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From Infant to Birth Dose: A Scoping Review of Implementation Challenges for Rotavirus and Birth Dose Vaccines in Low- and Middle-Income Countries

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Background



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Despite notable progress in global vaccine distribution, vaccine coverage remains a **significant challenge** in low- and middle-income countries (**LMICs**).

In 2018, **19.4 million** newborns **missed** essential **vaccines**, most of whom were in LMICs (WHO, 2019).



- The WHO recommends **BCG**, **OPV0**, and **HepB-BD** at birth; meanwhile, a **three-dose** schedule of **rotavirus** vaccine at 2, 3, and 4 months of age. Early administration of rotavirus at birth provides a safety benefit → intussusception peaked in 4-8 months of age and is rarely found before 2 months of life.
- As the future shifts towards rotavirus vaccination at birth, **understanding the current barriers** to implementing both infant-dose rotavirus vaccines and birth-dose vaccines (BDVs) in LMICs is essential.



Objective

Explores the barriers and enablers of rotavirus vaccine implementation and BDV uptake in LMICs.

Methods



Guideline

Follow PRISMA guidelines

Data Source

PubMed, Scopus, Cochrane, and grey literature (Portal Garuda)

The Keywords

Parent, stakeholder, enabler, barrier, factor, vaccine, immunization, low and middle-income countries

