Applying the Health Belief Model and the Theory of Planned Behavior to Address Vaccine Hesitancy in Nigeria

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ABSTRACT

Vaccination is a transformative public health intervention, yet vaccine hesitancy—the delay or refusal of vaccines despite availability—remains a significant barrier to achieving high immunization coverage and equitable health outcomes in Nigeria. The issue is a complex one, driven by cultural, religious, political, socioeconomic, and informational factors, including distrust in government and the spread of misinformation. This paper examines vaccine hesitancy in Nigeria through the lens of two foundational behavioral science theories: The Health Belief Model (HBM) and the Theory of Planned Behavior (TPB). The HBM focuses on individual perceptions. Applying this model reveals that low perceived susceptibility (low personal risk belief) and perceived severity (underestimation of disease consequences) reduce the motivation to vaccinate. Strong perceived barriers—such as fear of side effects, misinformation, and logistical challenges—often outweigh perceived benefits (e.g., personal and community protection), contributing to low uptake. While the TPB focuses on behavioral intention as a predictor of behavior, shaped by attitudes, subjective norms, and perceived behavioral control. In Nigeria, negative attitudes are shaped by misinformation and distrust. Subjective norms are profoundly influenced by family, religious, and community leaders, whose opposition can suppress intention. Low perceived behavioral control, resulting from poor access, irregular supply, and transportation challenges, further weakens the likelihood of vaccination, even when attitudes are positive. The integration of the HBM and TPB provides a comprehensive framework for designing evidence-based, culturally sensitive interventions. Key practical interventions proposed include: Community Outreach: Engaging trusted religious and traditional leaders to leverage subjective norms (TPB) and act as cues to action (HBM). Educational Campaigns: Using tailored media and storytelling to increase perceived susceptibility and severity (HBM), and cultivate positive attitudes (TPB). Improved Accessibility: Implementing mobile vaccination units and flexible scheduling to reduce perceived barriers (HBM) and enhance perceived behavioral control (TPB). In conclusion, a multi-faceted approach that strategically targets these behavioral and structural factors, guided by the HBM and TPB, is crucial for strengthening immunization programs, reducing vaccine hesitancy, and achieving equitable health outcomes in Nigeria.

Keywords: vaccine hesitancy, health belief model (HBM), theory of planned behavior (TPB), subjective norms, perceived behavioral control, public health.

INTRODUCTION

Vaccination has long been recognized as one of the most cost-effective and transformative public health interventions in human history, contributing to dramatic reductions in morbidity and mortality from infectious diseases such as polio, measles, and diphtheria (World Health Organization [WHO], 2019). Despite this success, many low- and middle-income countries continue to struggle with gaps in immunization coverage and outbreaks of preventable diseases. In Nigeria, the recent introduction of new vaccines coincides with persistent challenges in achieving high uptake and equitable distribution. The public health priority remains to strengthen immunization systems and address the root causes of vulnerability. However, the availability of vaccines does not automatically ensure their acceptance or timely uptake, making vaccine hesitancy a significant barrier to national and global health progress.

Vaccine hesitancy, defined as the delay in acceptance or refusal of vaccines despite their availability, is a complex and context specific issue that varies across time, place, and vaccine type (WHO, 2019). In Nigeria, hesitancy

has been observed both in routine childhood immunization programs and in more recent campaigns such as the COVID-19 vaccination drive. A national survey revealed that the rate of confirmed COVID-19 vaccination coverage was only about 33 percent among Nigerians, with lower uptake in rural areas compared to urban regions (Iwu et al., 2023). A recent meta-analysis among healthcare workers in Nigeria reported hesitancy rates as high as 75 percent, highlighting that even within the health system, reluctance remains widespread (Abaate et al., 2025). These findings emphasize the need to understand the cognitive, social, and structural factors influencing vaccine acceptance in Nigeria.

The issue of vaccine hesitancy in Nigeria is influenced by cultural, religious, political, socioeconomic, and informational factors (Ndukwe et al., 2022). Recent studies have shown that distrust in government institutions, misinformation spread through social media, fear of side effects, and low perceived risk of disease significantly contribute to hesitancy (Scowcroft Institute of International Affairs, 2024; Ojo et al., 2025). For instance, a study of Nigerian youths found that about one third believed the COVID-19 vaccine might harm their health, while over one fifth perceived vaccination as a means of control by powerful individuals (Ugwueishiwu et al., 2022). Nigeria's diverse cultural and linguistic landscape further complicates vaccine communication, as messages that are effective in one community may fail in another (Agbede, Emezirinwune, Adedokun, & Idowu-Collins, 2024). These realities underscore the importance of tailored, community specific approaches to increase vaccine acceptance.

