Association of Rotavirus Vaccines With Reduction in Rotavirus Gastroenteritis in Children Younger Than 5 Years

A Systematic Review and Meta-analysis of Randomized Clinical Trials and Observational Studies Sun et al. JAMA Pediatr. 2021;175(7):e210347. doi:10.1001/jamapediatrics.2021.0347.

Background & Methods: 121 studies (57RCTs, 50 case-control studies, and 14 cohort studies) till July 2020 were analyzed.

- Studies reporting the efficacy, effectiveness, safety, or immunogenicity of rotavirus vaccine were included. Studies with fewer than 100 enrolled participants were excluded.
- The primary outcomes were rotavirus gastroenteritis (RVGE), severe RVGE, and RVGE hospitalization.
- Safety-associated outcomes included serious adverse events, intussusception, and mortality.

ACADEMIC P.E.A.R.L.S

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Pediatric Evidence And Research Learning Snippet
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	No. with vaccine/	Positive with vaccine/positive		Favors	Favors
Studies	No. with placebo	with placebo, %	RR (95% CI)	vaccination	nonvaccinatio
LLR				_	
Shengli et al,23 2020	4582/4611	2.7/6.7	0.407 (0.332-0.499)	-	
P<.001	4582/4611	2.7/6.7	0.407 (0.332-0.499)	•	
Rotavac				_	
Bhandari et al, 38 2014	4534/2187	5.2/7.8	0.664 (0.548-0.804)	-	
P<.001	4357/2187	5.2/7.8	0.664 (0.548-0.804)	*	
Rotasiil				_	
Isanaka et al,46 2017	1780/1728	6.8/10.0	0.683 (0.546-0.853)	=	
Kulkarni et al. ³⁹ 2017	3527/3498	4.1/5.6	0.725 (0.588-0.894)	_	
Total / 2=0%; P<.001	5307/5226	5.0/7.1	0.705 (0.605-0.821)	•	
RV1					
HIC					
Bernstein et al. ⁸ 1999	108/107	1.9/16.8	0.110 (0.026-0.463)	<u> </u>	
Vesikari et al,15 2006	2572/1302	0.9/7.2	0.129 (0.083-0.201)		
Subtotal (2 = 0%; P <.001	2680/1409	1.0/7.9	0.027 (0.083-0.195)	-	
MIC					
Li et al,24 2014	1575/1573	1.7/5.7	0.300 (0.195-0.458)	-	
Ruiz-Palacios et al. ⁴³ 2007	78/87	3.8/13.8	0.279 (0.082-0.952)	· · ·	
Salinas et al, ⁴² 2005	464/454	3.2/10.8	0.300 (0.170-0.526)		
Justino et al, ⁶⁴ 2012	309/300	0.6/1.7	0.388 (0.076-1.986)	· · ·	
Madhi et al,48 2010	1944/960	4.2/11.8	0.358 (0.273-0.471)		
Rojas et al, ⁵² 2007	159/160	3.1/12.5	0.252 (0.097-0.654)		
Colgate et al, ³¹ 2016	292/301	16.8/34.2	0.490 (0.363-0.662)	-	
Zaman et al, ³² 2009	196/98	1.5/4.1	0.375 (0.086-1.643)		
Subtotal I ² = 0%; P <.001	5017/3933	3.7/10.1	0.373 (0.316-0.441)	•	
LIC				_	
Madhi et al, ⁴⁸ 2010	1030/483	8.3/12.6	0.653 (0.479-0.891)	_	
P<.001	1030/483	8.3/12.6	0.653 (0.479-0.891)	•	
Total /2=77.2%; P<.001	8727/5825	3.4/9.8	0.316 (0.224-0.448)	+	
RV1					
HIC				_	
Vesikari et al. ⁶¹ 2006	2207/2305	3.7/13.7	0.272 (0.215-0.344)	—	
Block et al, ⁶⁰ 2007	651/661	2.3/8.2	0.282 (0.161-0.495)		
Vesikari et al,14 2006	237/264	5.1/16.3	0.311 (0.168-0.575)		
Iwata et al,17 2013	380/381	1.8/7.3	0.251 (0.111-0.567)		
Subtotal I ² = 0%; P <.001	3475/3611	3.3/12.2	0.276 (0.226-0.336)	+	
MIC					
Grant et al, 10 2012	295/288	5.4/21.9	0.248 (0.147-0.419)		
Mo et al,27 2017	1930/1946	1.8/5.6	0.315 (0.215-0.460)		
Breiman et al,59 2012	991/978	2.9/6.4	0.454 (0.295-0.699)		
Tapia et al, ⁵⁴ 2012	1556/1562	2.4/5.8	0.408 (0.280-0.594)		
Subtotal /2 = 24.7%; P <.001	4772/4774	2.4/6.8	0.356 (0.279-0.453)	•	
UC					
Tapia et al. ⁵⁴ 2012	845/843	2.6/2.8	0.914 (0.517-1.618)		-
P=.76	845/843	2.6/2.8	0.914 (0.517-1.618)		
Total /2=60.4%; P<.001	9092/9228	2.8/8.6	0.350 (0.275-0.445)		

HIC indicates high-income countries; LIC, low-income countries; LLR, Lanzhou lamb rotavirus; MIC, middle-income countries; RR, relative risk; RVI, monovaler rotavirus vaccine.

- Rotarix (RV1) significantly reduced RVGE (RR, 0.316 [95%CI, 0.224-0.345]) and RVGE hospitalization risk (OR, 0.347 [95%CI, 0.279-0.432]) among fully vaccinated children.
- RotaTeq (RV5) had similar outcomes (RVGE: RR, 0.350 [95%CI, 0.275-0.445]; RVGE hospitalization risk: OR,0.272 [95%CI, 0.197-0.376]).
- Rotavirus vaccines also demonstrated higher protection against severe RVGE.
- Moderate associations were found between reduced RVGE risk and Rotavac (RR, 0.664 [95%CI, 0.548-0.804]).
- All rotavirus vaccines demonstrated no risk of serious adverse events.
- A positive correlation was also found between immunogenicity and vaccine protection.

Conclusions:

- There is high protection and low risk of serious adverse events for rotavirus vaccines in fully vaccinated children.
- This emphasizes the importance of worldwide introduction of rotavirus vaccination.
- Similar protection provided by Rotarix and RotaTeq decreases the pressure of vaccines selection.
- Rotavaq and Rosasiil, which are licensed only in India also showed similar results.

EXPERT COMMENT

- Rotavirus gastroenteritis contributes to 28% deaths due to diarrhea in children below 5 years age.
- Rotavirus vaccine is part of national immunization program in >100 countries. In India, Rotavirus vaccine is being introduced in phased manner.
- High effectiveness and good safety profile of all the licensed vaccines should encourage parents and health care authorities to promote Rotavirus vaccination.

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	With warm regards,		<u>Reference</u> Sun ZW, Fu Y, Lu HL, Yang RX, Goyal H, Jiang Y,		
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