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Research Article

Theoretical Perspectives on Health Misinformation and Vaccine Behaviour: A Review of the Health Belief Model, the Theory of Planned Behaviour, and the Social Amplification of Risk Framework

Rafiatu Anike Raji, PhD & Gideon Uchechukwu Nwafor, PhD

About Article

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About the Authors

Rafiatu Anike Raji, PhD
Department of Mass Communication
Chukwuemeka Odumegwu Ojukwu University
Email: rafianike@gmail.com

&

Gideon Uchechukwu Nwafor, PhD
Department of Mass Communication
Chukwuemeka Odumegwu Ojukwu University
Email: gu.nwafor@coou.edu.ng

ABSTRACT

The rapid circulation of health misinformation on social media platforms such as Facebook has become a central concern for vaccine communication research globally and in Nigeria specifically, where the 2023 introduction of the Human Papillomavirus (HPV) vaccine into the national immunisation schedule has been accompanied by persistent misinformation about infertility, promiscuity, and vaccine safety. While empirical studies increasingly document the prevalence and correlates of such misinformation, comparatively few studies in the Nigerian context undertake a systematic, comparative theoretical synthesis of the frameworks used to explain how misinformation translates into reduced vaccine uptake. This paper addresses that gap through a library-based (desk) review synthesising secondary literature, peer-reviewed empirical studies, foundational theoretical texts, and institutional reports on three theories commonly applied to vaccine-related health behaviour: the Health Belief Model (HBM), the Theory of Planned Behaviour (TPB), and the Social Amplification of Risk Framework (SARF). Using thematic documentary analysis rather than primary data collection, the review traces the origins, core constructs, empirical applications, and critiques of each framework, with particular attention to HPV vaccine misinformation in Nigerian and comparable low- and middle-income settings. The review finds that HBM best explains the cognitive endpoint at which misinformation-inflated barriers and diminished perceived benefits reduce vaccination likelihood, TPB best explains the intervening social-psychological mechanism by which peer-shared misinformation reshapes attitudes and subjective norms, and SARF best explains the upstream communicative process by which a single false claim is magnified through algorithmic and social amplification into population-level hesitancy. A comparative analytical matrix and an integrated conceptual pathway are presented, along with a discussion of persistent gaps in the literature. The review concludes that the three frameworks are complementary rather than competing and recommends deliberate theoretical triangulation in future research on social-media-mediated vaccine hesitancy.

INTRODUCTION

Human papillomavirus (HPV) is a principal cause of cervical cancer, a largely preventable disease that nonetheless remains a significant cause of morbidity and mortality among women in low- and middle-income countries, including Nigeria (World Health Organisation [WHO], 2024). The HPV vaccine, introduced into Nigeria's national immunisation schedule in October 2023, represents one of the most significant immunisation initiatives in Africa (Gavi, 2023). Yet the translation of vaccine availability into sustained population coverage depends critically on the information environment in which vaccination decisions are made, an environment increasingly dominated by social media platforms such as Facebook, which combine wide reach with a documented propensity to amplify misinformation (DataReportal, 2024; Vosoughi et al., 2018).

Scholarship addressing HPV vaccine hesitancy has proliferated in recent years, but relatively few studies undertake a deliberate, comparative synthesis of the theoretical frameworks routinely invoked to explain how misinformation translates into reduced vaccine uptake. Three frameworks recur with particular frequency: the Health Belief Model (HBM), which explains vaccination behaviour as a function of individual risk and benefit perception (Rosenstock, 1966; Janz & Becker, 1984); the Theory of Planned Behaviour (TPB), which explains behaviour as the product of attitude, subjective norm, and perceived behavioural control (Ajzen, 1991); and the Social Amplification of Risk Framework (SARF), which explains how risk perception is socially constructed and magnified through communication channels (Kasperson et al., 1988). Each offers a distinct explanatory lens, respectively individual-cognitive, social-psychological, and societal-communicative, for understanding why HPV vaccine misinformation on Facebook translates into hesitancy and reduced uptake.

