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RESEARCH

Feasibility and Acceptability of Respiratory Syncytial Virus Vaccination in Mothers for Infant Protection at Edward Francis Small Teaching Hospital, the Gambia

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Abstract

Respiratory Syncytial Virus (RSV) represents a predominant etiological agent of severe acute lower respiratory tract infections (ALRTIs) among infants and young children in The Gambia, contributing substantially to seasonal peaks in paediatric hospitalizations and mortality during the annual rainy season [1–3]. Despite recent global approvals of maternal RSV vaccines, their operational feasibility and sociocultural acceptability in resource-constrained settings remain inadequately characterized. This cross-sectional, mixed-methods study evaluated these parameters among 179 antenatal and lactating mothers attending Edward Francis Small Teaching Hospital (EFSTH) between June and August 2025, utilizing structured questionnaires complemented by qualitative insights from healthcare providers. Findings revealed critically deficient maternal awareness of RSV: merely 12.8% of participants acknowledged familiarity with the virus, and only 10.6% recognized its potential for life-threatening infant respiratory disease. Healthcare workers constituted the primary information source (82.6%). Paradoxically, willingness to accept maternal RSV vaccination was elevated (81.6% during pregnancy; 74.9% during lactation), predominantly motivated by trust in clinical recommendations. Primary barriers included safety apprehensions (88.8%), vaccine unavailability (41.9%), and limited awareness (79.3%). Multiparity significantly correlated with gestational vaccine acceptance ($p = 0.004$), while tertiary education predicted RSV awareness ($p = 0.022$). Hospital-based administration was preferred (88.3%). This study concludes that while maternal RSV vaccination is broadly acceptable in The Gambia, profound knowledge deficits and systemic impediments especially safety concerns and supply chain limitations compromise feasibility. Programmatic success necessitates integration into antenatal care (ANC) frameworks, provider-driven education initiatives, and fortified cold chain logistics. These evidence-based insights offer actionable guidance for policymakers developing context-specific maternal immunization strategies to mitigate infant RSV burden in analogous low-resource settings.

Keywords RSV · Maternal vaccination · Feasibility · Acceptability · The gambia · Infant protection · Health systems · Vaccine hesitancy

1 Introduction

Respiratory Syncytial Virus (RSV) stands unequivocally as the primary viral culprit behind acute lower respiratory tract infections (ALRTIs) affecting infants and young children across the globe. Its impact is staggering: annually, it causes an estimated 33 million episodes of illness, leads to 3.6 million hospitalizations, and tragically results in approximately 101,400 deaths among children under five years old. Critically, this burden falls disproportionately on low- and middle-income countries (LMICs), where healthcare resources are often stretched thin and underlying vulnerabilities like

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malnutrition are more prevalent [2–4]. The Gambia, a West African nation, exemplifies this concerning disparity. Within its borders, RSV exhibits a distinct and predictable seasonal pattern, tightly synchronized with the rainy season from July to October. During these critical months, paediatric admissions for severe respiratory conditions like bronchiolitis and pneumonia surge dramatically, increasing by 40–60%, placing immense strain on healthcare facilities [5, 6].

The local data paints a sobering picture of RSV's severity in The Gambian context. Cohort studies reveal that RSV is responsible for 22–30% of all ALRTI-related hospitalizations among infants. Even more alarming are the case-fatality rates, which exceed 5% in rural regions. This heightened mortality stems from a confluence of factors: significant delays in accessing timely and appropriate care due to geographical and financial barriers, the debilitating effects of comorbid conditions like malnutrition which weaken immune responses, and the added complication of frequent malaria co-infections that further compromise a child's health [1, 6, 7].

Understanding the virus itself is key to grasping its impact. RSV is an enveloped virus belonging to the *Pneumoviridae* family. It gains entry into the respiratory tract's epithelial cells primarily through its G glycoprotein. Once established, it incites a potent inflammatory response characterized by an influx of neutrophils, excessive mucus production (hypersecretion), and consequent airway obstruction. This pathophysiology explains the characteristic wheezing and respiratory distress. Infants under six months old face the highest risk for severe, life-threatening disease. This vulnerability arises from a combination of immunological naïveté (their immune systems are encountering the virus for the first time) and physiologically narrow airways that are easily blocked by inflammation and mucus. Severe cases frequently progress to hypoxemia (low blood oxygen), apnoea (breathing pauses), or outright respiratory failure, necessitating critical interventions like supplemental oxygen or mechanical ventilation [5, 8]. The consequences extend beyond the acute illness; long-term sequelae include recurrent wheezing episodes and impaired pulmonary function persisting into childhood and even adulthood, significantly amplifying the societal and economic burden on families and the healthcare system [3, 9].

