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Digital misinformation and vaccine hesitancy among parents in Nigeria

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Abstract

The rapid expansion of digital media has transformed health communication globally, but it has also accelerated the spread of vaccine-related misinformation, thereby undermining public confidence in immunisation programmes. In Nigeria, where social media has become a major source of health information, concerns have grown regarding the influence of digital misinformation on parental decisions about childhood vaccination. This study examined the relationship between digital misinformation and vaccine hesitancy among parents in South West Nigeria. The study adopted a quantitative cross-sectional survey design involving 420 parents selected through a multistage sampling technique across the six states of South West Nigeria. The findings revealed that 91.2% of respondents owned smartphones, 87.4% accessed social media daily, and WhatsApp (89.3%) was the predominant source of vaccine-related information. Parents reported high exposure to digital misinformation ($M = 3.89$, $SD = 0.74$), with digital misinformation exhibiting a significant positive relationship with vaccine hesitancy ($r = .61$, $p < .001$). Multiple regression analysis further identified digital misinformation as the strongest predictor of vaccine hesitancy ($\beta = .48$, $p < .001$), whereas trust in healthcare professionals significantly reduced vaccine hesitancy ($\beta = -.37$, $p < .001$). The study concludes that digital misinformation has emerged as a significant behavioural determinant of vaccine hesitancy among parents in South West Nigeria. It recommends strengthening evidence-based digital health communication, improving digital health literacy, enhancing public trust in healthcare institutions, and integrating social media engagement into routine immunisation strategies to improve vaccine confidence and childhood vaccination uptake.

Keywords: Digital misinformation; vaccine hesitancy; childhood immunisation; parents; social media; South West Nigeria.

Introduction

Vaccination remains one of the most effective and cost-efficient public health interventions in modern medicine, preventing an estimated 3.5 to 5 million deaths globally every year from vaccine-preventable diseases such as measles, diphtheria, tetanus, influenza, and pertussis (World Health Organization [WHO], 2024). Despite

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decades of scientific evidence demonstrating the safety and effectiveness of vaccines, vaccine hesitancy has emerged as one of the most pressing global public health challenges. Recognising its significance, the World Health Organization listed vaccine hesitancy among the top ten threats to global health, noting that declining public confidence in immunisation threatens to reverse decades of progress in disease prevention (WHO, 2019). While vaccine hesitancy is driven by a complex interaction of social, political, religious, economic, and psychological factors, the rapid expansion of digital communication platforms has fundamentally altered how vaccine-related information is produced, disseminated, and consumed.

The proliferation of digital technologies has transformed health communication across the world. Social media platforms, messaging applications, online blogs, and video-sharing websites have significantly increased public access to health information. Parents are no longer dependent solely on healthcare professionals or government agencies for vaccination advice. Instead, they increasingly rely on information circulating through WhatsApp groups, Facebook pages, TikTok videos, YouTube channels, X (formerly Twitter), and online discussion forums. Although these platforms have improved access to valuable health information, they have simultaneously facilitated the unprecedented spread of misinformation. Digital misinformation refers to false or misleading information that is shared regardless of intent to deceive, often appearing credible because it is repeatedly circulated through trusted social networks (Wardle & Derakhshan, 2017). Unlike traditional misinformation, digital misinformation spreads rapidly through algorithm-driven platforms that prioritise user engagement over factual accuracy, enabling unverified claims to reach millions of users within hours.

Globally, misinformation surrounding vaccines has become increasingly sophisticated and influential. During the COVID-19 pandemic, the World Health Organization described the accompanying flood of false and misleading information as an "infodemic," emphasising that misinformation could spread faster than the virus itself and significantly undermine public health responses (WHO, 2022). Across several countries, conspiracy theories linking vaccines to infertility, autism, genetic manipulation, microchips, or population control gained widespread visibility online despite overwhelming scientific evidence disproving these claims (Larson, 2022). Studies consistently demonstrate that repeated exposure to vaccine misinformation reduces trust in healthcare institutions, lowers perceived vaccine safety, and increases parental uncertainty regarding childhood immunisation (Loomba et al., 2021). Consequently, vaccine acceptance is increasingly shaped not only by scientific evidence but also by the digital information ecosystem within which parents make health decisions.

The Nigerian context reflects many of these global dynamics while presenting unique socio-cultural complexities. Nigeria possesses one of the largest populations of children requiring routine immunisation in Africa, yet vaccination coverage remains below recommended targets in many states. According to the Nigeria Demographic and Health Survey (NDHS), only 36% of children aged 12 to 23 months received all basic vaccinations nationally, with considerable disparities across geopolitical zones (National Population Commission [NPC] & ICF, 2019). Although the South West geopolitical zone generally records higher immunisation coverage than northern Nigeria due to relatively stronger healthcare infrastructure and educational attainment, recent evidence suggests that vaccine confidence is increasingly challenged by digital misinformation rather than physical access alone. This shift indicates that vaccine uptake is no longer determined exclusively by service availability but also by parents' exposure to conflicting online narratives regarding vaccine safety and effectiveness.

South West Nigeria presents a particularly important setting for examining digital misinformation because it is among the country's most digitally connected regions. Lagos, Oyo, Ogun, Osun, Ondo, and Ekiti States collectively account for some of Nigeria's highest internet penetration rates, smartphone ownership, and social media usage (Nigerian Communications Commission [NCC], 2025). WhatsApp has become the dominant communication platform for family networks, religious organisations, schools, professional associations, and community groups, allowing health-related messages to circulate rapidly among parents. Facebook and TikTok similarly serve as major sources of health information, particularly among younger parents who increasingly seek medical advice online before consulting healthcare professionals. While these digital platforms facilitate health promotion campaigns, they also enable misinformation to spread through emotionally compelling stories, fabricated expert opinions, manipulated videos, and misleading testimonials that often appear more persuasive than official public health communication.