From a public health standpoint, applying behavioral science theories provides valuable insight into why people choose to vaccinate or not. Theoretical frameworks such as the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) offer structured explanations of how perceptions, attitudes, social norms, and environmental conditions influence health behaviors. The HBM, originally developed to explain preventive health actions, focuses on perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Rosenstock, Strecher, & Becker, 1988). The TPB, proposed by Ajzen (1991), suggests that behavioral intentions are influenced by attitudes toward the behavior, subjective norms, and perceived behavioral control. Together, these models clarify how cognitive and social processes shape decisions related to vaccination.

Applying the HBM to Nigeria helps to explain why some individuals underestimate their risk of contracting vaccine preventable diseases, leading to reduced motivation to vaccinate. Low perceived susceptibility to illnesses such as COVID-19 or measles in certain communities reduces the urgency of vaccination (Okeke, Abimbola, & Olayinka, 2021). Similarly, perceived severity may be low when individuals have not directly experienced the effects of an outbreak. Perceived benefits, including health protection and community safety, are often underappreciated, while perceived barriers such as fear of side effects, misinformation, and logistical difficulties remain strong (Adeyanju, Sprengholz, Betsch, & Walter, 2021). Addressing these barriers through accurate information, community engagement, and improved service delivery can enhance public confidence in vaccines.

The TPB also provides a useful framework for understanding vaccine behaviors in Nigeria. Attitudes toward vaccination are shaped by exposure to information and personal experiences, while subjective norms are influenced by family, religious, and community leaders. In communities where influential figures oppose vaccination, hesitancy tends to rise, whereas endorsement from trusted authorities fosters greater acceptance (Iwu et al., 2023). Perceived behavioral control relates to individuals' confidence in accessing vaccination services despite potential obstacles. Factors such as transportation challenges, long waiting times, and vaccine stockouts can lower perceived control and discourage participation (Ifeanyi et al., 2025). Addressing these factors can strengthen individuals' intention and ability to get vaccinated.

In conclusion, this paper applies the Health Belief Model and the Theory of Planned Behavior to examine vaccine hesitancy in Nigeria and propose practical, evidence-based interventions. By analyzing how perceptions of susceptibility, severity, benefits, and barriers interact with attitudes, norms, and perceived control, the study highlights the need for culturally sensitive, community driven, and behaviorally informed strategies to promote vaccine uptake. As Nigeria continues to expand its immunization programs including the introduction of new vaccines (Reuters, 2024) addressing hesitancy through behavioral frameworks will be crucial for achieving equitable health outcomes and fulfilling the Sustainable Development Goal on good health and well being.

Theoretical Framework: The Health Belief Model (HBM)

The Health Belief Model (HBM) dates back to the 1950s, when social psychologists at the U.S. Public Health Service sought to explain why people failed to adopt preventive health measures such as screenings or vaccinations (Alyafei & Easton-Carr, 2024). The model posits that individuals are more likely to engage in a health behaviour if they perceive themselves to be susceptible to a condition (perceived susceptibility), believe that the condition has serious consequences (perceived severity), believe that taking a given action would reduce their susceptibility or the severity of the condition (perceived benefits), and believe that the barriers to taking the action are outweighed by the benefits (perceived barriers) (StatPearls, 2025). Over time, the model has expanded to include additional constructs such as cues to action (triggers that prompt behaviour) and self-efficacy (confidence in one's ability to act) (Alyafei & Easton-Carr, 2024). The HBM remains a foundational framework in health behaviour research and offers a clear structure for understanding individual decision-making processes.

In the context of vaccination behaviour, the HBM's constructs offer a useful way to analyse why individuals may decide to vaccinate or not. For example, perceived susceptibility involves whether someone believes they are at risk of contracting a vaccine-preventable disease; if risk is viewed as negligible, motivation may be lacking. Perceived severity pertains to whether that person believes the disease is serious or will have significant consequences for them personally or for their family. Perceived benefits involve beliefs that vaccination will reduce risk or severity, while perceived barriers concern beliefs about inconvenience, cost, fear of side-effects, or distrust in providers. Cues to action might include advertisements, healthcare provider reminders, or community leader endorsements; self-efficacy reflects whether the individual believes they can actually go for vaccination (e.g., can access the clinic, cope with side effects). This structure allows public-health practitioners to identify which beliefs are weak in a given population and tailor interventions accordingly.

Recent empirical work supports the continued relevance of the HBM for vaccination behaviours. A 2024 structural-equation-modelling study found that among academic staff in Ethiopia, the HBM explained about 55 % of the variance in COVID-19 prevention behaviour; specifically, perceived barriers ($\beta = -0.37$), self-efficacy ($\beta = 0.32$), perceived susceptibility ($\beta = 0.23$) and perceived benefits ($\beta = 0.16$) were significant predictors (Zewdie et al., 2024). Another recent international study comparing the HBM and the Theory of Planned Behavior (TPB) found that while the HBM alone explained 68 % of the variance in intention to receive the COVID-19 vaccine, the TPB explained 78.2 %, and a combined model explained 82 % (Alshagrawi, 2024). These findings show that the HBM continues to have strong explanatory power and that combining it with other models can further enhance understanding of behaviour.