This paper undertakes a purely library-based review to synthesise these three frameworks systematically, drawing on existing secondary literature rather than collecting new primary data, with the specific aim of clarifying how the three theories complement one another in explaining the misinformation-to-hesitancy pathway relevant to HPV vaccination among digitally active young adults in Nigeria and comparable settings.

Objectives of the Review

This library-based review sought to: (1) trace the theoretical origins and core constructs of the HBM, TPB, and SARF; (2) synthesise documented empirical applications of each framework to vaccine behaviour generally and HPV vaccine misinformation specifically; (3) critically compare the three frameworks' strengths, limitations, and contextual applicability to a Facebook-mediated misinformation environment; and (4) propose an integrated conceptual pathway that draws on the complementary strengths of all three frameworks to explain how HPV vaccine misinformation on social media translates into reduced vaccine uptake.

Justification for a Library-Based Approach

A library (desk) research design was deliberately chosen over a primary empirical design because the review's objective was theoretical synthesis rather than the generation of new field data. Library research is the appropriate methodology when the central research problem concerns how

existing theoretical knowledge is structured, where competing or complementary frameworks converge or diverge, and what synthesis reveals about gaps in a field's explanatory apparatus, questions answered through systematic engagement with published sources rather than through surveying or interviewing new respondents. This approach is particularly valuable given the proliferation of single-theory, single-context empirical studies on HPV vaccine hesitancy that, in isolation, offer limited guidance for a comprehensive account of how misinformation operates across the cognitive, social, and communicative levels simultaneously.

Methodology: Library (Desk) Research Design

Research Design

This review adopted a library-based (desk) research design, relying exclusively on existing, previously published secondary sources rather than the collection of new primary data. The approach proceeds through documentary analysis: the systematic reading, classification, comparison, and thematic synthesis of published material bearing on the HBM, TPB, SARF, and their application to vaccine hesitancy and health misinformation.

Sources of Literature

Literature for this review was drawn from a wide range of credible academic and non-academic sources. Peer-reviewed journal articles provided the primary evidentiary base, particularly those reporting empirical applications of the HBM, TPB, and SARF to vaccine behaviour and health misinformation in Nigerian, African, and international settings. Foundational theoretical texts, including Rosenstock's (1966) original statement of the Health Belief Model, Ajzen's (1991) formulation of the Theory of Planned Behaviour, and Kasperson et al.'s (1988) conceptual framework for the Social Amplification of Risk, anchored the theoretical discussion. Reports and publications from international health organisations, including the World Health Organisation, supplemented the academic literature with contextual and epidemiological grounding.

Selection and Analytical Procedure

Sources were selected on the basis of thematic relevance to one or more of the three focal frameworks, vaccine hesitancy or health misinformation, and, where available, Nigerian or African application. Priority was given to peer-reviewed empirical studies, systematic reviews, and foundational theoretical texts over grey literature. Once assembled, sources were read and coded thematically according to: (a) the theory or theories invoked; (b) the health behaviour domain addressed; (c) the geographic and population context; (d) reported empirical findings; and (e) documented critiques or limitations. This thematic coding enabled the cross-source comparative synthesis presented in Sections 4 and 5, and the construction of the comparative matrix (Table 1) and integrated conceptual pathway (Figure 1) presented later in this paper. As a purely documentary method, no human respondents were involved, and no claims of statistical generalisability are made; the review's contribution lies in the systematic organisation and synthesis of existing theoretical and empirical knowledge.

Conceptual Review

HPV, Cervical Cancer, and the Vaccine

Human papillomavirus is a ubiquitous group

of DNA viruses, with high-risk types 16 and 18 accounting for roughly 70% of cervical cancer cases worldwide (WHO, 2024). Cervical cancer remains one of the most common cancers among women globally, with the heaviest burden concentrated in low- and middle-income countries, where screening and treatment services are limited (WHO, 2024; Talabi et al., 2023). Prophylactic HPV vaccination is the most powerful primary prevention tool available, and Nigeria's October 2023 introduction of a single-dose HPV vaccine into its national immunisation programme represents a landmark public-health initiative in Africa (Gavi, 2023). However, the pathway from vaccine availability to sustained high coverage depends critically on demand-side factors, awareness, acceptability, and the information environment in which caregivers and young adults form vaccination decisions.