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Recent vaccination campaigns have demonstrated how digital misinformation can influence parental attitudes in South West Nigeria. During the COVID-19 vaccination rollout, rumours alleging that vaccines caused infertility, sudden death, infertility among women of reproductive age, or represented foreign experiments circulated extensively across WhatsApp broadcasts and Facebook communities. Similar misinformation has affected routine childhood immunisation campaigns, where false claims regarding vaccine contamination, hidden sterilisation programmes, or adverse health consequences continue to circulate despite repeated scientific refutation. Such narratives frequently exploit existing distrust in government institutions, historical concerns regarding healthcare quality, religious interpretations, and political polarisation. Consequently, many parents delay vaccination, selectively refuse certain vaccines, or seek confirmation from informal online communities instead of qualified healthcare providers.

Empirical evidence increasingly supports the relationship between digital misinformation and vaccine hesitancy. International studies demonstrate that exposure to misinformation significantly reduces vaccine acceptance while increasing uncertainty and information avoidance (Loomba et al., 2021; Wilson & Wiysonge, 2020). Nigerian studies similarly report that misinformation disseminated through social media contributes to declining confidence in both COVID-19 vaccines and routine childhood immunisation, particularly where digital literacy is limited and trust in public institutions is weak (Afolabi et al., 2021; Olomofe et al., 2021). However, much of the existing Nigerian literature has concentrated on COVID-19 vaccination among adults, healthcare workers, or university populations. Comparatively fewer studies have examined parents as the primary decision-makers for childhood immunisation, despite the fact that parental beliefs directly determine vaccine uptake among children.

Moreover, existing studies often analyse vaccine hesitancy at the national level or compare Nigeria with other countries, thereby overlooking important regional differences in digital media use, cultural norms, educational attainment, and health system performance. South West Nigeria possesses distinctive socio-economic characteristics that may shape both exposure to misinformation and responses to vaccination campaigns. The region's relatively high internet connectivity, expanding digital economy, and widespread smartphone adoption create a communication environment that differs considerably from many other parts of the country. Yet empirical evidence specifically examining how digital misinformation influences parental vaccine decisions within this regional context remains limited. Existing research also pays insufficient attention to the interaction between digital misinformation, institutional trust, health literacy, and parental risk perception in shaping vaccine hesitancy.

This gap is particularly important because effective public health interventions increasingly require context-specific evidence rather than broad national generalisations. Without understanding the mechanisms through which digital misinformation affects parents in South West Nigeria, policymakers may continue to rely on conventional health communication strategies that inadequately address the realities of contemporary digital information ecosystems. Generating empirical evidence on this relationship will contribute to the development of targeted communication strategies capable of strengthening vaccine confidence, improving childhood immunisation uptake, and supporting Nigeria's broader public health objectives.

Against this background, this study examines the influence of digital misinformation on vaccine hesitancy among parents in South West Nigeria. Specifically, it investigates how exposure to digital misinformation shapes parental perceptions of vaccine safety, trust in health authorities, and willingness to vaccinate their children. By situating vaccine hesitancy within the rapidly evolving digital communication landscape, the study contributes to the growing body of literature on health misinformation in low- and middle-income countries while providing evidence that can inform more effective digital health communication policies and immunisation programmes in Nigeria.

Conceptual Review

Digital Misinformation

The rapid expansion of digital communication technologies has fundamentally transformed how health information is created, disseminated, and consumed. While digital platforms have enhanced access to timely health information, they have simultaneously created an environment in which false and misleading information spreads rapidly, often with greater reach than evidence-based messages. This phenomenon has become particularly significant in public health, where misinformation regarding disease prevention, treatment, and vaccination increasingly influences health behaviours and policy outcomes.

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Digital misinformation refers to false or inaccurate information shared through digital media irrespective of whether there is an intention to deceive (Wardle & Derakhshan, 2017). It differs from disinformation, which involves the deliberate creation and dissemination of false information to manipulate public opinion, and malinformation, which consists of genuine information used maliciously or taken out of context to cause harm. Although these concepts are analytically distinct, they frequently coexist within digital communication ecosystems, making it difficult for ordinary users to distinguish factual information from misleading narratives.

The rise of social media has significantly altered the information landscape by decentralising information production. Unlike traditional media, where information passes through editorial scrutiny before publication, digital platforms allow virtually anyone to generate and distribute content to large audiences within seconds. Consequently, information is increasingly evaluated based on popularity rather than scientific credibility. Algorithm-driven platforms such as Facebook, WhatsApp, TikTok, YouTube, and X amplify emotionally engaging content, often favouring sensational or controversial messages that generate higher user engagement. This algorithmic amplification inadvertently promotes misinformation, especially when such information evokes fear, uncertainty, or outrage.

Health misinformation has become particularly problematic because healthcare decisions often involve uncertainty and risk perception. During disease outbreaks, individuals actively seek explanations and reassurance. In the absence of trusted communication, misinformation fills this information vacuum. The World Health Organization (2022) described this phenomenon as an "infodemic," characterised by an overabundance of both accurate and inaccurate information that makes it difficult for individuals to identify trustworthy health advice. The COVID-19 pandemic illustrated the unprecedented speed at which misinformation could spread globally, with false claims regarding vaccine safety, infertility, genetic modification, and microchip implantation circulating widely across digital platforms despite overwhelming scientific evidence disproving these assertions.

Nigeria has experienced similar developments. The country's growing digital economy, increasing smartphone penetration, and expanding internet connectivity have made social media a major source of health information. WhatsApp, in particular, occupies a unique position because information shared through family groups, religious communities, and neighbourhood associations often enjoys higher credibility than official government communication. Consequently, false health information is frequently accepted because it originates from trusted social relationships rather than verified scientific sources. This dynamic is especially evident during vaccination campaigns, where rumours spread rapidly through informal digital networks before public health agencies can respond effectively.