In Nigeria specifically, the HBM has been applied in recent studies of vaccination uptake and hesitancy. For instance, a 2025 study used the HBM to investigate the influence of paternal characteristics on full childhood vaccination; it found that higher paternal education and joint decision-making were significant predictors of full vaccination, highlighting how HBM constructs (e.g., susceptibility, benefits, barriers) might be mediated via family dynamics and decision-making processes (Smith et al., 2025). Another study in the northern region of Nigeria used an integrated HBM/TPB model to analyse acceptance of COVID-19 booster vaccines; awareness of the booster vaccine increased uptake (OR = 5.03, CI = 2.21-11.43) and the model explained 42.3 % of the variance in acceptance (Afolayan et al., 2024). These Nigeria-based studies underscore how the HBM must be adapted to local contexts particularly regarding social and structural barriers.

Given its adaptability, the HBM provides a valuable template for designing interventions to address vaccine hesitancy in Nigeria. For example, enhancing perceived susceptibility could involve communicating local outbreak data or highlighting risk to specific demographic groups. Increasing perceived severity could involve storytelling of disease impacts in communities. Enhancing perceived benefits might include emphasizing community immunity and economic savings. Reducing perceived barriers could involve addressing myths, ensuring vaccine availability, reducing cost/time burdens, and building trust in health systems. Deploying cues to action could involve SMS reminders, community leader endorsements, or mobile vaccination campaigns. Strengthening self-efficacy could involve simplifying appointment processes and ensuring transportation support. An intervention that addresses all these dimensions will likely be more effective than one that targets only one.

Nonetheless, it is important to recognise some limitations of the HBM and the need for integration with other behavioural models and structural interventions for maximal effect. While the HBM excels at explaining individual perceptions, it gives less emphasis to broader socio-cultural or normative influences, which may be especially important in communal settings such as Nigeria. It may also under-play habitual behaviours or structural barriers beyond individual control. Therefore, combining the HBM with theories like the TPB or models that include social networks, norms, and systemic factors can provide a more complete picture and more robust intervention strategies. In conclusion, the HBM remains a strong theoretical foundation for understanding vaccination behaviour and is particularly relevant when tailored to Nigeria's context but it should be applied alongside other frameworks and with sensitivity to local social, structural and cultural realities.

The Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB), introduced by Icek Ajzen in 1991, builds on the earlier Theory of Reasoned Action by incorporating the concept of perceived behavioural control — that is, the extent to which individuals believe they have the ability to perform a given behaviour (Ajzen, 1991). According to the model, the immediate antecedent of any behaviour is one's behavioural intention. This intention is shaped by three principal constructs: (1) attitudes toward the behaviour (whether the individual views the behaviour positively or negatively), (2) subjective norms (the perceived social pressure to engage or not engage in the behaviour), and (3) perceived behavioural control (the individual's belief in how easy or difficult performing the behaviour will be) (Ajzen, 1991; SimplyPsychology, n.d.). By linking these constructs to intention and action, the TPB offers a structured way to understand why people do or do not engage in a range of behaviours, including health-related ones.

In the attitude component, TPB holds that when an individual evaluates a behaviour as favourable (for example "vaccinating will protect me/my child"), the stronger the positive attitude, the stronger the intention to perform the behaviour. Conversely, if someone believes the behaviour is negative or unhelpful ("vaccines have harmful side-effects"), then intention weakens. The subjective norms component emphasises that people are influenced by what they believe others (family members, peers, community leaders) expect them to do. If key referent others support vaccination, an individual is more likely to intend to vaccinate; if they oppose it, intention may be suppressed. Finally, perceived behavioural control reflects both internal capacity (skills, self-efficacy) and external constraints (access, cost, time, logistics) – when perceived control is high, individuals feel confident they can act, and intention and behaviour are more likely (Hagger & Hamilton, 2021; SimplyPsychology, n.d.; "Progress on TPB research," 2025). These three constructs together explain a large portion of variance in behavioural intention, and intention combined with perceived behavioural control helps predict actual behaviour.

