Pediatric asthma control during the COVID-19 pandemic: a systematic review and meta-analysis

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Abstract

Background: During the current ongoing COVID-19 pandemic, studies had reported that patients with asthma would experience increased asthma-associated morbidity because of the respiratory virus SARS-CoV-2 infection, based on experience with other respiratory viral infections. However, some studies suggested that there was no apparent increase in asthma related morbidity in children with asthma, it is even possible that due to reduced exposures due to confinement, such children may have improved outcomes. In order to understand the impact of Covid-19 on asthma control in children, we performed this systematic review and meta-analysis. Methods: We searched PubMed, Embase, and Cochrane Library to find literature from December 2019 to June 2021 related to Covid-19 and children's asthma control, among which results such as abstracts, comments, letters, reviews and case reports were excluded. The level of asthma control during the COVID-19 pandemic was synthesized and discussed. Results: A total of 20456 subjects were included in 7 studies. Random effect model is used to account for the data. Compared to the same period before the COVID-19 pandemic, asthma exacerbation, asthma admission, emergency room visit reduced a lot. The outcome of use of inhaled corticosteroids and Beta-2 agonists shows no significant difference. Conclusion: Compared to the same period before the COVID-19 pandemic and the measures in response to it, the level of asthma control has been significantly improved. We need to understand the exact factors leading to these improvements and find methods to sustain it.

Title Page

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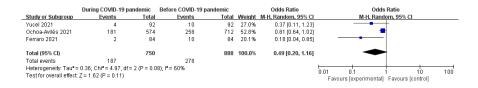


Figure 2 Forest plots for comparison of asthma exacerbation between COVID-19 pandemic and before it.

	During COVID-19 p	andemic	Before COVID-19 pandemic			Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M-H, Random, 95% Cl
Papadopoulos 2021	0	108	0	108		Not estimable	
Ulimann 2021	0	85	4	85	3.0%	0.11 [0.01, 2.00]	·
Guijon 2021	19	18912	57	18912	97.0%	0.33 [0.20, 0.56]	
Total (95% CI)		19105		19105	100.0%	0.32 [0.19, 0.54]	•
Total events	19		61				
Heterogeneity: Tau ² = (0.00; Chi² = 0.57, df =	1 (P = 0.45	i; l² = 0%				0.01 0.1 1 10 100
Test for overall effect: Z = 4.35 (P < 0.0001)							0.01 0.1 1 10 100 Favours (experimental) Favours (control)
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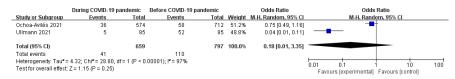
Figure 3 Forest plots for comparison of asthma admission between COVID-19 pandemic and before it.

	During COVID-19 pa	Before COVID-19 pa	ndemic		Odds Ratio	Odds Ratio					
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl		M-H, Rand	om, 95% Cl		
Ferraro 2021	0	92	2	92	8.4%	0.20 [0.01, 4.13]	+				
Ochoa-Avilés 2021	4	574	43	712	73.3%	0.11 [0.04, 0.31]		_			
Ulimann 2021	1	85	12	85	18.3%	0.07 [0.01, 0.57]	· · ·				
Total (95% CI)		751		889	100.0%	0.11 [0.04, 0.26]					
Total events	5		57								
Heterogeneity: Tau ² = Test for overall effect:	7); I² = 0%				0.01 0. Favours (e		1 Favours (cont		100		

Figure 4 Forest plots for comparison of emergency room visit between COVID-19 pandemic and before it.

	During COVID-19 pa	indemic	Before COVID-19 pandemic			Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	M-H, Random, 95% Cl
Guijon 2021	5	166	19	166	32.5%	0.24 [0.09, 0.66]	_
Ochoa-Avilés 2021	221	574	260	712	35.0%	1.09 [0.87, 1.37]	+
Ulimann 2021	5	85	53	85	32.5%	0.04 [0.01, 0.10]	
Total (95% CI)		825		963	100.0%	0.22 [0.03, 1.85]	
Total events	231		332				
Heterogeneity: Tau ² = Test for overall effect:		= 2 (P < 0	00001); I² = 96%			0.01 0.1 1 10 100 Favours (experimental) Favours (control)	
							· · · · · · · · · · · · · · · · · · ·

Figure 5 Forest plots for comparison of use of inhaled corticosteroid between COVID-19 pandemic and before it.



 $\label{eq:Figure 6} {\bf Forest \ plots \ for \ comparison \ of \ use \ of \ Beta-2 \ agonists \ between \ COVID-19 \ pandemic \ and \ before \ it.}$

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