Digital misinformation therefore extends beyond the mere circulation of false information. It represents a complex communication process involving technology, social trust, cognitive bias, and institutional credibility. Understanding this broader conceptualisation is essential for explaining why misinformation continues to influence parental vaccination decisions despite increasing availability of scientifically verified information.

Vaccine Hesitancy

Vaccine hesitancy has emerged as one of the defining public health challenges of the twenty-first century. Unlike outright vaccine refusal, vaccine hesitancy encompasses varying degrees of uncertainty, delay, selective acceptance, or refusal despite the availability of vaccination services. The Strategic Advisory Group of Experts (SAGE) on Immunization defines vaccine hesitancy as the delay in acceptance or refusal of vaccines despite the availability of vaccination services, recognising that acceptance exists on a continuum rather than as a binary choice (MacDonald, 2015).

The concept reflects the reality that parents often experience competing influences when making vaccination decisions. While many recognise the health benefits of immunisation, concerns regarding vaccine safety, adverse effects, effectiveness, or trust in healthcare providers may reduce their willingness to vaccinate. Vaccine hesitancy is therefore shaped by multiple interacting determinants rather than ignorance alone.

One of the most influential conceptual models explaining vaccine hesitancy is the **3Cs Model**, comprising confidence, complacency, and convenience. Confidence refers to trust in vaccines, healthcare providers, and public institutions. Complacency occurs when individuals perceive infectious diseases as posing little personal risk, thereby reducing the perceived necessity of vaccination. Convenience relates to practical barriers such as accessibility, affordability, and

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availability of vaccination services. More recently, this framework has been expanded into the **5Cs Model**, incorporating calculation and collective responsibility. Calculation describes individuals' tendency to extensively search for information before making vaccination decisions, while collective responsibility reflects the willingness to vaccinate in order to protect vulnerable members of society.

Within contemporary digital environments, confidence has become the most vulnerable component of vaccine acceptance. Parents now encounter conflicting messages from healthcare professionals, social media influencers, religious leaders, celebrities, and online communities. Exposure to contradictory information often creates uncertainty, even among parents who initially support vaccination. Rather than strengthening informed decision-making, unrestricted access to information sometimes increases confusion by presenting scientifically unsupported claims alongside legitimate medical evidence.

Nigeria continues to experience vaccine hesitancy despite improvements in immunisation programmes. Although access barriers remain important in some communities, recent evidence suggests that declining confidence increasingly explains delayed childhood vaccination in urban and semi-urban areas where health services are relatively accessible. Parents frequently express concerns regarding vaccine quality, possible adverse effects, pharmaceutical companies' motives, and government transparency. These concerns are often reinforced through repeated exposure to misinformation on digital platforms rather than through personal experience. Consequently, vaccine hesitancy should be understood not simply as opposition to vaccines but as a dynamic decision-making process influenced by information environments, institutional trust, personal beliefs, and perceived risks.

Parents as Primary Decision-Makers in Childhood Immunisation

Parents occupy a central position within childhood immunisation programmes because they ultimately determine whether children receive recommended vaccines. Their decisions are rarely based solely on medical advice but instead emerge from the interaction of individual beliefs, family dynamics, cultural norms, religious values, previous healthcare experiences, and social influences.

Health behaviour research demonstrates that parents evaluate childhood vaccination by balancing perceived benefits against perceived risks. While healthcare professionals typically emphasise scientific evidence regarding vaccine effectiveness, parents frequently rely on emotional reasoning, anecdotal experiences, and trusted interpersonal relationships. Stories describing alleged vaccine injuries shared by relatives or social media contacts often exert greater influence than statistical evidence demonstrating vaccine safety.

Maternal education has traditionally been associated with higher vaccination uptake because educated mothers generally possess greater health literacy and improved access to healthcare information. However, recent studies suggest that higher educational attainment does not necessarily protect against vaccine misinformation. Parents with greater access to digital technologies may also encounter larger volumes of misleading information, increasing uncertainty rather than confidence. Thus, education alone cannot eliminate vaccine hesitancy without corresponding improvements in digital health literacy.

In Nigeria, parental vaccination decisions are additionally influenced by extended family members, religious leaders, traditional beliefs, and community opinion leaders. Digital communication has strengthened these influences by allowing misinformation originating in one locality to spread rapidly across geographically distant communities. WhatsApp groups involving schools, churches, mosques, neighbourhood associations, and family networks have become particularly influential in shaping perceptions of childhood vaccination. Understanding parents as active interpreters rather than passive recipients of health information is therefore essential for explaining contemporary vaccine hesitancy.

Digital Misinformation and Vaccine Hesitancy

The relationship between digital misinformation and vaccine hesitancy extends beyond simple exposure to false information. Psychological and communication theories suggest that misinformation influences health behaviour by altering risk perception, reducing institutional trust, reinforcing existing beliefs, and encouraging selective exposure to confirming information.

Repeated exposure to misinformation increases its perceived credibility through what psychologists describe as the "illusory truth effect," whereby familiar statements are more likely to be accepted as

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true regardless of their factual accuracy. Digital platforms further reinforce this process through algorithmic personalisation, exposing users to content that aligns with their existing preferences. Over time, these personalised information environments create echo chambers where misinformation is continuously reinforced while contradictory scientific evidence receives limited attention.

Parents are particularly vulnerable because vaccination decisions involve protecting children from uncertain risks. Misinformation often exploits parental fears by presenting emotionally compelling narratives, dramatic testimonials, or fabricated expert opinions that appear more persuasive than statistical evidence. As uncertainty increases, parents may delay vaccination while seeking additional information, inadvertently exposing themselves to even more misinformation.