This dependence on the information environment is precisely why theoretical frameworks capable of explaining communication-mediated behaviour, rather than frameworks addressing biomedical efficacy alone, are indispensable to understanding HPV vaccine uptake in the current moment. Vaccine efficacy and safety are, by this point, well-established scientific facts; the outstanding public-health challenge is instead a communicative and behavioural one, namely how false claims about that established science come to outcompete accurate information for the attention and trust of a specific, digitally embedded population. This reframing is what motivates the theoretical, rather than purely epidemiological, focus of the remainder of this review.

Misinformation as a Communication Phenomenon

Misinformation is typically defined as false or inaccurate information shared without intent to deceive, distinguished from disinformation, which involves deliberate dissemination of false content to mislead audiences (Wardle & Derakhshan, 2017). On social media platforms such as Facebook, health misinformation often takes the form of exaggerated claims, anecdotal testimony, or conspiracy-laden narratives designed, deliberately or inadvertently, to evoke strong emotional responses that increase the likelihood of engagement and sharing (Suarez-Lledo & Alvarez-Galvez, 2021). Vosoughi et al. (2018) demonstrated that false information spreads significantly faster and more widely on social media than accurate information, particularly when it appeals to fear, mistrust, or moral concern, a pattern with direct bearing on HPV vaccine misinformation narratives concerning infertility and sexual morality.

Theoretical Review

The Health Belief Model

The Health Belief Model (HBM) is one of the most widely used frameworks for explaining and predicting individual health behaviours. Initially developed in the 1950s by social psychologists working in the U.S. Public Health Service, the model sought to explain why people did or did not utilise preventive health services (Rosenstock, 1966). Over subsequent decades, the HBM was elaborated and formalised by researchers including Janz and Becker (1984), whose core contribution was to centre individual perceptions, about risk, severity, benefits, and barriers, as the proximal determinants of health action.

At its core, the HBM proposes that the likelihood of engaging in a health behaviour is a function of perceived susceptibility (belief about personal risk), perceived severity (belief about the seriousness of the condition), perceived benefits (belief in the effectiveness of the recommended action), and perceived barriers (perceived obstacles to taking the action), with later formulations adding cues to action and self-efficacy (Janz & Becker, 1984; Champion & Skinner, 2008). Brewer and Fazekas (2007), in a systematic review of HPV vaccine acceptability studies, identified perceived susceptibility and perceived benefits as consistent predictors of vaccine intent across settings, although contextual moderators, culture, health systems, and communication environments, shaped the magnitude of these relationships.

The rise of social media misinformation complicates the picture HBM seeks to describe. Misinformation can directly alter perceived barriers and benefits: false claims about severe adverse effects inflate perceived barriers, while conspiracy narratives undermine perceived benefits, often simultaneously reducing perceived susceptibility by reframing disease risk as exaggerated or misattributed. Analyses of social media discourse around vaccines show that anti-vaccine messages frequently target perceived safety and fertility concerns, directly corresponding to HBM barriers, in emotionally compelling formats that function as potent cues to action for some users (McKenzie et al., 2024). Despite its strengths, HBM has attracted important critiques: it focuses primarily on individual rational calculation and does not explicitly incorporate social norms or structural constraints (Glanz et al., 2008), and it is essentially static, making it less well suited on its own to modelling the dynamic influence of rapidly circulating online misinformation (Janz & Becker, 1984).

The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB), formulated by Ajzen (1991) as an extension of the earlier Theory of Reasoned Action, was designed to account for behaviours over which people have incomplete volitional control by adding a perceived behavioural control component to the attitudinal and normative determinants of intention. At its conceptual core are three proximal determinants of behavioural intention: attitude toward the behaviour (the individual's overall evaluation of performing it), subjective norm (perceived social pressure from important referents), and perceived behavioural control (the perceived ease or difficulty of performing the behaviour), which together predict behavioural intention, the immediate antecedent of behaviour (Ajzen, 1991; Fishbein & Ajzen, 2010).