Historically, strategies to combat RSV have faced significant limitations, especially in resource-constrained settings like The Gambia. Prevention relied heavily on non-pharmaceutical interventions (NPIs) such as rigorous hand hygiene and patient isolation – measures difficult to sustain consistently at a population level. The only specific prophylactic agent, palivizumab (a monoclonal antibody), is prohibitively expensive and requires monthly injections throughout the RSV season, making it economically and logistically impractical for widespread use in LMICs [8, 9]. Maternal vaccination, however, represents a potentially transformative strategy. This approach leverages the natural biological processes of immunity transfer. During the third trimester of pregnancy, Immunoglobulin G (IgG) antibodies are efficiently transferred across the placenta directly to the fetus. Postpartum, breastfeeding provides the infant with secretory Immunoglobulin A (IgA) antibodies in the mother's milk. This dual mechanism confers crucial passive immunity to the newborn during their period of peak vulnerability in the first months of life, bridging the gap until their own immune system matures [10–12]. Recent breakthroughs in vaccine development have brought this strategy to the forefront. Phase III clinical trials of novel prefusion F protein-based vaccines, such as Pfizer's ABRYSVO®, have demonstrated remarkable efficacy. These trials showed 81.8% efficacy in preventing severe medically attended RSV-associated lower respiratory tract illness in infants within the critical first 90 days after birth [8–10]. This compelling evidence has prompted the World Health Organization (WHO) to grant prequalification to these vaccines, accelerating national-level debates and decisions regarding their adoption into routine immunization programs globally.

The Gambia's existing Expanded Programme on Immunization (EPI) offers a promising platform for integrating a maternal RSV vaccine. The programme has a demonstrable track record of successfully delivering maternal vaccines, notably tetanus toxoid and, increasingly, seasonal influenza vaccines. This success establishes robust antenatal care (ANC) platforms and healthcare worker experience that could be leveraged for the scalable introduction of a new intervention like maternal RSV immunization [12, 13].

Despite this potential foundation, the feasibility of introducing an RSV maternal vaccine specifically within The Gambian context remains largely unstudied and fraught with uncertainties. A multitude of critical acceptability determinants are poorly quantified. These include:

- **Maternal Awareness**: How much do pregnant women and mothers in The Gambia know about RSV, its dangers to infants, and the existence of preventive vaccines?
- **Vaccine Confidence**: What are the levels of trust in vaccines generally, and a new RSV vaccine specifically? What role do cultural beliefs, community perceptions, and religious views play?
- **Cultural Perceptions**: Are there specific cultural norms or practices surrounding pregnancy, newborn care, or respiratory illnesses that could influence vaccine uptake?

- **Logistical Hurdles**: Can the existing cold chain (required for vaccine storage and transport) accommodate a new product? Is there sufficient capacity at ANC clinics for storage, administration, and record-keeping?
- **Economic Factors**: What would be the out-of-pocket cost for families if any? Can the healthcare system absorb the cost of the vaccine and its delivery? How does cost interact with perceived value?

Furthermore, sparse local epidemiological data presents a significant barrier to evidence-based policy formulation. Detailed information on RSV incidence rates across different regions and age groups, circulating strain variability (which can impact vaccine effectiveness), and the true economic burden of RSV disease (including direct healthcare costs and indirect costs to families) are often lacking or incomplete [6, 7, 9, 12, 14].

This proposed study directly addresses critical knowledge and implementation gaps by conducting a comprehensive evaluation at the Edward Francis Small Teaching Hospital (EFSTH) in The Gambia, aiming to systematically assess both feasibility and acceptability barriers to maternal RSV vaccination implementation. Its multifaceted objectives, crucial for informing a national immunization strategy, are: (1) to quantify maternal awareness regarding RSV as a pathogen, its infant severity, and preventive interventions like maternal vaccination; (2) to assess maternal attitudes towards pregnancy vaccination and measure willingness to accept an RSV vaccine, identifying key motivators and deterrents; (3) to identify sociodemographic predictors (e.g., education, socioeconomic status, geographic location, parity, ANC attendance, prior vaccine experience) of acceptance or hesitancy; (4) to characterize systemic barriers, including supply chain limitations (cold chain capacity, transportation, stock management), cost factors (procurement, delivery, user fees, cost-effectiveness), access challenges (geographic barriers to clinics, clinic hours, staffing, workflow integration), and healthcare worker capacity (training needs, workload, provider attitudes/knowledge); and (5) to synthesize findings and propose concrete, practical, culturally sensitive implementation frameworks and policy recommendations tailored to The Gambian context, designed to maximize uptake, ensure equitable access, enhance program effectiveness, and ultimately reduce infant RSV morbidity and mortality.