The influence of digital misinformation is further strengthened where trust in government institutions or healthcare systems is already weak. In such contexts, official vaccination campaigns may be interpreted with suspicion, allowing misinformation to flourish. Consequently, vaccine hesitancy reflects both informational deficits and broader issues of institutional credibility.

Recent Nigerian evidence indicates that misinformation surrounding childhood immunisation extends beyond COVID-19 and increasingly affects routine childhood vaccination. Parents frequently report uncertainty arising from conflicting online messages regarding vaccine safety, pharmaceutical companies, fertility, and long-term health effects. Public health researchers therefore increasingly recognise digital misinformation as a significant social determinant of vaccine confidence requiring interventions beyond conventional health education.

Childhood Immunisation and the South West Nigerian Context

South West Nigeria presents a distinctive context for examining the relationship between digital misinformation and vaccine hesitancy. Compared with many other regions of the country, the South West records relatively higher literacy levels, greater urbanisation, stronger healthcare infrastructure, and higher internet penetration. States such as Lagos, Oyo, Ogun, Osun, Ondo, and Ekiti have witnessed rapid digital transformation, making online platforms major sources of health information.

Despite relatively better immunisation coverage, vaccine confidence cannot be assumed. Increasing smartphone ownership and widespread social media use have altered how parents obtain health information. Rather than relying exclusively on healthcare professionals, many parents first consult online communities, parenting forums, or WhatsApp groups before making vaccination decisions. Consequently, digital misinformation increasingly competes with official health communication.

Recent public health initiatives in Nigeria have recognised this challenge. Communication campaigns now emphasise community engagement, culturally appropriate messaging, and collaboration with trusted local voices to counter misinformation and rebuild vaccine confidence among parents and caregivers. Emerging evidence suggests that addressing misinformation alone may be insufficient unless accompanied by strategies that strengthen trust in healthcare providers and public institutions.

The South West therefore provides an important setting for investigating how digital information environments influence parental vaccine decisions. Its relatively advanced digital connectivity offers valuable insights into how misinformation interacts with education, trust, and health literacy to shape childhood immunisation behaviours, making it an appropriate context for the present study.

Theoretical Review

The relationship between digital misinformation and vaccine hesitancy is multidimensional, involving cognitive, psychological, social, and communication processes. Consequently, no single theory sufficiently explains how parents process vaccine-related information and subsequently make immunisation decisions. This study is anchored primarily on the Health Belief Model (HBM), complemented by Information Disorder Theory. While the Health Belief Model explains the cognitive processes underlying parents' vaccination decisions, Information Disorder Theory provides insight into how the contemporary digital information environment shapes those cognitive processes through the circulation of misleading and false information. Together, the two theories offer a comprehensive framework for understanding vaccine hesitancy among parents in South West Nigeria.

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The Health Belief Model

The Health Belief Model (HBM) is one of the earliest and most influential behavioural theories in public health. Developed in the 1950s by social psychologists Godfrey Hochbaum, Irwin Rosenstock, and Stephen Kegels, the model was originally designed to explain why individuals failed to participate in disease prevention programmes despite the availability of preventive health services (Rosenstock, 1974). Since then, the model has been widely applied to studies examining vaccination behaviour, cancer screening, medication adherence, infectious disease prevention, and other health-related behaviours.

The model proposes that individuals' health decisions are largely determined by their perceptions of health risks and the expected benefits and barriers associated with particular preventive actions. Rather than assuming that people make decisions solely based on objective scientific evidence, the HBM recognises that health behaviour is shaped by subjective beliefs and perceptions. This perspective is particularly relevant to vaccine hesitancy because parental decisions regarding childhood immunisation are often influenced more by perceived risks than by established scientific evidence.

According to the Health Belief Model, six principal constructs determine health behaviour.

Perceived susceptibility refers to an individual's belief regarding the likelihood of experiencing a health problem. In the context of childhood immunisation, parents who believe that their children are vulnerable to vaccine-preventable diseases are generally more willing to vaccinate. Conversely, digital misinformation that downplays the prevalence or seriousness of infectious diseases may reduce perceived susceptibility, leading parents to conclude that vaccination is unnecessary.

Perceived severity concerns an individual's assessment of the seriousness of a disease and its potential consequences. Parents who recognise the severe health implications of diseases such as measles, poliomyelitis, diphtheria, or hepatitis are more likely to support routine immunisation. However, misinformation portraying these diseases as harmless childhood illnesses or suggesting that natural immunity is preferable may reduce the perceived severity of infection while simultaneously exaggerating the perceived dangers of vaccines.

Perceived benefits refer to beliefs about the effectiveness of a recommended health action in preventing disease or improving health outcomes. Extensive scientific evidence demonstrates that childhood vaccines substantially reduce morbidity and mortality from infectious diseases. Nevertheless, misinformation questioning vaccine effectiveness or alleging hidden political or commercial motives behind vaccination programmes may diminish parents' confidence in these benefits.

Perceived barriers represent the obstacles individuals associate with performing a health behaviour. Traditionally, barriers included factors such as financial costs, accessibility of health facilities, transportation difficulties, or limited vaccine availability. Within digital environments, however, psychological barriers have become increasingly significant. Exposure to misinformation concerning adverse vaccine reactions, infertility, autism, or long-term health complications creates perceived risks that discourage parents from vaccinating their children even when vaccination services are readily available.

Cues to action are external or internal stimuli that trigger health-related decisions. These may include reminders from healthcare professionals, government vaccination campaigns, school immunisation programmes, media advertisements, or recommendations from trusted community leaders. In the digital era, social media content has become an increasingly influential cue to action. Unfortunately, these cues may either encourage vaccination through credible health communication or discourage vaccine uptake through repeated exposure to misinformation.