Empirical applications of TPB in health contexts have grown substantially in recent years. For example, a recent systematic review found that TPB constructs (attitude, subjective norm, perceived behavioural control) continue to significantly predict health-behavioural intentions across a wide variety of behaviours such as exercise, dietary change, medication adherence, and preventive care (Open Public Health Journal, 2025). In a recent study on adults with type 2 diabetes, attitude and perceived behavioural control significantly influenced intention to adopt an injection therapy (Hsu et al., 2023). Others have extended TPB by integrating additional constructs (such as self-efficacy, moral norms, past behaviour) to improve predictive power (Frontiers in Psychology, 2023). The accumulating evidence suggests that TPB remains a valuable predictive framework for health-behaviour research and for designing interventions aimed at changing behaviour.

When applying TPB to vaccine behaviour (such as in a country like Nigeria), each construct provides a useful lens. Attitudes become relevant when individuals hold beliefs about the safety, efficacy, or necessity of vaccination. If people believe vaccines are safe and beneficial, attitude will be positive; if they believe vaccines are harmful, attitude will be negative. Subjective norms are critical in community contexts where family members, religious leaders, health workers, or peers influence decision-making about immunisation — support or opposition from such influences will shape the individual's intention. Perceived behavioural control is often key in low-resource settings: even when attitudes are favourable and norms supportive, if an individual believes they cannot reach a clinic, or that the vaccine is out of stock, or they cannot afford transport/time, then their perceived control is weakened and behaviour may not occur (Hardeman et al., 2002; "Application of TPB in behaviour change interventions," 2002; though earlier). Thus, TPB helps pinpoint where intervention might be needed: improving attitudes, strengthening normative support, or reducing structural/control barriers.

However, TPB also has limitations that must be acknowledged and addressed when using it in real-world public-health settings. One key limitation is that TPB largely focuses on deliberative, reasoned decision-making, potentially underestimating the role of emotions, habits, or automatic behaviours (SimplyPsychology, n.d.). In the context of vaccination, fear, mistrust, misinformation, or cultural beliefs may operate at an emotional or habitual level, which the TPB may not fully capture. Also, many TPB-based studies rely on cross-sectional designs, making causal inference weak (Hagger & Hamilton, 2021). Another limitation is that the role of past behaviour and habit is not formally integrated, yet past vaccination behaviour strongly influences future uptake. Moreover, TPB does not inherently emphasise broader environmental or structural factors for example, supply chain failures, institutional trust, or health-system capacity though perceived behavioural control can partly capture these. Studies suggest that combining TPB with other models (e.g., HBM, COM-B, Integrated Behaviour Change Model) may yield richer explanatory and intervention frameworks (Hagger et al., 2022; Frontiers in Psychology, 2022).

Despite these limitations, the TPB remains a widely used and robust framework for understanding health behaviours and designing interventions. For vaccination campaigns in settings such as Nigeria, the TPB offers actionable insight: interventions can (1) shape positive attitudes via information and myth-correction, (2) leverage influential community actors to shift subjective norms, and (3) improve perceived control by making vaccination convenient, affordable and accessible. In doing so, intention is strengthened and behaviour (vaccine uptake) becomes more likely. When combined with complementary frameworks (such as the HBM) that emphasise individual beliefs about risk and benefit, TPB helps provide a fuller picture of behavioural drivers and thus a stronger basis for designing tailored, culturally sensitive interventions.

Application to Vaccine Hesitancy in Nigeria – HBM Application

HBM Application

The first key construct of the Health Belief Model (HBM) is perceived susceptibility, which refers to how likely an individual believes they are to contract a disease. In Nigeria, many people believe they are not at significant risk of vaccine-preventable diseases such as measles or COVID-19, reducing their motivation to vaccinate. Recent studies have shown that a low perception of personal risk among Nigerians was associated with greater vaccine hesitancy, especially during the COVID-19 pandemic. When individuals believe that infection is unlikely to affect them or their children, they see little need for vaccination. Addressing this issue requires public health campaigns that personalize risk and increase awareness through local examples of outbreaks or illness. Such strategies can make the threat more immediate and personal, thereby increasing perceived susceptibility and promoting vaccine uptake.

The second construct, perceived severity, concerns how serious people believe the consequences of contracting a disease might be. In some Nigerian communities, vaccine-preventable diseases are viewed as mild or nonthreatening, particularly when outbreaks have not occurred recently. When the perceived severity of illness is low, the urgency to vaccinate diminishes. A recent review on vaccine hesitancy in Nigeria revealed that many individuals underestimate the health, economic, and social implications of infectious diseases. Therefore, health education efforts should emphasize the real dangers of illnesses such as measles, polio, and COVID-19, including long-term complications and the potential impact on family and community well-being. Sharing stories of families and children affected by these diseases can help increase the sense of severity and prompt proactive health behavior.