Meta-analytic reviews indicate that TPB explains a substantial proportion of variance in intentions and a meaningful proportion of variance in behaviour across many domains: Armitage and Conner (2001) found that TPB variables explained, on average, about 39% of the variance in intentions and 27% of the variance in behaviour across diverse behaviours, while Godin and Kok (1996) similarly reported that attitudes, subjective norms, and perceived behavioural control significantly predict intentions to engage in preventive health actions. In vaccination research specifically, positive attitudes toward vaccines, supportive subjective norms, and higher perceived behavioural control are consistently associated with higher vaccination intentions and uptake (Brewer & Fazekas, 2007).

TPB's known limitations are important in the social media context: the model emphasises rational, deliberative processes and may underplay the influence of emotion, habit, or impulsive reaction, factors highly relevant to health decisions shaped by fear or acute exposure to misinformation, and its subjective norm construct aggregates the social environment into perceived pressure without fully explicating the mechanisms through which social networks or opinion leaders exert influence (Fishbein & Ajzen, 2010). This limitation motivates integration with media-effect and social-amplification perspectives, particularly for studies of undergraduate Facebook users, in which message source credibility, likes and shares, and peer endorsement can serve as potent normative cues that alter TPB constructs without deep cognitive elaboration.

The Social Amplification of Risk Framework

The Social Amplification of Risk Framework (SARF), developed by Kasperson et al. (1988), explains how risks, whether scientific, technological, environmental, or health-related, are perceived, communicated, and responded to in society. The central proposition of SARF is that risk is not experienced solely through objective hazard characteristics but is socially constructed and amplified, or attenuated, through communication processes, institutional behaviours, media reporting, and cultural practices (Renn, 1991). As risks travel through 'amplification stations' (media, experts, interpersonal networks, and now social media), perceptions can become magnified or minimised, often producing secondary social, political, or economic ripple effects (Kasperson, 2012).

In contemporary contexts, social media platforms such as Facebook serve as powerful amplification channels, rapidly spreading risk information and misinformation to large audiences; algorithms prioritise emotionally charged content, while user interactions (likes, comments, shares) serve as social endorsement cues that intensify perceived credibility and urgency of risk-related claims (Oluwoye, 2023). Empirical studies of vaccination controversies confirm SARF's insights: the now-debunked claim linking the MMR vaccine to autism was amplified by media coverage and advocacy groups, resulting in widespread hesitancy and measles outbreaks, while misinformation about HPV vaccination and infertility has similarly been amplified in specific cultural and media contexts, reducing vaccine uptake despite scientific consensus on safety and effectiveness.

SARF has faced important critiques: scholars argue that it is overly metaphorical, lacks precise measurement tools, and sometimes assumes a linear flow of risk information (Frewer et al., 2002), while others note that risk amplification is not inherently negative, since amplification can also raise necessary awareness about neglected hazards (Pidgeon et al., 2003). In the age of social media, SARF requires updating to account for algorithmic amplification and influencer dynamics, and recent adaptations integrate insights from network theory and digital communication studies to better explain how risks spread in online environments (Sellnow & Sellnow, 2019).

Methodological Approaches to Evaluating These Theories

The literature synthesised above reveals a

discernible pattern in how each framework is typically operationalised. HBM studies are predominantly cross-sectional and quantitative, using validated Likert-scale instruments to measure perceived susceptibility, severity, benefits, and barriers, with correlational or regression analysis used to test predictive relationships (Champion & Skinner, 2008). TPB studies follow a similarly quantitative, belief-based measurement approach, eliciting salient behavioural, normative, and control beliefs and combining belief strength with outcome evaluations into composite measures (Fishbein & Ajzen, 2010), though scholars increasingly recommend longitudinal or experimental designs to disentangle whether misinformation exposure changes TPB constructs and intentions, since cross-sectional surveys cannot establish temporal order (Armitage & Conner, 2001).