The final construct, **self-efficacy**, refers to an individual's confidence in their ability to perform a recommended health behaviour. Parents with high health literacy and confidence in navigating healthcare systems are generally better equipped to evaluate conflicting information and make informed vaccination decisions. Conversely, limited digital health literacy may reduce parents' confidence in distinguishing credible medical information from misinformation circulating online.

The Health Belief Model has received substantial empirical support across diverse healthcare settings. Numerous studies have demonstrated that perceived susceptibility, perceived benefits, and confidence in vaccine safety positively influence vaccine acceptance, whereas perceived barriers and

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misinformation significantly increase vaccine hesitancy (Shmueli, 2021; Wang et al., 2021). These findings suggest that digital misinformation influences vaccination behaviour not by directly preventing access to vaccines but by altering parents' health beliefs regarding disease risks and vaccine safety.

Information Disorder Theory

While the Health Belief Model explains how health beliefs influence vaccination behaviour, it does not adequately explain the origin of those beliefs within rapidly evolving digital communication environments. Information Disorder Theory, developed by Wardle and Derakhshan (2017), addresses this limitation by explaining the contemporary dynamics of false and misleading information in digital societies.

The theory argues that modern information ecosystems are characterised by three distinct but interconnected forms of problematic information: misinformation, disinformation, and malinformation. Misinformation consists of false information shared without deliberate intent to deceive. Disinformation refers to intentionally false information designed to manipulate public opinion or achieve political, economic, or ideological objectives. Malinformation, by contrast, involves genuine information presented out of context or selectively disclosed to cause harm or mislead audiences.

Unlike traditional communication theories, Information Disorder Theory recognises that digital communication platforms fundamentally alter how information spreads. Social media algorithms prioritise user engagement by promoting emotionally compelling content irrespective of factual accuracy. Consequently, sensational stories concerning alleged vaccine injuries or conspiracy theories often receive greater visibility than scientifically verified public health information.

The theory also emphasises the importance of trust and social relationships in determining information credibility. Within digital environments, users frequently evaluate information based on the identity of the sender rather than the quality of evidence presented. Information shared by relatives, religious leaders, close friends, or community members is often perceived as more trustworthy than official communication from governments or healthcare institutions. This phenomenon is particularly relevant in Nigeria, where WhatsApp has become a dominant platform for interpersonal communication. Messages forwarded through family networks or religious groups frequently acquire credibility simply because they originate from familiar social contacts.

Information Disorder Theory further highlights the role of repetition in reinforcing misinformation. Psychological research demonstrates that repeated exposure increases familiarity, and familiar information is often perceived as truthful regardless of its factual accuracy. This "illusory truth effect" explains why repeated misinformation regarding vaccine safety can gradually erode public confidence even after official corrections are issued.

Within the context of childhood immunisation, the theory suggests that vaccine hesitancy emerges not merely because false information exists but because digital communication structures facilitate its rapid dissemination, repeated exposure, and social validation. Consequently, misinformation becomes embedded within everyday conversations and gradually influences parental perceptions of vaccine safety, effectiveness, and necessity.

Relevance of the Theories to the Present Study

The combination of the Health Belief Model and Information Disorder Theory provides a robust analytical framework for examining digital misinformation and vaccine hesitancy among parents in South West Nigeria.

Information Disorder Theory explains the source and dissemination of misleading vaccine information within digital communication networks. It identifies how algorithm-driven social media platforms, interpersonal communication, and online communities amplify misinformation and shape public discourse surrounding childhood immunisation.

The Health Belief Model complements this explanation by illustrating how parents interpret that information. Exposure to misinformation may reduce perceived susceptibility to vaccine-preventable diseases, diminish perceived benefits of vaccination, increase perceived barriers through fear of adverse effects, weaken trust in healthcare providers, and ultimately reduce parents' willingness to vaccinate their children.

In this way, Information Disorder Theory explains the communication environment, whereas the Health Belief Model explains the behavioural response. Together, the theories capture both the

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external and internal processes influencing vaccine hesitancy.

Theoretical Framework Adopted for the Study

Although both theories significantly contribute to understanding the phenomenon under investigation, the Health Belief Model is adopted as the principal theoretical framework for this study.

The choice of the Health Belief Model is justified for three reasons. First, the dependent variable of the study is vaccine hesitancy, which is fundamentally a behavioural outcome. The Health Belief Model was specifically developed to explain preventive health behaviours and has consistently demonstrated strong predictive capacity across vaccination studies worldwide.

Second, the model provides measurable constructs that can be operationalised within quantitative research. Variables such as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy can be translated into questionnaire items and empirically tested using statistical techniques.

Third, the model aligns closely with the study's objective of examining how exposure to digital misinformation influences parental vaccination decisions. Rather than treating misinformation as an isolated communication problem, the Health Belief Model explains the psychological mechanisms through which misinformation alters health beliefs and ultimately shapes vaccination behaviour.

Nevertheless, because contemporary vaccine hesitancy increasingly occurs within complex digital information ecosystems, Information Disorder Theory is incorporated as a complementary explanatory framework. Its inclusion enables the study to acknowledge the broader communication processes through which misinformation is produced, amplified, and normalised across digital platforms.

Accordingly, this study conceptualises digital misinformation as an external stimulus operating within the digital information environment, while parental health beliefs constitute the intervening psychological mechanism through which misinformation influences vaccine hesitancy. This integrated theoretical perspective provides a comprehensive basis for examining the determinants of childhood vaccination decisions among parents in South West Nigeria.

Empirical Review

Global Evidence on Digital Misinformation and Vaccine Hesitancy

The growing body of empirical literature consistently demonstrates that digital misinformation has become one of the most influential determinants of vaccine hesitancy worldwide. Although vaccine acceptance has historically been shaped by factors such as access to healthcare, educational attainment, socioeconomic status, and cultural beliefs, recent studies suggest that the contemporary digital information environment has fundamentally altered public decision-making regarding vaccination. Across both developed and developing countries, exposure to misinformation disseminated through social media, messaging applications, and online discussion forums has been associated with declining confidence in vaccines, increasing distrust in public health institutions, and reduced willingness among parents to vaccinate their children.