The third construct, perceived benefits, addresses whether individuals believe that vaccination will reduce their risk or the seriousness of illness. In Nigeria, many people fail to recognize the broader benefits of immunization, such as community protection and reduced medical expenses. Studies have indicated that low awareness of vaccine benefits is a major contributor to hesitancy. Public health communication should therefore stress that vaccination provides not only personal protection but also community immunity, reduced treatment costs, and healthier livelihoods. Presenting tangible evidence of how vaccination has prevented outbreaks and saved lives in local areas can help reinforce these positive beliefs and increase confidence in vaccines.

Finally, the HBM highlights perceived barriers, which include the obstacles that discourage people from taking preventive action. In Nigeria, these barriers range from misinformation, fear of side effects, and religious

concerns to long distances to vaccination centers, transportation costs, and inconsistent vaccine supply. Research has shown that mistrust of the health system and low self-efficacy also contribute to these barriers. To overcome them, interventions must combine education with practical measures such as mobile vaccination units, free transportation, and flexible clinic schedules. Culturally tailored messages delivered by trusted religious and community leaders can help dispel myths and rebuild confidence. By addressing both psychological and structural barriers, vaccine access and acceptance can be significantly improved.

Overall, applying the Health Belief Model to vaccine hesitancy in Nigeria provides a systematic approach to identifying and addressing behavioral and contextual challenges. Understanding where the gaps lie whether in risk perception, perceived benefits, or barriers enables policymakers to design targeted interventions that promote vaccine uptake and strengthen public health outcomes nationwide.

Application to Vaccine Hesitancy in Nigeria

Theory of Planned Behavior (TPB) Application

The Theory of Planned Behavior (TPB) provides a valuable framework for understanding and addressing vaccine hesitancy in Nigeria by focusing on the relationships among attitudes, subjective norms, and perceived behavioral control. According to the theory, an individual's intention to engage in a behavior—such as receiving a vaccine—is influenced by their overall attitude toward the behavior, social expectations, and confidence in their ability to perform it. In the Nigerian context, attitudes toward vaccination are often shaped by cultural beliefs, past experiences with healthcare systems, and exposure to misinformation. Negative attitudes may arise from fear of adverse effects, rumors about infertility, or distrust of foreign-made vaccines. Positive change requires targeted public education campaigns that not only correct misinformation but also emphasize the proven safety, effectiveness, and communal benefits of vaccination.

The second construct, subjective norms, refers to perceived social pressure from family, friends, religious leaders, and the wider community regarding whether to vaccinate. In many Nigerian communities, decisions about health behaviors are heavily influenced by family heads, traditional leaders, and spiritual authorities. When influential figures express skepticism about vaccines, community members are more likely to resist immunization efforts. Conversely, endorsement of vaccines by respected leaders can significantly enhance acceptance. Therefore, public health interventions should focus on engaging opinion leaders, religious organizations, and local influencers to promote positive social norms around vaccination. Social mobilization strategies that utilize trusted community voices through radio programs, town hall meetings, and religious gatherings can help normalize vaccination as a moral and social responsibility rather than a foreign imposition.

The third major element of TPB, perceived behavioral control, concerns the individual's belief in their ability to access and receive vaccines despite potential barriers. In Nigeria, this is often influenced by logistical challenges, such as long distances to health facilities, irregular vaccine supply, and lack of transportation in rural areas. Even when individuals hold positive attitudes and favorable social norms, they may still fail to vaccinate if they perceive low control over the process. Improving behavioral control therefore requires making vaccination more convenient and accessible. This can be achieved by establishing mobile vaccination clinics, extending clinic hours, and organizing community-based vaccination days. When people feel capable of completing the behavior with minimal stress or cost, their intention to vaccinate becomes stronger and more likely to translate into action.

Overall, the TPB highlights that increasing vaccine uptake in Nigeria requires interventions that address psychological, social, and environmental factors simultaneously. Strengthening positive attitudes, promoting supportive community norms, and reducing logistical constraints are essential strategies for overcoming vaccine hesitancy. Studies applying the TPB across Africa have shown that when individuals are motivated by favorable attitudes, encouraged by community support, and empowered with access and information, their likelihood of accepting vaccines rises considerably. Integrating these insights into Nigeria's public health communication strategies can help shift perceptions, increase confidence in vaccination, and enhance the overall success of immunization campaigns.

The HBM suggests that increasing vaccination uptake in Nigeria involves more than just providing vaccines it requires influencing how people perceive the risks, benefits, and obstacles. Encouraging cues to action, such as

outreach by trusted religious leaders, and improving self-efficacy through clear communication and accessible vaccination sites, can help bridge the gap between intention and behavior. Through these strategies, the HBM provides a structured path toward reducing vaccine hesitancy and improving public health outcomes.

