lockdown in Paris, France: a retrospective observational study

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## ABSTRACT

This retrospective observational study conducted in Necker Hospital for Sick Children, France (January 2018–June 2020) evaluated a potential temporal association between admissions for suicide behaviours in children and adolescents and the national COVID-19 lockdown (March–May 2020). During the study period, 234 patients were admitted for suicide behaviours (28% male; mean age 13.4 years). Using Poisson regression, we found a significant decrease in the incidence of admissions for suicide behaviour during the lockdown (adjusted incidence rate ratio: 0.46; 95% CI 0.24 to 0.86). This association might result from reduced help-seeking and decreased hospital admission rates during the lockdown, as well as cognitive and environmental factors. Further multicentre studies should be conducted to confirm these findings and investigate whether a compensatory rise in admissions for suicide behaviour occurred in the postlockdown period.

## INTRODUCTION

During the last decade, the prevalence of suicide attempts has significantly increased in children and adolescents, turning out to be a pervasive public health concern.<sup>1</sup> Besides, global health, social and economic crisis may constitute important stressing factors. The outbreak of the SARS-CoV-2 (or COVID-19) has affected all countries around the world. During the current COVID-19 pandemic, the lockdown may have influenced mental well-being.<sup>2</sup> Notably, the lockdown may have had an impact on suicidal behaviour in children and adolescents.<sup>3</sup> However, little is known about the psychiatric consequences of lockdown. One study suggested that the COVID-19 pandemic in Japan has not affected suicide rates among children and adolescents.<sup>4</sup> We evaluated a potential temporal association between admissions for suicide behaviours and the COVID-19 lockdown in a paediatric hospital in Paris, France.

## METHODS

We conducted a retrospective observational study at Necker-Enfants Malades Hospital, a large university hospital in Paris, France. We included patients aged 7–17 years old admitted for suicidal behaviour between 1 January 2018 and 1 June 2020 in paediatric and emergency paediatric units. All patients received a psychiatric examination. The follow-up

## What is already known?

- ▶ During the current COVID-19 pandemic, the lockdown may have influenced mental well-being.
- ▶ Few studies have explored children and adolescent suicide behaviour during the COVID-19 pandemic.

## What this study adds?

- ▶ This study is the first exploring hospital admission for suicide behaviour in child and adolescent during COVID-19 lockdown.
- ▶ We found a 50% decrease in the incidence of suicide behaviours in children and adolescents during the COVID-19 lockdown.
- ▶ This association might result from reduced help-seeking and decreased hospital admission rates during the lockdown, as well as cognitive and environmental factors.

was jointly made by both paediatricians and child and adolescent psychiatrists. The diagnosis of suicide behaviour included suicide attempts and suicide crisis, as defined by the International Classification of Diseases, 10th revision. Patients were identified based on discharge codes. We defined two periods: Period 1: before and after the lockdown, and period 2: during the French COVID-19 lockdown (ie, between 16 March 2020 and 10 May 2020). All procedures were in accordance with the ethical principles of the Declaration of Helsinki.

The characteristics of patients admitted for suicidal behaviour were compared between period 1 and Period 2 using standard univariate tests. Then, we used Poisson regression to model the count of patients admitted for suicidal behaviour per week. Independent variables included the lockdown period and summer breaks (ie, July and August weeks). Associations were expressed as incident rate ratios (IRR). Statistical analysis was performed using Stata V.15/SE.

## RESULTS

During the study period, 234 children were admitted for suicide behaviour (28% male; mean 13.4 years (SD 1.8)). There was no significant



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**Table 1** Association between suicide behaviours in children and adolescents and the COVID-19 lockdown: Poisson regression

Variable	Univariate analysis		Multivariate analysis	
	Crude IRR (95% CI)	P value	Adjusted IRR (95% CI)*	P value
Lockdown	0.51 (0.27 to 0.95)	0.034	0.46 (0.24 to 0.86)	0.016
Summer	0.33 (0.20 to 0.57)	<0.001	0.32 (0.19 to 0.55)	<0.001