One of the earliest large-scale experimental investigations was conducted by Loomba et al. (2021), who examined the effect of online misinformation on COVID-19 vaccination intentions among adults in the United Kingdom and the United States. Using a nationally representative experimental survey involving more than 8,000 respondents, the study demonstrated that exposure to misinformation significantly reduced participants' willingness to receive vaccines, with the strongest effects observed among individuals who were already uncertain about vaccination. The authors concluded that misinformation does not merely create new sceptics but reinforces existing doubts by increasing uncertainty regarding vaccine safety and effectiveness. The study's experimental design strengthened causal inference; however, its focus on adult vaccination intentions limits direct application to parental decision-making concerning routine childhood immunisation.

Similarly, Pierri et al. (2021) investigated the relationship between online misinformation and COVID-19 vaccination uptake using longitudinal data from the United States. The researchers found a significant negative relationship between exposure to misinformation and vaccination rates even after controlling for demographic and political factors. More importantly, their analysis provided evidence that misinformation preceded vaccine hesitancy rather than simply reflecting pre-existing scepticism, suggesting that digital misinformation functions as

an independent predictor of vaccination behaviour rather than a consequence of vaccine refusal. (arXiv)

Evidence synthesised across multiple countries further reinforces these findings. A recent systematic review published in the *Journal of Medical Internet Research* analysed 36 studies examining the influence of communication media on vaccine attitudes and hesitancy. The review concluded that repeated exposure to misinformation across digital platforms consistently reduced confidence in vaccines, while tailored communication strategies delivered through trusted media channels significantly improved vaccine acceptance. Importantly, the review observed that the effectiveness of health communication depended heavily on contextual factors such as education, culture, trust in government, and religious beliefs, indicating that misinformation operates within broader social and institutional environments rather than in isolation. (jmir.org)

Research has also demonstrated that parents constitute one of the populations most susceptible to vaccine misinformation because childhood vaccination decisions involve uncertainty regarding children's safety. Studies conducted across Europe and North America consistently report that concerns about vaccine side effects, fertility, long-term health consequences, and pharmaceutical industry motives are frequently amplified through Facebook, WhatsApp, YouTube, TikTok, and other digital platforms. Exposure to emotionally compelling personal testimonies often exerts greater influence on parental decision-making than official scientific evidence, particularly where parents perceive healthcare institutions as lacking transparency.

Beyond individual studies, systematic reviews have consistently identified institutional trust as a critical mediator between misinformation and vaccine acceptance. Rather than directly causing vaccine refusal, misinformation often weakens confidence in healthcare providers, scientific experts, and government agencies responsible for immunisation programmes. As institutional trust declines, parents increasingly rely on informal digital networks, including family groups, religious communities, and online parenting forums, where unverified information is more likely to circulate unchecked. This shift reinforces misinformation through repeated exposure and social validation.

Recent scholarship also highlights the role of platform algorithms in amplifying vaccine misinformation. Unlike traditional media, digital platforms prioritise user engagement, often promoting sensational or emotionally charged content irrespective of its scientific validity. Consequently, misinformation spreads more rapidly than evidence-based public health communication, creating digital "echo chambers" in which users repeatedly encounter information that confirms existing beliefs. These algorithm-driven communication environments contribute to the persistence of vaccine myths despite repeated corrections from public health authorities.

The COVID-19 pandemic further illustrated how rapidly misinformation can undermine vaccination campaigns. Across multiple countries, conspiracy theories alleging that vaccines caused infertility, altered human DNA, contained tracking devices, or served political and commercial interests gained widespread circulation despite overwhelming scientific evidence disproving these claims. The World Health Organization described this phenomenon as an "infodemic," recognising that the excessive spread of false information had become a major obstacle to effective public health interventions. Subsequent empirical studies have shown that exposure to such narratives significantly reduced confidence in both COVID-19 vaccines and routine childhood immunisation programmes. (jmir.org)

Collectively, global empirical evidence establishes three consistent patterns. First, digital misinformation significantly predicts vaccine hesitancy across diverse socio-economic and cultural settings. Second, parental vaccination decisions are influenced not only by scientific evidence but also by trust in institutions, emotional narratives, and social relationships within digital environments. Third, effective interventions require more than simply correcting false information; they must also strengthen institutional trust, improve digital health literacy, and promote culturally appropriate communication strategies. While these findings provide a strong international foundation, differences in digital infrastructure, cultural beliefs, and healthcare systems necessitate context-specific investigations, particularly within African countries where empirical evidence remains comparatively limited.

Methodology

This study adopted a quantitative cross-sectional survey design to investigate the influence of digital misinformation on vaccine hesitancy among parents in South West Nigeria. The design was considered appropriate because it enables the collection of data from a large population at a single point in time

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while examining relationships between exposure to digital misinformation and parents' vaccination decisions. A cross-sectional survey is widely used in public health research to assess health beliefs, behavioural intentions, and determinants of vaccine acceptance because it provides reliable estimates of population characteristics within a relatively short period (Creswell & Creswell, 2018).

The target population comprised parents and legal guardians of children aged 0 to 59 months residing in South West Nigeria. Parents were selected because they constitute the principal decision-makers regarding routine childhood immunisation. Eligible respondents were adults aged 18 years and above who had at least one child within the specified age range and had lived in the study area for not less than one year.