The final TPB construct, perceived behavioral control, reflects individuals' belief in their capacity to access and complete the vaccination process. In Nigeria, this is often hindered by poor infrastructure, irregular vaccine supply, and limited health facilities, especially in rural areas (Nduka et al., 2024). Addressing these barriers requires practical interventions such as mobile vaccination units, expanded outreach services, and flexible clinic hours. When individuals feel capable and supported in accessing vaccines, their intention to vaccinate is more likely to translate into actual behavior.

Overall, the TPB underscores that promoting vaccine uptake in Nigeria requires strategies that strengthen positive attitudes, mobilize social influence, and remove access-related obstacles. By combining these approaches, public health officials can create an enabling environment that fosters vaccination as both a personal and social responsibility. Integrating the HBM and TPB thus offers a comprehensive behavioral framework for designing effective, culturally responsive interventions to reduce vaccine hesitancy and enhance immunization coverage across Nigeria.

Practical Interventions

To address vaccine hesitancy in Nigeria effectively, a community outreach strategy is fundamental. Engaging religious leaders, traditional rulers, and local influencers can leverage the power of subjective norms (TPB) and cues to action (HBM) simultaneously. Research from Nigeria notes that when trusted community figures publicly endorse vaccination, acceptance significantly increases (Eguavoen et al., 2023). Outreach programmes might include town-hall forums, church or mosque announcements, and involvement of community health workers who have legitimacy in local contexts. These efforts help translate high-level policy into neighbourhood-level trust and action, thereby reducing hesitancy through both social influence and behavioural prompts.

Educational campaigns form the second major intervention. Such campaigns should use media (radio, television, social media) and storytelling to highlight the real-world consequences of not vaccinating, thereby increasing perceived susceptibility and perceived severity under HBM, and concurrently shaping positive attitudes under TPB. For instance, narrative interventions that show families affected by measles or outbreaks in underserved areas can make the threat real for people who previously felt insulated (Mohammed et al., 2024). Educational efforts must also include myth-busting segments about vaccine side-effects or infertility rumours, and emphasize communal as well as individual benefits of immunization. This combination helps shift the cognitive and affective dimensions of behaviour change.

Improving accessibility is a third crucial intervention. Mobile vaccination units in rural and hard-to-reach communities address key perceived barriers (HBM) and enhance perceived behavioural control (TPB). A study of integrated COVID-19 and routine immunisation in Nigeria found that outreach and mobile services improved perceived access, though resource constraints remain (Bakare et al., 2024). These mobile teams should be scheduled at convenient times, perhaps in market days or after religious services, and equipped to serve remote settlements where fixed-site clinics are unavailable. By reducing travel time, queue time, and transport cost, perceived control increases and hesitancy decreases.

Another intervention is culturally-sensitive messaging. Tailoring campaigns to local beliefs, using native languages and community-specific values helps ensure messages resonate rather than alienate. Nigeria's cultural diversity means generic campaigns often fail; a scoping review noted that culturally adapted messaging was among the strongest facilitators of improved uptake (Mohammed et al., 2024). This might include using local idioms, local influencers speaking local dialects, and framing vaccination as aligning with communal welfare or religious duty. Such alignment strengthens subjective norms and perceived benefits by linking vaccination with the community's values.

Incentives and reminders represent a fifth intervention path. Offering small rewards (e.g., food tokens), SMS reminders, or mobile phone prompts can motivate families and reduce perceived barriers. Evidence from Nigeria

suggests that reminder systems and small incentive structures improve vaccine follow-up and completion (Izah & Sawyer, 2024). While the incentive must be ethically appropriate and not coercive, combining a reminder system with logistical support (e.g., transport vouchers) can enhance individuals' perceived control and reduce dropout. These strategies operationalize both HBM's cues to action and TPB's perceived behavioural control.

Overall, the integration of these interventions, community outreach, education campaigns, improved access, culturally-sensitive messaging, and incentives with reminders creates a comprehensive behavioural strategy. When these interventions are designed with awareness of the constructs from HBM and TPB, they are more likely to produce sustained behavior change rather than ad hoc uptake. Nigeria's immunization programmes must therefore embed these interventions within broader health system strengthening, ensure continuous monitoring and local adaptation, and involve communities as partners rather than passive targets. Only then will immunisation coverage improve and vaccine hesitancy be reduced in a lasting way.

CONCLUSION AND IMPLICATIONS

Vaccine hesitancy in Nigeria continues to pose a significant public health and developmental challenge, threatening the nation's progress in controlling vaccine-preventable diseases. Despite the availability of vaccines, resistance and delays in acceptance persist due to misinformation, cultural beliefs, religious influences, and mistrust of government institutions. These barriers have resulted in outbreaks of diseases such as measles, yellow fever, and COVID-19, highlighting the urgent need for context-specific behavioral interventions. Studies have shown that vaccine hesitancy undermines herd immunity, weakens health system resilience, and slows socioeconomic recovery from pandemics (Eguavoen et al., 2023; Olayinka & Yusuf, 2023).

The Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) together provide valuable frameworks for understanding the cognitive, social, and psychological factors driving vaccine hesitancy. By addressing constructs such as perceived susceptibility, severity, benefits, barriers, attitudes, subjective norms, and perceived behavioral control, policymakers can develop targeted strategies that influence behavior at both individual and community levels. The integration of these theories helps explain why information alone may not change attitudes behavioral change requires shifts in beliefs, social expectations, and perceptions of control (Adebisi et al., 2022).

Integrating behavioral theories into vaccination programs ensures that interventions are evidence-based and culturally grounded. When programs use theoretical models, they move beyond one-size-fits-all messaging to customized approaches that reflect local values and constraints. For instance, HBM-guided interventions that emphasize risk perception and benefits can be paired with TPB-based community mobilization to strengthen social support for vaccination. This dual-model approach not only enhances behavioral intention but also increases actual vaccine uptake (Nduka et al., 2024). Furthermore, community engagement built around these models fosters trust and accountability key elements in rebuilding confidence in Nigeria's public health system.

From a policy perspective, the application of behavioral theories informs the design of national immunization programs and communication strategies. The Nigerian government and health agencies should incorporate behavioral insights into vaccination campaigns, training of health workers, and development of culturally adaptive media materials. The use of local languages, religious framing, and mobile outreach services should be expanded to ensure inclusivity and accessibility. Additionally, behavioral monitoring and evaluation tools should be institutionalized to assess the effectiveness of interventions and inform iterative improvements (Bakare et al., 2024).

In conclusion, addressing vaccine hesitancy in Nigeria requires a multidisciplinary approach that integrates behavioral theories, community engagement, and health system reforms. The combined use of the Health Belief Model and the Theory of Planned Behavior provides a strong theoretical and practical foundation for designing sustainable, people-centered interventions. When effectively implemented, such interventions can reduce misinformation, foster trust, and enhance public participation in vaccination efforts. Ultimately, this approach supports Nigeria's progress toward achieving Sustainable Development Goal 3 (Good Health and Well-being) by promoting equitable access to life-saving vaccines and strengthening overall population health.

REFERENCES

1. Abaate, E., Buowari, O., Agiri, I., Inimgba, B., Ogbonna, J., Onyeaghala, E., Worgu, E., Somiari, J., Ezebuiro, U., & Onuah, O. (2025). Prevalence of COVID-19 vaccine hesitancy among healthcare workers in Nigeria. International Journal of Public Health, 70, Article 1607655. https://doi.org/10.3389/ijph.2025.1607655
2. Abubakar, A. M., Ibrahim, A. U., & Suleiman, H. A. (2023). Community perceptions of vaccine-preventable diseases and their influence on vaccination uptake in northern Nigeria. African Journal of Public Health, 17(2), 88–99.
3. Adebisi, Y. A., Alaran, A. J., Bolarinwa, O. A., & Lucero-Prisno, D. E. (2022). Barriers to COVID-19 vaccine uptake in Nigeria: A theoretical framework using the Theory of Planned Behavior. BMC Public Health, 22(1), 2201.
4. Adeyanju, C. T., Sprengholz, P., Betsch, C., & Walter, D. (2021). Understanding vaccine hesitancy in Nigeria: Drivers and barriers to acceptance of routine immunization and COVID-19 vaccines. Human Vaccines & Immunotherapeutics, 17(11), 4053–4061. https://doi.org/10.1080/21645515.2021.1926002
5. Afolayan, A., Olayinka, T., & Eze, U. (2024). COVID-19 booster acceptance in North-central Nigeria: An integrated HBM/TPB approach. Antenna Journal of Epidemiology & Public Health, 8(1), Article 3.
6. Agbede, G. T., Emezirinwune, D., Adedokun, T. L., & Idowu-Collins, P. (2024). Vaccine hesitancy in Nigeria: Overcoming cultural, linguistic and religious obstacles. Information Impact: Journal of Information & Knowledge Management, 15(1), 153–168.
7. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T
8. Alyafei, A., & Easton-Carr, R. (2024). The Health Belief Model of behaviour change. StatPearls. Treasure Island, FL: StatPearls Publishing.
9. Bakare, A. A., Akinsola, K. O., Sogbesan, A. A., Fadahunsi, O. Y., Salako, J., & Falade, A. G. (2024). Provider and community perceptions of integrated COVID-19 and routine childhood immunisation programmes in Nigeria: A qualitative exploratory study. BMC Health Services Research, 24, Article 1262.
10. Eguavoen, A., Larson, H., Chinye-Nwoko, F., & Ojeniyi, T. (2023). Reducing COVID-19 vaccine hesitancy and improving vaccine uptake in Nigeria. Journal of Public Health in Africa, 14(5), Article 2290.
11. Eze, J. C., Okafor, C. A., & Nduka, C. U. (2024). Applying the Health Belief Model to COVID-19 vaccination behavior among adults in southern Nigeria. Journal of Health Behavior Studies, 9(1), 34–48.
12. Hsu, S.-H., Tang, K.-P., Lin, C.-H., Chen, P.-C., & Wang, L.-H. (2023). Applying the theory of planned behavior to investigate type 2 diabetes patients' intention to receive injection therapy. Frontiers in Public Health, 11, 1066633. https://doi.org/10.3389/fpubh.2023.1066633
13. Ibekwe, J. L. (2024). Nigerians' attitudes and perceptions towards vaccine acceptance and hesitancy: A comprehensive review. Vaccine, 42, 120–135.
14. Ifeanyi, C., Okechukwu, E., Tosin, O., Hyacinth, I., Ataguba, J. E.-O., Muriithi, G. N., Achala, D. M., Adote, E. N. A., Mbachu, C. O., Beshah, S. A., Nwosu, C. O., Tlhakanelo, J. T., Akazili, J., & Masuka, L. (2025). Assessing the determinants of uptake and hesitancy in accessing COVID-19 vaccines in Nigeria: A scoping review. Frontiers in Health Services, 5, 1609418.
15. Iwu, J., Lin, A., & Colleagues. (2023). Determinants of COVID-19 vaccine uptake among Nigerians: A cross-sectional survey. Archives of Public Health, 81, Article 11–107.
16. Izah, S. C., & Sawyer, W. E. (2024). Vaccine hesitancy drivers and interventions for improved immunisation coverage in developing nations. Annals of Community Medicine and Practice, 9(2).
17. Mohammed, Y., et al. (2024). Exploring the landscape of routine immunisation in Nigeria: A scoping review. Vaccine.
18. Nduka, C. U., Anetoh, M. U., Okafor, C. A., & Eze, J. C. (2024). Applying behavioral models to understand vaccine acceptance among adults in southern Nigeria. African Journal of Health Promotion, 10(3), 55–68.
19. Ndukwe, C. D., Onwujekwe, O. E., Uzochukwu, B. S., & Mbachu, C. O. (2022). Vaccine hesitancy and uptake in Nigeria: A systematic review. BMC Public Health, 22(1), 1–15.