SARF studies present the greatest methodological diversity and, arguably, the greatest challenge: because the framework's central claim concerns a multi-stage communicative process (signal generation, filtering, amplification, and behavioural or societal response), rigorous SARF-informed research often combines content analysis of social media discourse with survey or behavioural outcome data (McKenzie et al., 2024). This mixed-methods orientation contrasts with the largely single-method, quantitative conventions typical of HBM and TPB research, reflecting SARF's origin in risk communication and media studies rather than individual health psychology.

Comparative Regional Evidence Beyond Nigeria

The three frameworks reviewed here have each accumulated substantial evidence outside the Nigerian context that reinforces the patterns identified above. Loomba et al. (2021), examining COVID-19 vaccine misinformation in the United Kingdom and United States, found that exposure to misinformation significantly reduced vaccination intent, a finding directly analogous to the HPV-specific Nigerian evidence this review draws upon and one that lends broader cross-national credibility to the HBM-consistent claim that misinformation operates by shifting perceived barriers and benefits. Pennycook et al. (2020), testing a scalable accuracy-nudge intervention on social media, demonstrated experimentally that simply prompting users to consider the accuracy of content before sharing reduced the spread of misinformation, offering an SARF-consistent, amplification-stage intervention with direct relevance to the Facebook-specific counter-misinformation strategies discussed in Section 6.1. Together, this international evidence suggests that the mechanisms identified in Nigerian HPV-specific research are not idiosyncratic to that context but reflect broader, cross-nationally replicated dynamics of social-media-mediated vaccine hesitancy, even as the specific cultural content of the misinformation, infertility and promiscuity narratives in Nigeria, autoimmune and population-control narratives elsewhere, varies by setting.

Comparative Analysis of the Three Frameworks

Table 1 synthesises the preceding review into a comparative analytical matrix, juxtaposing the three frameworks across their originators, level of analysis, core constructs, principal

strengths, key limitations, and specific relevance to HPV vaccine misinformation on Facebook. This synthesis makes explicit what is often left implicit in single-theory studies: that the three frameworks operate at complementary rather than competing levels of explanation, individual-cognitive (HBM), social-psychological (TPB), and societal-communicative (SARF).

Table 1

Comparative Matrix of the Health Belief Model, Theory of Planned Behaviour, and Social Amplification of Risk Framework

Dimension	Health Belief Model	Theory of Planned Behaviour	Social Amplification of Risk Framework
Originators	Rosenstock (1966); Janz & Becker (1984)	Ajzen (1991)	Kasperson et al. (1988)
Level of analysis	Individual cognitive-perceptual	Individual social-cognitive	Societal-communicative
Core constructs	Perceived susceptibility, severity, benefits, barriers, cues to action, self-efficacy	Attitude, subjective norm, perceived behavioural control, intention	Amplification stations, signal filtering, ripple effects, attenuation
Primary strength	Explains why misinformation-inflated barriers reduce vaccination likelihood	Explains how peer-shared misinformation shapes attitudes and social norms	Explains how Facebook magnifies risk signals into population-level hesitancy
Key limitation	Individualistic; static; underplays social norms and structural constraints	Emphasises deliberative reasoning; underplays emotion and rapid informational shocks	Overly metaphorical; limited precise measurement tools; assumes linear flow
Relevance to HPV misinformation on Facebook	Explains why infertility/safety claims raise perceived barriers and reduce perceived benefit	Explains why peer endorsement of anti-vaccine posts shifts subjective norms among undergraduates	Explains why algorithmic and peer amplification make some myths disproportionately visible

To ground this comparative matrix in the empirical record, Table 2 summarises a purposively selected set of studies illustrating each framework's application to vaccine-related behaviour and misinformation, spanning foundational meta-analyses and contemporary Facebook-specific research.