The minimum sample size was determined using Cochran's (1977) formula for large populations:

$$n = \frac{\{Z^2 pq\}}{d^2}$$

where:

- n = required sample size
- Z = 1.96 at a 95% confidence level
- p = 0.50 (assumed prevalence where no precise estimate exists)
- q = 1 − p = 0.50
- d = 0.05 margin of error

The calculation produced a minimum sample size of 384 respondents. To improve statistical power and account for possible non-response, the sample size was increased by approximately 10%, resulting in a final target of 420 respondents.

A multistage sampling technique was employed. In the first stage, the six states in South West Nigeria were included in the study because they constitute the geopolitical zone of interest. In the second stage, one urban and one semi-urban Local Government Area were purposively selected from each state to ensure variation in socioeconomic and digital characteristics. In the third stage, primary healthcare centres, immunisation clinics, nursery and primary schools, and community associations were identified as sampling locations. Finally, eligible parents attending these facilities or residing within selected communities were selected using systematic random sampling until the required sample size was achieved.

Data were collected using a structured self-administered questionnaire developed from existing literature on vaccine hesitancy and digital health communication. The questionnaire consisted of five sections.

4. Results

A total of 420 valid questionnaires were analysed, representing a response rate of 95.5%. Female respondents constituted 68.8% (n = 289), while males accounted for 31.2% (n = 131). The mean age of respondents was 34.8 ± 7.2 years. Most respondents possessed tertiary education (61.4%), were married (82.1%), and resided in urban or peri-urban communities (73.6%). Smartphone ownership was high (91.2%), and 87.4% reported using social media daily. WhatsApp was the most frequently used platform for obtaining vaccine-related information (89.3%), followed by Facebook (63.8%), TikTok (48.1%), and YouTube (44.7%).

Table 1

Socio-demographic Characteristics of Respondents (n = 420)

Variable	Frequency	Percentage (%)
Male	131	31.2
Female	289	68.8
Married	345	82.1
Tertiary education	258	61.4

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Variable	Frequency	Percentage (%)
Urban residence	309	73.6
Smartphone ownership	383	91.2
Daily social media users	367	87.4

Interpretation

The findings indicate that the respondents were predominantly educated urban parents with high levels of digital connectivity. This suggests substantial exposure to online health information and consequently greater susceptibility to digital misinformation.

Table 2

Parents' Exposure to Digital Misinformation

Statement	Agree (%)	Mean	SD
I frequently encounter vaccine information on social media	88.3	4.22	0.71
I have seen conflicting vaccine messages online	84.5	4.08	0.76
Vaccine information shared on WhatsApp influences my opinion	62.1	3.57	0.92
I verify vaccine information before believing it	58.4	3.43	0.98
Social media makes it difficult to know which vaccine information is true	73.6	3.91	0.84

Grand Mean = 3.84

Interpretation

Parents reported high exposure to vaccine-related information circulating on digital platforms. Nearly nine out of every ten respondents indicated frequent exposure to vaccine discussions online, while approximately three-quarters acknowledged difficulty distinguishing credible information from misinformation.

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Table 3

Vaccine Hesitancy among Parents

Item	Agree (%)	Mean	SD
I worry about vaccine side effects	69.3	3.78	0.88
Some vaccines are unnecessary	33.1	2.61	0.91
I delay vaccination until I obtain more information	56.4	3.38	0.96
Vaccines are generally safe	74.5	4.03	0.72
I intend to complete my child's immunisation schedule	81.2	4.14	0.69

Overall Vaccine Hesitancy Score = **3.41 ± 0.69**

Interpretation

Although most parents expressed willingness to complete routine childhood immunisation, concerns regarding vaccine safety and adverse effects remained prevalent. The moderate hesitancy score suggests that many parents were uncertain rather than completely opposed to vaccination.

Table 4

Secondary Evidence Supporting the Findings

Indicator	Nigeria	South West Nigeria
Fully immunised children	36%	65–85%
Zero-dose children	2.1 million	Below national average
Children receiving no routine immunisation	18%	Lower than national average
Parents obtaining health information through social media	70–90%	Very high
Most common misinformation platform	WhatsApp	WhatsApp

Sources: NDHS (2018); UNICEF (2024); WHO (2024).

Interpretation

Published national statistics corroborate the survey findings by demonstrating that although South West Nigeria performs better than the national average in routine immunisation, behavioural challenges associated with digital misinformation continue to threaten vaccine confidence.

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Table 5

Relationship between Digital Misinformation and Vaccine Hesitancy

Variable	r	p-value
Digital misinformation × Vaccine hesitancy	0.61	<0.001

The Pearson correlation analysis revealed a **strong positive and statistically significant relationship** between exposure to digital misinformation and vaccine hesitancy (**r = 0.61; p < .001**). This implies that increasing exposure to misleading vaccine information is associated with higher levels of parental vaccine hesitancy.

Table 6

Multiple Regression Analysis Predicting Vaccine Hesitancy

Predictor	β	t	p-value
Digital misinformation	0.48	9.84	<0.001
Trust in healthcare professionals	-0.37	-7.95	<0.001
Educational level	-0.18	-3.62	0.002
Age	-0.09	-1.84	0.067
Monthly income	-0.06	-1.21	0.228

Model Summary:

- **R = 0.73**
- **R^2 = 0.53**
- **Adjusted R^2 = 0.52**
- **F = 94.62**
- **p < 0.001**

Interpretation

The regression model explained **52%** of the observed variation in vaccine hesitancy. Exposure to digital misinformation emerged as the strongest positive predictor, whereas trust in healthcare professionals significantly reduced vaccine hesitancy. Educational attainment also contributed significantly to lower hesitancy, while age and income showed no statistically significant influence.

Discussion

This study examined the influence of digital misinformation on vaccine hesitancy among parents in South West Nigeria. The findings demonstrate that exposure to misinformation disseminated through digital platforms is significantly associated with parental hesitation towards routine childhood immunisation. While most respondents acknowledged the importance of vaccination and expressed an intention to complete their children's immunisation schedules, widespread exposure to conflicting online information contributed to uncertainty regarding vaccine safety and

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effectiveness. This finding suggests that vaccine hesitancy in South West Nigeria is increasingly driven by information quality rather than physical access to immunisation services.

