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Commentary

Adolescent Vaccination in India: Recommendation from the Indian Association for Adolescent Health

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In 2019, India's top ten causes of death included ischaemic heart disease, chronic obstructive pulmonary diseases, stroke, diarrhoeal diseases, neonatal diseases, lower respiratory tract infection, tuberculosis, diabetes, cirrhosis, falls, road injuries, and self-harm.[1] It is noticeable that some of the causes or risk factors of the above-mentioned conditions are vaccine-preventable in nature.

To date, no specific immunisation schedule has been adopted by the Government of India for adolescents. The Indian Academy of Pediatrics recommends immunisation in adolescents under the categories of mandatory vaccines, catch-up vaccines, and vaccines in special situations.[2]

The all-age group HBsAg seroprevalence was reported to be 2.9% (2.6 to 3.3). The death rate was 7.9 (6.4 to 9.7) per 100,000 population (all age groups included).[3] There is a recent resurgence of diphtheria cases in the past few years in India.[4-6] In a recent systematic review from India, the overall seroprevalence rate of VZV infection in the general population of India was 72.48% (95% CI; 68.21%-76.56%).[7] In multisite surveillance between 2016 and 2018, influenza was found to be the most common virus detected among acute respiratory infection (15.4%; 95% CI: 14.5-16.2) and severe acute respiratory infection (12.7%; 95% CI: 11.9-13.5) cases.[8] In a modelling study, it was estimated that 0.56 million (0.49-0.64 million) severe episodes of pneumococcal pneumonia and 105 thousand (92-119 thousand) pneumococcal deaths occur in India.[9] A meta-analysis from India reported the prevalence of laboratory-confirmed typhoid among individuals with fever across all hospital studies to be 9.7% (95% CI: 5.7%-16.0%).[10] In recent years, many measles outbreaks have been reported among adolescents and adults.[11-13] A review article from the Indian subcontinent revealed the changing trend in the endemicity of hepatitis A infection, with more susceptible adolescents/ adults than previously observed. Older age groups were reported to present with more severe symptoms of hepatitis A.[14]

There is no specific data about the burden of hepatitis A among Indian adults and the cost-effectiveness of the vaccine.[15] No study is available

for testing the cost-effectiveness of influenza vaccine in low-middle income countries.[16] However, Indian consensus-based recommendations for influenza vaccine include vaccination of people who are living with, or caring for high-risk people; pregnant women; older adults (aged more than 50 years); people with chronic medical conditions; and children.[17] For the yellow fever vaccine, the average out-of-pocket expenditure was found to be INR 2153 per person, with a range varying from INR 400 to INR 26950 equivalent to USD 6 to USD 380 according to 2022 rates.[18] In the World Health Organization (WHO) South-East Asia Region, only three countries accounted for 98% of the total reported malaria cases in the region, the primary contributor being India (58%). India also represents 3% of the global malaria burden.[19] Cost-analysis of malaria vaccination is yet to be conducted in India. Evidence from Indian studies suggests that adolescent vaccination with the human papillomavirus vaccine, pre-exposure prophylaxis of rabies vaccine, hepatitis B virus vaccine, typhoid vaccine, pneumococcal vaccine, and dengue vaccine are cost-effective interventions for addressing the burden of the disease.[20-25] For malaria, measles, mumps, rubella, yellow fever, meningococcal infection, influenza, chicken pox, and hepatitis A, no cost-effective analyses are available in India.

In one of the estimations by Sujitha et al., it was found that pre-exposure prophylaxis against rabies was 20 times less than the cost of PEP (Post-Exposure Prophylaxis), therefore it would be a highly cost-effective strategy if instituted among children and adolescents.[21] Pre-exposure rabies prophylaxis is safe and immunogenic and should be considered where the risk of exposure is high. Not just cost-effective, pre-exposure prophylaxis is also effective considering the challenges of post-exposure prophylaxis in India.[26,27] Children and adolescents are more exposed to pet animals during their play and providing post-exposure prophylaxis to every exposed child is difficult.[28] A wide multi-centre survey in India showed that 35.3% of the total human rabies cases belonged to the age group of 14 years or less.[29]

The Indian Medical Association has recommended various vaccines for adolescents.[30] After the consultation with Indian Association for Adolescent Health, the vaccines shown in Table 1 have been recommended during 10-19 years of age.

Table 1.Vaccines Recommended Vaccines Recommended for Adolescents

Vaccine	Doses	Route	Schedule
Hepatitis A	3	IM	0-1-6 months
Hepatitis B	2 (killed) 1 (live attenuated)	IM	0-6 months
dT/ Tdap	1	IM	10-18 years, followed by a booster every 10 years
Varicella (chickenpox)	2	IM	4-6 weeks interval
HPV	2 (9-14 yrs) 3 (> 14 yrs)	IM	2 doses: 0-6 months 3 doses: 0-1 (HPV2), 2 (HPV4) and 6 months
Influenza	1	IM	Yearly
Pneumococcal (PPSV)	2	IM	5 years apart in high-risk persons
PCV 13	1	IM	6-18 yrs, if not received previously and having some medical conditions e.g., HIV, sickle cell disease, CKD
Typhoid	1 (conjugated)		Till 18 years, repeat every 3 years in case of unconjugated vaccine
MMR	2	SC	4-8 weeks interval, only one dose if previously vaccinated
Japanese encephalitis	1	IM	Till 18 years of age (in endemic areas)
Meningococcal (ACWY)	1 or 2	IM	A single dose (not high risk), 2 doses 4 weeks apart in high-risk persons
Rabies	3 or 4	ID/ IM	Pre-exposure: 0, 7, 28 days Post-exposure: 0, 3, 7, 28 days

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Way Forward

The Scientific Advisory Group of Experts (SAGE) has suggested an Expanded Programme of Immunization (EPI) that expands immunisation activities beyond infancy, especially till adolescence.[31] The immunisation schedule needs to be expanded for adolescents, only after rigorous cost-analysis studies in India. In the absence of robust evidence of cost-effectiveness, the suggested vaccines may not be advisable under the national immunisation schedule. Keeping in mind the need of the hour, nationwide studies for estimation of the cost-effectiveness of these vaccines must be prioritised and encouraged.

A vaccine in adolescents is contraindicated when there was a severe allergic reaction (e.g., anaphylaxis) after the previous dose of that particular vaccine. In case of mild to moderate allergic reactions, strict precautions should be observed. In the case of live vaccines such as MMR, adolescents with severe immunodeficiency (e.g., long-term immunosuppressive therapy, receipt of chemotherapy, or severely immune-compromised patients with HIV infection) may defer the vaccination.

It is advised to the policymakers and health managers that the investment in adolescent vaccination could be considered one of the most cost-effective public health strategies as observed in vaccinations against smallpox, polio, influenza, and other important diseases.

Conflict of Interest: None

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