Table 2

Illustrative Summary of Reviewed Studies by Theoretical Framework

Study	Theory	Context	Key Finding
Brewer & Fazekas (2007)	HBM	HPV vaccine acceptability, systematic review	Perceived susceptibility and benefits consistently predicted vaccine intent across settings
Armitage & Conner (2001)	TPB	Meta-analysis, multiple behaviours	TPB variables explained ~39% of variance in intention and ~27% in behaviour
Godin & Kok (1996)	TPB	Health behaviours, review	Attitude, subjective norm, and perceived behavioural control significantly predicted preventive health intentions
Vosoughi et al. (2018)	SARF-adjacent	Social media, Twitter	False information spreads significantly faster and wider than true information online
Loomba et al. (2021)	SARF/HBM	COVID-19 vaccine misinformation, UK/USA	Exposure to misinformation significantly reduced vaccination intent
McKenzie et al. (2024)	SARF	Facebook-shared HPV articles	Misleading claims and emotive frames achieved disproportionate engagement on Facebook
Suarez-Lledo & Alvarez-Galvez (2021)	Cross-cutting	Systematic review, health misinformation	Misinformation is prevalent on social media and consistently associated with vaccine hesitancy

A close reading of the comparative matrix reveals a consistent pattern: studies drawing on HBM alone explain why misinformation-affected individuals arrive at a less favourable cost-benefit calculus regarding vaccination but are less able to explain how that shift in calculus came about socially. Studies drawing on TPB alone explain the socially mediated shift in attitude and norm but offer comparatively little insight into why particular pieces of misinformation, rather than others, achieve the reach necessary to shift norms at scale. Studies drawing on SARF alone explain the amplification process by which misinformation achieves that reach but, in isolation, offer less specific guidance on the individual cognitive and social-psychological mechanisms, HBM's and TPB's particular

strengths, by which amplified risk signals are ultimately translated into an individual's vaccination decision. This complementarity, rather than any single framework's superiority, is the central analytical finding of this review.

Synthesis: An Integrated Pathway from Misinformation to Vaccine Hesitancy

Building on the comparative synthesis above, this review proposes an integrated conceptual pathway linking the three frameworks into a single explanatory account of how HPV vaccine misinformation on Facebook translates into reduced vaccine uptake (Figure 1). In this pathway, a risk signal, a false or misleading claim about the vaccine, first enters the digital information ecosystem. Per the Social Amplification of Risk Framework, this signal is then filtered and amplified through algorithmic prioritisation of emotionally engaging content and through peer sharing, likes, and comments that function as social endorsement cues, disproportionately magnifying the signal's visibility and perceived credibility relative to its actual evidentiary weight. Per the Theory of Planned Behaviour, this amplified signal then reshapes the individual's attitude toward vaccination and, critically, their perception of subjective norms, since observing peers share or endorse the claim signals apparent social consensus. Finally, per the Health Belief Model, these shifted attitudes and norms are translated into a revised health-belief calculus, in which perceived barriers to vaccination rise and perceived benefits fall, culminating in a vaccination decision, delay, or refusal.

Figure 1: Integrated Conceptual Pathway Linking SARF, TPB, and HBM in HPV Vaccine Misinformation Effects (Synthesised from Reviewed Literature)

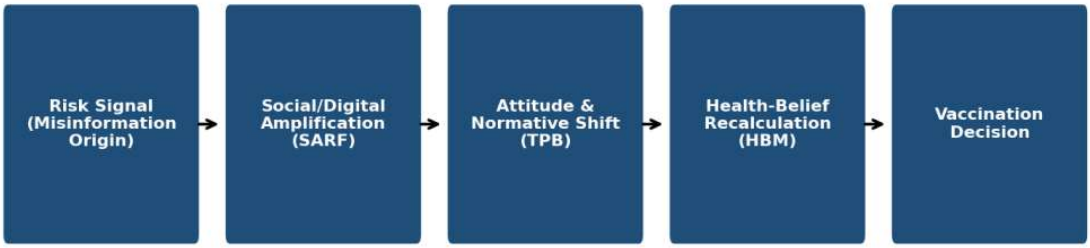

Figure 1. Integrated conceptual pathway linking SARF, TPB, and HBM in HPV vaccine misinformation effects, synthesised from the reviewed literature.