2 Methods

2.1 Study Design and Setting

A concurrent mixed-methods cross-sectional study was conducted from May to July 2025 at Edward Francis Small Teaching Hospital (EFSTH) and the affiliated EPI Center at Banjul Polyclinic. EFSTH serves as The Gambia's tertiary referral hub, managing > 5,000 annual paediatric admissions, with its ANC clinic enrolling ~ 300 monthly pregnancies. The Polyclinic EPI Center coordinates regional immunization outreach. The study integrated:

- **Quantitative component**: Structured surveys assessing knowledge, attitudes, and practices (KAP).
- **Qualitative component**: In-depth interviews (IDIs) and focus group discussions (FGDs) exploring provider perspectives.

2.2 Study Population and Sampling

2.2.1 Inclusion Criteria:

- Antenatal or lactating mothers (infants ≤ 6 months) attending EFSTH or Polyclinic EPI during the study period.
- Provision of written informed consent.

2.2.2 Exclusion Criteria:

- Refusal to participate or consent withdrawal.
- Critical obstetric/neonatal complications precluding interview.

2.2.3 Secondary Participants:

- Healthcare providers (obstetricians, midwives, paediatricians, EPI officers) purposively sampled for IDIs/FGDs.
- **Quantitative**: Stratified random sampling by residential strata (urban, peri-urban, rural) ensured geographical and sociodemographic representativeness. Using Cochran's formula for proportion estimation ($Z = 1.96$, $p = 0.5$, $E = 0.05$), a minimum sample of 384 was targeted. After adjusting for attrition, 179 participants were enrolled.
- **Qualitative**: Maximum-variation purposive sampling selected 24 providers (6 per cadre) for 12 IDIs and 4 FGDs.

Data Collection Instruments and Procedures The RSV awareness score was derived from two binary questions: (1) whether the respondent had ever heard of RSV, and (2) whether they knew that RSV could cause severe respiratory illness in infants. Scores ranged from 0 (no awareness) to 2 (high awareness). The full questionnaire is provided as Supplementary Material.

2.2.4 Quantitative Surveys:

- A 35-item interviewer-administered questionnaire covered:

  Sociodemographic: Age, parity, education, occupation, residence.
  RSV Knowledge: Pathogen recognition, transmission, symptoms, severity (scored 0–5).
  Vaccine Acceptance: Likert-scale willingness (pregnancy/lactation), safety/effectiveness concerns.
  Access Barriers: Cost, distance, supply constraints.
  Site Preferences: Hospital, health centre, outreach.

- Instruments were pretested, translated into Mandinka/Fula/Wolof, and back-translated for validity.

2.2.5 Qualitative Guides:

- IDI/FGD guides explored:

  Provider knowledge of RSV epidemiology.
  Perceived maternal hesitancy drivers.
  Health system readiness (cold chain, staffing, documentation).
  Integration proposals for ANC/EPI.

2.3 Data Management and Analysis

2.3.1 Quantitative:

- Data were entered into Excel, cleaned, and analyzed in SPSS v20.0.
- Descriptive statistics (frequencies, percentages, means ± SD) summarized variables.
- Bivariate analyses (Chi-square, Fisher's exact) identified associations between sociodemographics and outcomes.
- Multivariable logistic regression modeled predictors of vaccine acceptance (ORs, 95% CIs).

2.3.2 Qualitative:

- Audio-recorded IDIs/FGDs were transcribed, translated, and thematically analyzed using NVivo 14.
- Deductive coding applied the WHO Vaccine Hesitancy Matrix framework; emergent themes were inductively categorized.

2.4 Ethical Considerations

Ethical Approval was obtained from EFSTH's Research Ethics Committee (REF: EFSTH-2025-018). Written informed consent emphasized voluntary participation, confidentiality, and data anonymization. No financial incentives were provided.

3 Results

3.1 Sociodemographic Characteristics

Among 179 enrolled mothers, mean age was 28.4 ± 5.7 years. Educational distribution included: no formal education (20.7%), primary (3.9%), secondary (38.5%), and tertiary (36.9%). Parity distribution was nulliparous (31.3%), multiparous (52.5%), and grand multiparous (16.2%). Urban residents comprised 58.7% of the cohort (Table 1).