Period

Related publications up to 14 February 2025

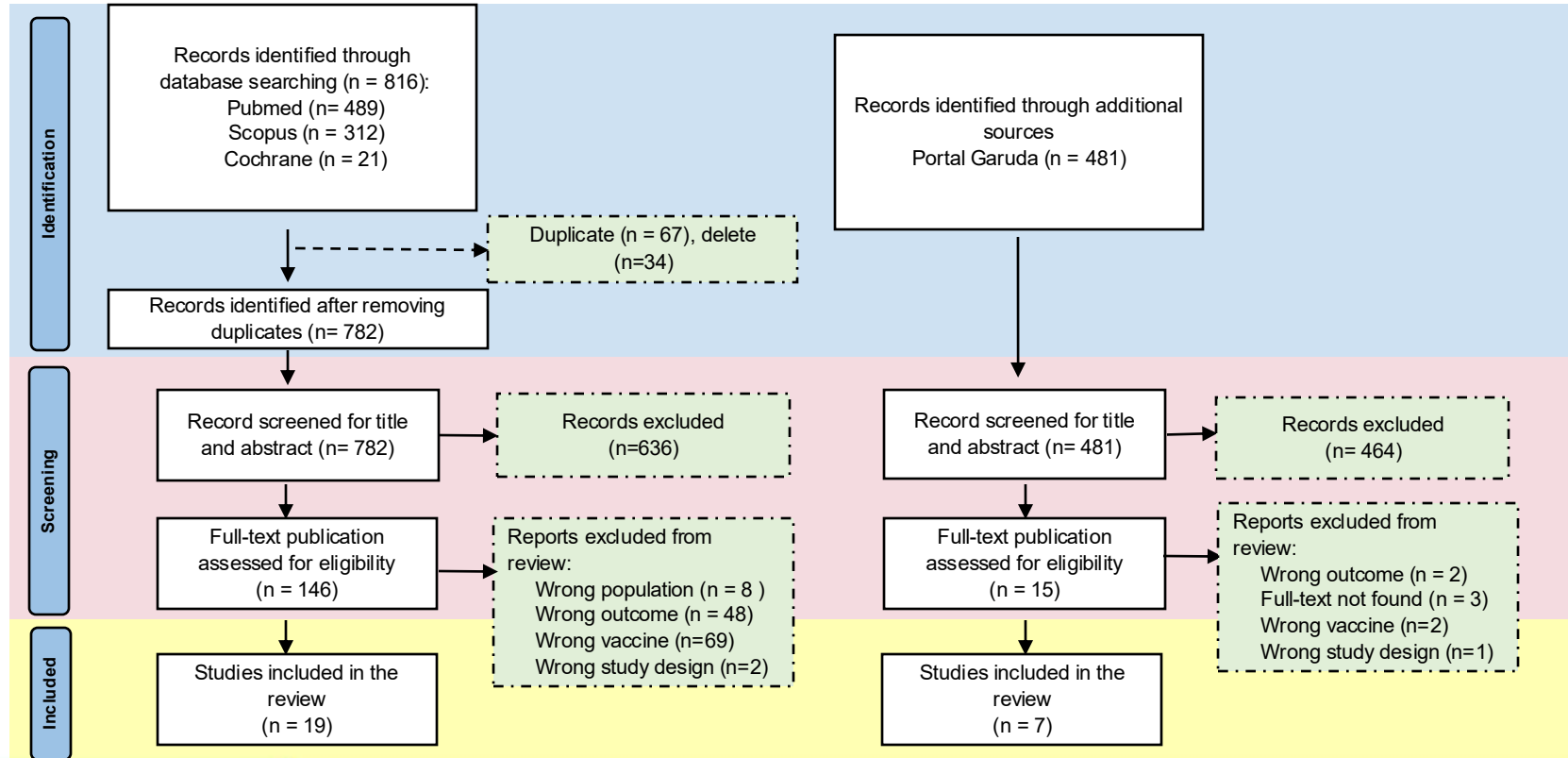
Inclusion Criteria

- About birth dose vaccines (BCG, OPV, Hepatitis B) and rotavirus
- The literature included research on birth dose vaccine hesitancy, barriers, enabling factors, or determinants.
- Published in the English or Indonesian language
- All types of studies

Data extraction

Author's name, year of publication, country, sample size (n), study design, and outcome

PRISMA Flowchart



Study characteristics



- Of the **1,297** articles **26** met the inclusion criteria.

- The population in the literature may include caregivers, stakeholders, and/or healthcare workers.

- Seven out of the included studies included more than 1000 respondents in their sample.

Variable	n = 26	%	Variable	n = 26	%
Vaccine type			Origin country		
Hepatitis B	10	38.5	Asia Pacific		
Rotavirus	6	23.1	Indonesia	8	30.7
OPV	6	23.1	Pakistan	5	19.2
Birth dose vaccine	3	11.5	PNG	2	7.7
OPV, IPV and routine immunization	1	3.8	Others (Malaysia, India, Vietnam)	3	11.5
Study design			Africa	1	3.8
Quantitative			Nigeria	2	7.7
Cross sectional	18	69.2	Others (Burkina Faso, Somalia, Ethiopia)	5	19.2
Case control	2	7.7	2 or more countries	3	11.5
RCT	1	3.8	Publication year		
Qualitative	4	15.4	<=2010	2	7.7
Mixed Methods	1	3.8	2011-2019	16	61.6
			2020-2025	8	30.7

Enabler factors



17 studies reported on enabler factors:

BDV (n=14)	Rotavirus (n= 4)
<ul style="list-style-type: none">• Mother and caregiver education and knowledge (6)	<ul style="list-style-type: none">• Family and social network support (2)
<ul style="list-style-type: none">• Place of ANC and delivery (4)	<ul style="list-style-type: none">• Community and religious leader engagement (1)
<ul style="list-style-type: none">• Health worker capacity (4)	<ul style="list-style-type: none">• Health worker engagement (pediatrician) (1)
<ul style="list-style-type: none">• Health worker engagement (midwives) (3)	<ul style="list-style-type: none">• Mother occupation (1)
<ul style="list-style-type: none">• Health education and campaign (3)	<ul style="list-style-type: none">• Health education (1)
<ul style="list-style-type: none">• Access (2)	<ul style="list-style-type: none">• The mode of payment for the vaccine (1)
<ul style="list-style-type: none">• Family support (1)	
<ul style="list-style-type: none">• Household income (1)	
<ul style="list-style-type: none">• Religion (1)	

Barrier factors



11 studies reported on the barrier factors:

BDV (n=10)	Rotavirus (n=3)
<ul style="list-style-type: none">Religious concerns (halal/haram) (2)	<ul style="list-style-type: none">Religious concerns (halal/haram) (1)
<ul style="list-style-type: none">Fear of AEFI (Adverse Events Following Immunization) (2)	<ul style="list-style-type: none">Gender issue (1)
<ul style="list-style-type: none">Preterm infant (2)	<ul style="list-style-type: none">Cost of vaccine (1)
<ul style="list-style-type: none">Access (1)	<ul style="list-style-type: none">Perception (1)
<ul style="list-style-type: none">Health policy (1)	
<ul style="list-style-type: none">Geopolitical (1)	
<ul style="list-style-type: none">Culture (1)	
<ul style="list-style-type: none">Mother Decision Authority (1)	

Conclusions



A successful transition from infant-dose to birth-dose rotavirus vaccination requires strategic planning that addresses existing implementation challenges related to both infant-dose rotavirus vaccines and BDVs.



Key strategies



01

Strengthen caregiver knowledge and awareness by using targeted parental education (one-on-one counselling), involving fathers, and extended families.

02

Promote community engagement, including religious leaders, to build trust and reduce hesitancy (public campaign).

03

Ensure strong coordination of the health system, adequate health worker capacity, reliable vaccine supply, and equitable access to vaccines, especially in underserved areas.

04

Secure sustainable financing and foster international collaboration.



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Searching Strategy



No.	Date of Search	Database	Keywords	No of Articles	Notes
1.	14/2/2025	Pubmed	(vaccine OR birth-dose OR rotavirus OR hepatitis OR polio OR BCG) AND (parent OR mother OR caregiver OR stakeholder) AND (factor OR barrier OR enabler OR acceptance OR refuse OR knowledge OR perception OR attitude OR belief OR experience) AND (LMIC OR Low Income Countr* OR Middle Income Countr* OR Indonesia OR Afghanistan OR Bangladesh OR Cambodia OR Africa OR China OR Egypt OR Ethiopia OR India OR Iran OR Iraq OR Jordan OR Kenya OR Lebanon OR Libya OR Malaysia OR Mexico OR Myanmar OR Nigeria OR Pakistan OR Papua OR Philippines OR Somalia OR Sri Lanka OR Sudan OR Thailand OR Tunisia OR Turkey OR Uganda OR Vietnam)	489	parent and stakeholder filter: Title/Abstract
2.	13/2/2025	Scopus	TITLE-ABS-KEY (("vaccine" OR "birth-dose" OR "rotavirus" OR "hepatitis" OR "polio" OR "bcg") AND ("parent" OR "mother" OR "caregiver" OR "stakeholder") AND ("factor" OR "barrier" OR "enabler") AND ("imic" OR "low-income countr*" OR "middle-income countr*"))	312	parent and stakeholder filter: Title/Abstract/Key word

Searching Strategy (con't)



No.	Date of Search	Database	Keywords	No of Articles	Notes
3.	13/2/2025	Cochrane	vaccine OR birth-dose OR rotavirus OR hepatitis OR polio OR BCG in Title Abstract Keyword AND parent OR mother OR caregiver OR stakeholder in Title Abstract Keyword AND factor OR barrier OR enabler OR acceptance OR refuse OR knowledge OR perception OR attitude OR belief OR experience in Title Abstract Keyword AND LMIC OR Low Income Countr* OR Middle Income Countr* OR Indonesia OR Afghanistan OR Bangladesh OR Cambodia OR Africa OR China OR Egypt OR Ethiopia OR India OR Iran OR Iraq OR Jordan OR Kenya OR Lebanon OR Libya OR Malaysia OR Mexico OR Myanmar OR Nigeria OR Pakistan OR Papua OR Philippines OR Somalia OR Sri Lanka OR Sudan OR Thailand OR Tunisia OR Turkey OR Uganda OR Vietnam in Title Abstract Keyword	21	parent and stakeholder filter: Title/Abstract/Key word
4.	13/2/2025	Portal Garuda	(imunisasi) AND (orang tua OR ibu) AND (faktor)	418	Filter: Abstract