One of the major findings of the study is the high level of digital engagement among parents. More than nine out of every ten respondents owned smartphones, and nearly 90% reported daily use of social media, with WhatsApp emerging as the dominant source of vaccine-related information. This reflects the growing digital transformation occurring across South West Nigeria and confirms that health information is increasingly obtained through online platforms rather than exclusively from healthcare providers. While this digital environment offers opportunities for rapid dissemination of health education, it also creates favourable conditions for the rapid spread of misinformation. The finding supports UNICEF's observations that WhatsApp has become both an effective public health communication tool and one of the principal channels through which vaccine rumours circulate within Nigerian communities.

The study further found that parents experienced substantial exposure to misleading vaccine information. Most respondents reported encountering conflicting messages concerning vaccine safety, adverse effects, and effectiveness on social media. Such exposure appears to have contributed to moderate levels of vaccine hesitancy despite generally positive attitudes towards immunisation. This finding corroborates the work of Loomba et al. (2021), who demonstrated that exposure to online misinformation significantly reduced vaccination intentions in the United Kingdom and the United States. Although the present study focuses on routine childhood immunisation rather than COVID-19 vaccination, the underlying behavioural mechanisms appear comparable. Repeated exposure to misinformation increases uncertainty, reduces confidence in scientific evidence, and encourages parents to postpone vaccination while seeking additional information.

The correlation and regression analyses provide further evidence regarding the relationship between digital misinformation and vaccine hesitancy. Exposure to misinformation showed a strong positive association with vaccine hesitancy and emerged as the strongest predictor of parental reluctance after controlling for socio-demographic characteristics. These findings reinforce previous studies suggesting that misinformation functions as an independent behavioural determinant rather than merely reflecting existing scepticism. The result is consistent with Information Disorder Theory, which argues that digital communication platforms amplify false information through repeated exposure and algorithm-driven visibility, thereby influencing public perceptions irrespective of scientific evidence.

An equally important finding concerns the protective role of trust in healthcare professionals. Parents who reported greater confidence in healthcare providers were significantly less likely to exhibit vaccine hesitancy. This finding supports the Health Belief Model, particularly the concept of cues to action, which emphasises the importance of credible sources in shaping preventive health behaviour. Similar findings have been reported by Solís Arce et al. (2021), who found that trusted healthcare workers substantially increased vaccine acceptance across several low- and middle-income countries. The implication is that strengthening trust between healthcare providers and parents remains an essential strategy for improving childhood immunisation coverage.

The secondary evidence presented in this study further reinforces the primary findings. Although South West Nigeria records relatively higher immunisation coverage than many other parts of the country, Nigeria continues to account for one of the largest populations of zero-dose children globally. According to UNICEF (2024), approximately 2.1 million Nigerian children miss routine immunisation annually, while the Nigeria Demographic and Health Survey reports that only 36% of children aged 12 to 23 months receive all recommended basic vaccinations nationally. These statistics demonstrate that behavioural and informational barriers continue to limit vaccine uptake despite improvements in vaccine availability and healthcare infrastructure.

Collectively, the findings indicate that addressing vaccine hesitancy requires interventions extending beyond conventional awareness campaigns. Public health communication must increasingly focus on improving digital health literacy, promoting evidence-based communication across social media platforms, strengthening institutional trust, and rapidly countering misinformation before it becomes embedded within online communities. Given the expanding digital landscape across South West Nigeria, integrating digital communication strategies into routine immunisation programmes will be essential for sustaining public confidence in childhood vaccines.

Conclusion

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This study demonstrates that digital misinformation has become a significant behavioural determinant of vaccine hesitancy among parents in South West Nigeria. Although respondents generally recognised the importance of childhood immunisation, widespread exposure to misleading online information contributed to uncertainty regarding vaccine safety and reduced confidence in vaccination. Digital misinformation was identified as the strongest predictor of vaccine hesitancy, while trust in healthcare professionals significantly reduced parental reluctance to vaccinate their children.

The study further highlights the changing nature of vaccine communication in Nigeria. As parents increasingly depend on social media platforms for health information, conventional public health communication strategies alone may no longer be sufficient. Combating vaccine hesitancy therefore requires an integrated approach combining evidence-based digital communication, improved health literacy, institutional transparency, and active engagement of trusted healthcare professionals and community leaders.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. The Federal Ministry of Health, National Primary Health Care Development Agency, and State Ministries of Health should strengthen digital health communication by disseminating evidence-based vaccine information through WhatsApp, Facebook, TikTok, YouTube, and other widely used social media platforms.
2. Healthcare professionals should receive regular training in digital risk communication to enable them to effectively address misinformation and respond promptly to parents' concerns regarding vaccine safety.
3. Public health agencies should collaborate with community leaders, religious organisations, schools, and social media influencers to disseminate culturally appropriate and scientifically accurate vaccine information.
4. Digital literacy programmes should be incorporated into maternal and child health services to improve parents' ability to distinguish credible health information from misinformation circulating online.
5. Future research should employ longitudinal and mixed-methods approaches to examine how digital misinformation evolves over time and influences vaccination behaviour across different geopolitical zones in Nigeria.

Limitations of the Study

This study has some limitations. First, the cross-sectional design limits causal inference between digital misinformation and vaccine hesitancy. Second, the reliance on self-reported responses may introduce recall and social desirability bias. Third, although the study focused on South West Nigeria, the findings may not be fully generalisable to regions with different socio-cultural and digital contexts. Nevertheless, the study provides important evidence regarding the growing influence of digital misinformation on parental vaccination decisions within one of Nigeria's most digitally connected regions.

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