

Beyond the Jab: Integrating Behavioral Strategies for Pediatric Vaccination Success

Somayeh Khezerloo ¹, * Reza Abdollahi ¹

¹ Department of Nursing, School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran.

Abstract

Pediatric vaccinations represent one of the most effective public health interventions, preventing millions of deaths annually from diseases like measles, polio, and pertussis. Yet, achieving high coverage rates remains challenging due to barriers such as parental hesitancy, children's needle-related anxiety, and logistical issues. While the vaccine administration itself is crucial, success hinges on integrating behavioral strategies that address psychological, social, and practical factors. These approaches, drawn from behavioral science, can enhance uptake by fostering positive experiences and countering misinformation. Systematic reviews indicate that such interventions can boost vaccination rates by 1.7 to 3.4 times, particularly in pediatric settings. Integrating these strategies demands a holistic shift: training healthcare teams, leveraging tools like Behavioral and Social Drivers (BeSD) for monitoring, and partnering with communities. Policy implications include mandating provider education and incentivizing clinics for high uptake. Future research should evaluate digital tools, like apps for reminders, in diverse settings. Ultimately, moving beyond the jab to behavioral integration not only boosts pediatric vaccination success but builds resilient health systems, safeguarding generations against preventable diseases.

Key Words: Behavioral strategies, Pediatric vaccination, Vaccine.

* Please cite this article as: Khezerloo S, Abdollahi R. Beyond the Jab: Integrating Behavioral Strategies for Pediatric Vaccination Success. J Ped Perspect 2025; 13 (10):19699-19703. DOI: 10.22038/jpp.2025.91140.5596

*Corresponding Author:

Reza Abdollahi, PhD Student of Nursing, Department of Nursing, School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran. Tel: 09019753320; Email : Rezaabdollahi97@yahoo.com

DEAR EDITOR

Pediatric vaccinations are one of the most effective public health interventions, preventing millions of deaths annually from diseases like measles, polio, pertussis, diphtheria, tetanus, human papilloma virus (HPV), and influenza. However, achieving high coverage rates remains challenging due to barriers such as parental hesitancy, children's needle-related anxiety, and logistical issues. While the vaccine administration itself is crucial, success depends on integrating behavioral strategies that address psychological, social, and practical factors. These approaches, drawn from behavioral science, can enhance uptake by fostering positive experiences and countering misinformation. A 2025 systematic review and meta-analysis of 88 randomized controlled trials indicates that such interventions can boost vaccination rates by 1.5 times (OR 1.5, 95% CI 1.27-1.77), particularly in pediatric settings for vaccines like diphtheria, pertussis, and tetanus (1).

At the core of behavioral barriers lies a complex interplay of thoughts, feelings, and social influences, as outlined in the World Health Organization's Behavioral and Social Drivers (BeSD) framework. For childhood vaccines, BeSD identifies four domains: thinking and feeling (e.g., confidence in vaccine safety), social processes (e.g., family norms and health worker recommendations), motivation (e.g., intention to vaccinate), and practical issues (e.g., access and affordability) (2). Surveys using BeSD tools reveal that 74-96% of caregivers view vaccines as important for child health, yet 32% encounter negative information, eroding trust. In low- and middle income countries (LMICs), where zero-dose children are prevalent, practical barriers like transportation exacerbate hesitancy. Analytically, BeSD's strength is its data-

driven approach: by measuring indicators like intention (86-93% positive among families), programs can tailor interventions, such as community engagement to reinforce social norms (3). However, its limitation is the need for local adaptation; cognitive testing ensures cultural relevance, but resource constraints in LMICs may hinder widespread use. Effective demographic factors influencing hesitancy include age (younger parents more hesitant), gender (though inconsistent), and ethnicity, with the role of cultural factors, parental education, socioeconomic components of health, and the level of access to vaccines being emphasized. For instance, lower parental education and income, cultural mistrust in healthcare, and geographic barriers reduce uptake, particularly among ethnic minorities and low-socioeconomic groups, as shown in a 2024 study on social determinants. Integrating these factors into BeSD applications can enhance equity (4).