\*Adjusted for the effect of summer breaks.  
IRR, incidence rate ratio.

difference in patient characteristics between periods 1 and 2 (median age 13.4 vs 13.6 years,  $p=0.55$ ; % male 28% vs 17%,  $p=0.51$ ; intensive care units admission 11% vs 8%,  $p=1$ ). The number of admissions for suicide behaviour was 2.5 (SD 1.7) and 1.25 (SD 1.28) per week during period 1 and period 2, respectively. The incidence of admissions for suicidal behaviour was also lower during summer breaks (0.88 (SD 1.45) per week). In Poisson univariate regression, there was a significant association between the lockdown and the average number of admissions for suicidal behaviours (crude IRR 0.51 (95% CI 0.27 to 0.95),  $p=0.034$ ). This association remained significant in multivariate Poisson regression adjusted for the effect of summer breaks (adjusted IRR 0.46 (95% CI 0.24 to 0.86),  $p=0.016$ ; table 1). In 2018–2019, rates of admissions per week did not differ between March and May compared with the rest of the year (2.75 (SD 1.54) vs 2.275 (SD 1.68), respectively; Poisson IRR 1.21 (95% CI 0.91 to 1.60);  $p=0.19$ ).

## DISCUSSION

This study is the first exploring hospital admission for suicide behaviour in child and adolescent during COVID-19 lockdown. The only study that investigated suicide rates among children and adolescents during the COVID-19 pandemic explored only the school closure period.<sup>4</sup> We found a 50% decrease in the incidence of suicide behaviour in children and adolescents during the COVID-19 lockdown. This association might result from a combination of several factors. First, the observed decrease in suicidal behaviours may reflect reduced help-seeking and a global decrease in hospital admission rates during the lockdown. Moreover, some environmental and cognitive factors could also be involved, such as buffering-copying mechanisms and changes in familial and lifestyle dynamics during the lockdown. Suicide behaviour in children and adolescents is traditionally associated with perceived burdensomeness, thwarted belongingness and feeling of hopelessness and also school harassment and social withdrawal.<sup>5</sup> The lockdown may have disrupted these dimensions, thus increasing the feeling of belonging and social connectedness. Our study was conducted in a single hospital on a short period, which may limit the generalisability of the findings. Further studies are needed to investigate whether change in hospital admissions may have impacted the number of suicide behaviours, whether a compensatory rise in admissions

will occur in the postlockdown period and whether suicide behaviour in children and adolescents could change during a second lockdown period. Further studies should evaluate the influence of copying factors in children and adolescents, and the mechanisms underlying the effects of globalised health threat and pandemic lockdown on suicidal behaviour. In our world with recurrence of epidemic risk, this could help to develop preventive interventions.<sup>6</sup>

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**Data availability statement** All data relevant to the study are included in the article or uploaded as supplementary information. Data concern number of patients admitted for suicidal behavior without any identified participant.

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## REFERENCES

- Burstein B, Agostino H, Greenfield B. Suicidal attempts and ideation among children and adolescents in US emergency departments, 2007–2015. *JAMA Pediatr* 2019;173:598–600.
- Reger MA, Stanley IH, Joiner TE. Suicide mortality and coronavirus disease 2019—A perfect storm? *JAMA Psychiatry* 2020;77:1093.
- Hoekstra PJ. Suicidality in children and adolescents: lessons to be learned from the COVID-19 crisis. *Eur Child Adolesc Psychiatry* 2020;29:737–738.
- Isumi A, Doi S, Yamaoka Y, et al. Do suicide rates in children and adolescents change during school closure in Japan? the acute effect of the first wave of COVID-19 pandemic on child and adolescent mental health. *Child Abuse Negl* 2020:104680.
- Carballo JJ, Llorente C, Kehrmann L, et al. Psychosocial risk factors for suicidality in children and adolescents. *Eur Child Adolesc Psychiatry* 2020;29:759–76.
- Gunnell D, Appleby L, Arensman E, et al. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatry* 2020;7:468–71.