Two features of this integrated pathway merit emphasis. First, the pathway is not strictly linear in practice: HBM's perceived barriers and benefits are themselves partly constituted by prior social and communicative processes rather than existing as a wholly independent, prior cognitive baseline, meaning the three stages should be understood as analytically distinguishable but empirically interpenetrating. Second, the pathway implies that intervention at any single stage, content moderation at the SARF stage, corrective peer messaging at the TPB stage, or targeted benefit-and-barrier messaging at the HBM stage, is unlikely to be as effective as coordinated intervention across all three stages simultaneously, a point with direct implications for the design of counter-

misinformation campaigns discussed in Section 6.1.

Implications for Practice

For public health authorities and communicators designing counter-misinformation strategies, the integrated pathway suggests a three-pronged approach mirroring its three stages. At the SARF stage, interventions should focus on the amplification environment itself: content moderation, rapid-response fact-checking, and social listening to detect emergent misinformation narratives before they achieve wide algorithmic amplification (Vraga & Bode, 2020). At the TPB stage, interventions should leverage trusted peer messengers and credible local influencers to counter the normative cues created by anti-vaccine peer sharing, since subjective norms are most effectively shifted by socially credible sources rather than official messaging alone (Adejumo & Olagoke, 2023). At the HBM stage, corrective messaging should directly and specifically address the perceived barriers most inflated by circulating misinformation, explicitly countering infertility and safety claims with clear, locally resonant evidence, while simultaneously reinforcing perceived benefits through concrete framing of cervical cancer prevention.

For researchers, the integrated pathway also carries specific measurement implications. Studies seeking to test the pathway's claims empirically would need to move beyond the single-framework designs that dominate the literature reviewed in Section 4.4, incorporating, at minimum, a content-analytic measure of misinformation amplification on the platform under study (to capture the SARF dimension), a validated TPB instrument measuring attitude, subjective norm, and perceived behavioural control (to capture the social-psychological dimension), and a validated HBM instrument measuring perceived susceptibility, severity, benefits, and barriers (to capture the individual cognitive dimension), ideally within a single longitudinal design capable of tracking how a specific misinformation event moves through all three stages over time. Such a design would represent a meaningful methodological advance over the largely single-framework literature synthesised in this review.

Illustrative Case Application

To make the integrated pathway concrete, consider a representative scenario documented across the reviewed Nigerian literature: a Facebook post, often framed as a personal testimony, claims that a named individual became infertile after receiving the HPV vaccine. Read through SARF, this single anecdotal claim is filtered through Facebook's engagement-maximising algorithm, which prioritises emotionally charged content; because fertility anxieties resonate powerfully in a cultural context where fertility is closely tied to social identity, the post accumulates disproportionate likes, comments, and shares relative to its evidentiary weight, and is thereby amplified far beyond its original reach (Kasperson et al., 1988; Oluwoye, 2023). Read through TPB, undergraduates who observe peers sharing, liking, or commenting supportively on the post experience a shift in perceived subjective norm, the post's visibility signals that scepticism toward the vaccine is a socially sanctioned position within their peer network, independent of whether they personally find the claim scientifically credible (Ajzen, 1991). Read through HBM, this socially validated scepticism is then

internalised as a specific increase in perceived barriers (fear of infertility) and a corresponding decrease in perceived benefit (doubt that the vaccine's cervical cancer protection outweighs this newly salient risk), culminating in delayed or refused vaccination (Janz & Becker, 1984).

This illustrative case demonstrates why theoretical triangulation matters practically: a purely HBM-oriented intervention might supply accurate statistical information about infertility risk, but would leave unaddressed the socially validated scepticism that TPB identifies as a distinct causal pathway; a purely TPB-oriented intervention might deploy trusted peer messengers, but would not address the algorithmic dynamics that SARF identifies as the reason the original claim reached the wide audience it did. Only an intervention informed by all three frameworks, simultaneously moderating amplification, reshaping perceived norms, and directly correcting the specific belief distortion, addresses the full pathway this review's synthesis identifies.