Effective communication is the foundation of behavioral integration. The American Academy of Pediatrics (AAP) emphasizes presumptive language, where providers state, "Your child is due for vaccines today," rather than asking for permission, increasing uptake even among hesitant parents. This leverages choice architecture, making vaccination the default. For hesitancy, motivational interviewing (MI) a patient-centered technique elicits parents' concerns and aligns recommendations with their values, boosting initiation rates for vaccines like HPV and influenza in trials (5). Expert analysis shows MI's efficacy stems from reducing reactance; parents feel empowered rather than coerced. Additional tactics include bundling discussions for all due vaccines and sharing personal anecdotes about vaccine-preventable diseases, which build empathy and trust. The role of counseling services before, during, and after pregnancy is crucial, as prenatal counseling by

obstetricians can significantly improve vaccine knowledge and childhood vaccination rates, addressing attitudes early and countering misinformation from social media. In pediatric contexts, starting conversations prenatally is key, with evidence showing that educating pregnant women increases rates for vaccines like hepatitis B and measles. Yet, challenges arise with diverse populations: acknowledging historical medical distrust in minoritized groups is essential to avoid alienating families (6).

Reducing procedural distress is another critical behavioral pillar, as needle fear affects up to 63% of children and can lead to avoidance. Age-tailored strategies minimize pain and anxiety, transforming the experience (7). For infants, breastfeeding or sucrose during injections, combined with skin-to-skin contact, leverages distraction and comfort positioning to lower cortisol responses. Toddlers benefit from numbing creams, vibration devices, and bubbles for deep breathing, while school aged children respond to positive self talk ("I am brave") and rewards like stickers. Adolescents should co-create plans, fostering autonomy. Evidence from randomized trials confirms these reduce infant distress at immunizations for vaccines like pertussis and measles, with praise reinforcing brave behaviors. Analytically, these interventions work via attentional narrowing shifting focus from pain to positive stimuli but require provider training to implement consistently. In resource-limited settings, low-cost options like singing or toys are scalable, though cultural preferences must guide choices to avoid unintended stress (8).

The type of vaccine and its emergency use is definitely different from non-emergency planned vaccination. Emergency vaccines, such as those developed rapidly for outbreaks like COVID-19, often face higher hesitancy due to perceived novelty

and safety concerns, requiring more intensive misinformation correction and trust-building compared to routine planned vaccinations like measles or polio, which benefit from established schedules and long-term evidence of efficacy. Behavioral strategies must adapt, with stronger emphasis on provider recommendations for emergency contexts to counter complacency (9).

Broader systemic interventions amplify individual efforts. Reminders via SMS or calls yield a pooled odds ratio (OR) of 1.7 for uptake, with higher impacts in LMICs (OR 2.0), as evidenced in a 2024 review of SMS interventions improving coverage for childhood vaccines like influenza and measles. Incentives, such as food vouchers or cash, achieve OR 2.3, effectively motivating low-income families for vaccines like DTP3. On-site vaccination at schools or clinics (OR 2.9) removes access barriers, while provider recommendations (OR 3.4) harness authority. Multifaceted approaches, combining education, reminders, and community outreach, prove most robust, as seen in urban slums where health camps increased polio coverage (10). However, ethical concerns with incentives include potential coercion, and sustainability depends on funding. In high hesitancy cohorts, dialogue-based interventions raise rates by 43%, emphasizing community involvement. The role of immigration and the status of the host country are important and significant issues, as migrants and refugees often face lower pediatric vaccination rates due to language barriers, lack of information in native languages, fear of legal consequences, logistical mobility issues, and mistrust in host country health systems, leading to immunity gaps for diseases like measles and polio. Host countries must provide culturally sensitive services and dedicated centers to address these (11).