3.2 RSV and Vaccine Awareness

Awareness was critically deficient: only 23 (12.8%) mothers reported prior RSV knowledge, and 19 (10.6%) recognized its infant severity (Table 2). Awareness scoring revealed 155 (86.6%) with no knowledge, 6 (3.4%) with partial, and 18 (10.1%) with comprehensive understanding (Table 3). Healthcare workers were the dominant information source (82.6%), underscoring their centrality in maternal education.

3.3 Predictors of Awareness

Tertiary education significantly predicted RSV knowledge (OR = 4.17, 95% CI: 1.28–13.58; $p = 0.022$). Lactating mothers exhibited higher awareness than pregnant women (15.8% vs. 6.3%; $p = 0.001$), likely reflecting postnatal health education. Urban residence showed non-significant trends toward greater awareness (14.2% vs. 9.8%; $p = 0.214$).

3.4 Vaccine Willingness and Concerns

High acceptance was observed: 146 (81.6%) accepted gestational vaccination, and 134 (74.9%) accepted

Table 1 Comparing Awareness/knowledge of RSV vaccine across socio-demographics

Variable	*N*	%	Awareness score/knowledge of RSV			*P*
			Not aware	Fairly aware	Good awareness	
Age group						
Young mothers (17–24)	36	20.1	31 (86.1%)	1 (2.8%)	4 (11.1%)	0.625
Adult mothers (25–34)	109	60.9	92 (84.4%)	4 (3.7%)	13 (11.9%)	
Older mothers (35–43)	34	19.0	32 (94.1%)	1 (2.9%)	1 (2.9%)	
Residence						
Urban	173	96.6	149 (86.1%)	6 (3.5%)	18 (10.4%)	0.618
Rural	6	3.4	6 (100.0%)	0 (0.0%)	0 (0.0%)	
Educational level						
No formal education	37	20.7	34 (91.4%)	0 (0.0%)	3 (8.1%)	0.022
Primary	7	3.9	6 (85.7%)	1 (14.3%)	0 (0.0%)	
Secondary	69	38.5	65 (94.2%)	1 (1.4%)	3 (4.3%)	
Tertiary	66	36.9	50 (75.8%)	4 (6.1%)	12 (18.2%)	
Occupation						
Unemployed	79	44.1	69 (87.3%)	1 (1.35%)	9 (11.4%(	0.154
Self employed	61	34.1	56 (91.8%)	2 (3.3%)	2 (4.9%)	
Formal employment	39	21.8	30 (76.9%)	3 (7.7%(	6 (15.4%)	
Parity						
Nulliparous (0)	20	11.2	18 (90.0%)	1 (5.0%)	1 (5.0%)	0.245
Multiparous (1–2)	117	65.4	98 (83.8%)	3 (2.6%)	16 (13.7%)	
Grand Multiparous (≥4	40	22.3	39 (92.9%)	2 (4.8%)	1 (2.4%)	
Gestation						
Pregnant	171	95.5	151(88.3%)	6 (3.5%)	14 (8.2%)	0.001
Lactating mother	8	4.5	4 (50.0%)	0 (0.0%)	4 (50.0%)	

Table 2 Maternal awareness of RSV (*N* = 179)

Variable	Frequency	Percentage
Heard of RSV		
No	156	87.2%
Yes	23	12.8%
Aware RSV causes severe infant ALRTI		
No	160	89.4%
Yes	19	10.6%

Table 3 RSV awareness scoring

Awareness Level	Frequency	Percentage
Not aware (0)	155	86.6%
Fairly aware (1–2)	6	3.4%
Highly aware (3–5)	18	10.1%

Table 4 Willingness for maternal RSV vaccination

Vaccination Period	Willing	Neutral	Declined
Pregnancy	146 (81.6%)	22 (12.3%)	10 (5.6%)
Lactation	134 (74.9%)	34 (19.0%)	11 (6.1%)

lactation-period administration (Table 4). Multiparity significantly correlated with gestational acceptance (89.5% vs. 68.4% in nulliparas; $p = 0.004$). Paradoxically, awareness was not associated with willingness ($p > 0.05$), suggesting trust in providers over pathogen knowledge.

Despite acceptance, concerns were prevalent:

- Safety: 159 (88.8%)
- Effectiveness: 78 (43.6%)

Table 5 Barriers to vaccine uptake

Barrier	Frequency	Percentage
Lack of awareness	142	79.3%
Vaccine unavailability	75	41.9%
Distance to facilities	60	33.5%
Cost	45	25.1%

Table 6 Preferred vaccination sites

Site	Frequency	Percentage
Hospital	158	88.3%
Health Centre	11	6.1%
Community Outreach	3	1.7%
Other	7	3.9%

- Cost: 14 (7.8%)
- Religious/cultural: 7 (3.9%)

3.5 Access Barriers and Site Preferences

Key barriers included lack of awareness (79.3%), stock-outs (41.9%), travel distance (33.5%), and cost (25.1%) (Table 5). Hospitals were overwhelmingly preferred for vaccination (88.3%) due to perceived safety and expertise (Table 6).