Gaps in the Literature and Directions for Future Research

This review identifies several gaps warranting further scholarly attention. First, despite the individual popularity of all three frameworks in vaccine-hesitancy research, genuinely integrated, multi-theory empirical studies remain scarce; most published work applies a single framework to a single empirical setting, limiting the field's capacity to test the integrated pathway proposed in Section 6 directly. Second, SARF applications to HPV vaccine misinformation on Facebook specifically, as opposed to other platforms or other vaccines, remain comparatively rare in the Nigerian literature, even though Facebook is documented as the dominant platform among Nigerian undergraduates (DataReportal, 2024; Adejumo & Olagoke, 2023). Third, longitudinal designs capable of establishing the temporal and potentially causal order between misinformation exposure and shifts in HBM and TPB constructs remain rare relative to the volume of cross-sectional studies, a gap explicitly acknowledged even within the empirical literature this review draws upon. Finally, comparative and integrative theoretical work of the kind attempted in this review remains rare relative to single-theory empirical studies, suggesting scope for further desk-based synthesis as the evidence base on HPV vaccine misinformation in Nigeria continues to expand.

A further, more practical gap concerns instrumentation. Because HBM, TPB, and SARF emerged from distinct disciplinary traditions, health psychology, social psychology, and risk communication studies respectively, validated measurement instruments developed for one framework do not straightforwardly translate into the others' constructs. A questionnaire item well suited to capturing an undergraduate's perceived barrier to vaccination (an HBM construct) is not automatically informative about the degree to which a specific misinformation post was algorithmically or socially amplified (a SARF construct), nor about the peer-normative pressure the undergraduate perceived when encountering it (a TPB construct). Future Nigerian research seeking to operationalise the integrated pathway proposed in Section 6 would therefore benefit from the deliberate development of a composite instrument spanning all three theoretical traditions, potentially combining

social media content analysis with individual-level survey measurement, rather than continued reliance on single-framework instruments applied in isolation from one another.

Limitations of This Review

As a library-based synthesis, this review is itself subject to limitations inherent to the desk-research method. First, its conclusions are only as comprehensive as the secondary sources available for synthesis; where Nigerian empirical literature on a given sub-theme is sparse, the review draws more heavily on international evidence, whose direct transferability to the Nigerian undergraduate Facebook context cannot be assumed without caveat. Second, because the review relies on published findings rather than re-analysed primary data, it cannot independently verify the methodological rigour of every source synthesised, though priority was given throughout to peer-reviewed and systematic-review sources precisely to mitigate this concern. Third, the comparative matrix and integrated pathway presented in Sections 5 and 6 represent this review's own synthetic interpretation and should be treated as a conceptual proposal for future empirical testing rather than an already-validated model. These limitations do not undermine the review's central contribution, a systematic, comparative organisation of an otherwise fragmented theoretical literature, but they do define the boundaries within which its conclusions should be read and applied.

Conclusion

This library-based review has synthesised existing secondary literature on three theoretical frameworks widely applied to vaccine hesitancy and health misinformation: the Health Belief Model, the Theory of Planned Behaviour, and the Social Amplification of Risk Framework. The review finds that each framework illuminates a distinct and necessary dimension of the misinformation-to-hesitancy pathway, societal-communicative, social-psychological, and individual-cognitive, respectively, and that none is sufficient in isolation to explain the full trajectory from a false Facebook claim to a reduced HPV vaccination decision. Drawing on this synthesis, the review proposes an integrated conceptual pathway that positions the three frameworks as sequential and complementary rather than competing, and identifies specific gaps, particularly the scarcity of genuinely multi-theory and longitudinal Nigerian studies, that future empirical and desk-based research should address. For scholars, public health communicators, and platform designers working on HPV vaccine misinformation in Nigeria and comparable contexts, the review's central recommendation is deliberate theoretical triangulation: counter-misinformation strategies designed with explicit attention to amplification, attitudinal, and belief-based dimensions simultaneously are, on the weight of the reviewed evidence, more likely to achieve sustained improvement in vaccine uptake than strategies grounded in any single theoretical frame.

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