Algorithm of actions in successful countries in this field should be determined to guide global efforts. In high-coverage nations like Australia, Rwanda, Albania, and Bangladesh, a stepwise approach includes:

- 1) Implementing mandatory vaccinations for school entry (e.g., MMR and polio in Australia and Germany);
- 2) Providing financial incentives tied to vaccination proof (e.g., child tax credits in Australia);
- 3) Offering school-based delivery for vaccines like HPV;
- 4) Launching catch-up campaigns for missed doses (e.g., voluntary school programs in England);
- 5) Ensuring free access and reminders via SMS or health systems;
- 6) Monitoring via national immunization information systems.

These strategies maintained rates above 90% in Rwanda (95% for essential immunizations) and helped recover post-pandemic declines, as seen in lessons from Australia, England, Germany, Singapore, and the US (12).

Conclusion Integrating these strategies demands a holistic shift: training healthcare teams, leveraging tools like BeSD for monitoring, and partnering with communities. Policy implications include mandating provider education and incentivizing clinics for high uptake. Future research should evaluate digital tools, like apps for reminders, in diverse settings, while addressing demographic, cultural, and immigration-related barriers. Ultimately, moving beyond the jab to behavioral integration not only boosts pediatric vaccination success but builds resilient health systems, safeguarding generations against preventable diseases.

CONFLICT OF INTEREST

The author declares that he has no competing interests to disclose in relation to this paper.

REFERENCES

1. Liu S, Durantini MR, Calabrese C, Sanchez F, Albarracin D. A systematic review and meta-analysis of strategies to promote vaccination uptake. *Nature human behaviour*. 2024 Sep;8(9):1689-705.
2. Malik AA, Ahmed N, Shafiq M, Elharake JA, James E, Nyhan K, et al. Behavioral interventions for vaccination uptake: A systematic review and meta-analysis. *Health Policy*. 2023 Nov 1;137:104894.
3. O'Leary ST, Opel DJ, Cataldi JR, Hackell JM. Strategies for improving vaccine communication and uptake. *Pediatrics*. 2024 Mar 1;153(3):e2023065483.
4. Parsekar SS, Vadrevu L, Jain M, Menon S, Taneja G. Interventions addressing routine childhood immunization and its behavioral and social drivers. *Frontiers in Public Health*. 2024 Jun 19;12:1364798.
5. Molendijk I. Navigating Barriers to Adequate Vaccination Coverage: Impact of the COVID-19 pandemic and Post-Pandemic Strategies.
6. Davis K. Prenatal Counseling from Obstetricians as a Potential Point of Intervention to Increase Childhood Vaccination Rates in Pennsylvania.
7. Currie GE, McLeod C, Waddington C, Snelling TL. SMS-based interventions for improving child and adolescent vaccine coverage and timeliness: a systematic review. *BMC Public Health*. 2024 Jul 2;24(1):1753.
8. Abu-Helalah M, Al-Mnayyis AA, Alzoubi H, Al-Abdallah R, Jdaitawi H, Nafi O, et al. Epidemiology of *Streptococcus pneumoniae* Serotypes in Jordan amongst children younger than the age of 5: a national cross-sectional study. *Vaccines*. 2023 Aug 22;11(9):1396.
9. Nasiri A, Farshidi H, Rezaei F, Dehdari T, Kazemi A, Rezapour H, Goshtaei M.

Perceived barriers of migrants and refugees to vaccinate their children against Measles and polio: a study in Iran. *International Journal for Equity in Health*. 2023 Dec 6;22(1):253.

10. Shen SC, Dubey V. Addressing vaccine hesitancy: Clinical guidance for primary care physicians working with parents. *Canadian Family Physician*. 2019 Mar 1;65(3):175-81.

11. Yu J, Li W, Zhang J, Guo R, Zheng Y.

Understanding the effect of sociodemographic and psychological latent characteristics on flex-route transit acceptance. *Plos one*. 2023 Feb 6;18(2):e0279058.

12. Lamot M, Kirbiš A. Understanding vaccine hesitancy: a comparison of sociodemographic and socioeconomic predictors with health literacy dimensions. *Vaccines*. 2024 Oct 4;12(10):1141.