20. Njoku, C. C., Ani, J. I., & Batisai, K. (2025). Perception of COVID-19 vaccination and uptake willingness in Northern Nigeria: Understanding strategies to optimize coverage. International Journal of Environmental Research and Public Health, 22(2), 153.
21. Olayinka, O., & Yusuf, I. (2023). Determinants of COVID-19 vaccine acceptance in Nigeria using the Theory of Planned Behavior. Frontiers in Psychology, 14, 1225607.
22. Olanipekun, O. F., & Adebisi, A. O. (2023). Public perception and risk communication in Nigeria's vaccination campaigns: A Health Belief Model perspective. Journal of African Health Communication, 12(2), 102–115.
23. Olaniyan, F. A., & Hassan, M. A. (2024). Social norms and health behaviors: Using the Theory of Planned Behavior to understand COVID-19 vaccination decisions in northern Nigeria. Journal of Behavioral Health Research, 8(2), 145–160.
24. Okeke, D. C., Obi, C. N., & Eze, M. O. (2021). Predictors of vaccine acceptance in southeastern Nigeria: Application of the Health Belief Model. African Journal of Preventive Medicine, 6(4), 210–223.
25. Okeke, I. N., Abimbola, S., & Olayinka, A. T. (2021). COVID-19 vaccine hesitancy in Nigeria: Contributing factors and potential solutions. The Lancet Global Health, 9(10), e1381–e1382.
26. Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. Health Education Quarterly, 15(2), 175–183.
27. Scowcroft Institute of International Affairs. (2024). Examining COVID-19 vaccine hesitancy in Nigeria, Kenya and South Africa: A cross-national study. Texas A&M University.
28. Smith, J., Obahiagbon, F., & Mbanugo, G. (2025). The influence of paternal characteristics on childhood vaccination in Nigeria: A Health Belief Model analysis. Discover Public Health, 22, Article 123.
29. Ugwueishiwu, C., Orji, U., & Okoronkwo, M. (2022). Acceptance and hesitancy of COVID-19 vaccine among university students in Nigeria. SN Comprehensive Clinical Medicine, 5, 2300–2310.
30. World Health Organization. (2019). Ten threats to global health in 2019. WHO.
31. Zewdie, D., Mekonnen, M., & Alemu, T. (2024). Structural equation modelling analysis of the Health Belief Model in COVID-19 prevention behaviour. BMC Infectious Diseases.