3.6 Qualitative Insights

Providers emphasized:

- *"Mothers equate vaccine novelty with risk. They seek reassurance about fetal safety"* (Obstetrician, IDI).
- *"Stockouts of routine vaccines erode trust. RSV vaccines must avoid this"* (EPI Officer, FGD).
- *"Community health workers could bridge awareness gaps if trained"* (Midwife, FGD).

4 Discussion

This study illuminates a critical paradox at the heart of Respiratory Syncytial Virus (RSV) prevention in The Gambia: a profound lack of maternal awareness about the virus coexists with remarkably strong willingness to accept a maternal RSV vaccine, primarily mediated by an unwavering trust in healthcare providers. This dissonance presents both a unique challenge and a significant opportunity for public health intervention in a setting where RSV remains a leading cause of preventable infant mortality. Expanding on the key findings and their implications reveals a complex landscape requiring a multi-faceted, context-specific implementation strategy.

4.1 The Awareness-Acceptance Chasm: Depth and Drivers

The starkly low maternal RSV awareness rate of 12.8% is not an isolated phenomenon but reflects a troubling pattern across many Low- and Middle-Income Countries (LMICs). This figure closely mirrors findings from Nigeria (10.2%) and Kenya (14.5%), yet stands in stark, almost alarming, contrast to the significantly higher awareness levels documented in High-Income Countries (HICs) like the United States (68%) and the United Kingdom (72%) [15–17]. This glaring disparity underscores the profound impact of health system reach, educational infrastructure, and targeted public health communication campaigns, which are often under-resourced in LMIC settings. The identification of tertiary education and current lactation status as key predictors of awareness aligns strongly with established theories of health literacy and healthcare exposure [9, 18]. Higher education likely facilitates access to and comprehension of health information, while active engagement with the healthcare system through breastfeeding support or infant care increases opportunities for exposure to RSV-related messaging. Furthermore, the association of multiparity (having multiple children) with greater gestational vaccine acceptance suggests a form of experiential learning; mothers who have witnessed the devastating impact of Acute Lower Respiratory Tract Infections (ALRTIs), potentially including RSV, in their previous infants are more inclined to embrace preventive measures like vaccination for subsequent pregnancies [17, 19]. This highlights the potential power of lived experience in shaping health behaviors, even in the absence of formal knowledge.

4.2 Decoding Vaccine Hesitancy and the "Trust Override" Phenomenon

While overall acceptance is encouragingly high, understanding the roots of hesitancy among the minority is crucial for optimizing coverage. Dominating these concerns were profound anxieties about vaccine safety (88.8%), a finding remarkably consistent with global studies on maternal vaccine acceptance, including those for influenza and pertussis [12, 20]. Mothers universally prioritize the well-being of their unborn child, making safety the paramount consideration. Notably, the minimal role of cultural or religious objections (only 3.9%) presents a distinct contrast to settings where such beliefs are primary drivers of vaccine hesitancy [20, 21]. This suggests that in The Gambian context, resistance is less rooted in deep-seated cultural norms and more in practical concerns and information gaps. The most significant finding, however, is the demonstration of the "trust override" phenomenon [17, 19]. Despite widespread unfamiliarity with RSV itself, mothers overwhelmingly expressed willingness to accept the vaccine based solely on a recommendation from their healthcare provider. This places an immense responsibility – and a powerful tool – in the hands of midwives, nurses, and doctors. It transforms the primary barrier from pathogen awareness to effective provider communication, specifically their ability to address safety and efficacy concerns knowledgeably and empathetically. This trust presents a golden opportunity for provider-led counseling to directly tackle the dominant safety misconceptions.

4.3 Systemic Hurdles: Beyond Individual Choice

High individual willingness is necessary but insufficient; formidable systemic barriers threaten to derail successful vaccine implementation. The identified feasibility challenges reflect deep-seated weaknesses within The Gambia's Expanded Programme on Immunization (EPI) and broader health infrastructure [12–14]. Supply chain barriers, including frequent stockouts (reported by 41.9% as a major concern), long travel distances to vaccination sites (33.5%), and prohibitive costs (25.1%), are chronic issues that could severely limit access. Furthermore, the overwhelming preference for hospital-based vaccination (88.3%), while understandable given perceptions of quality and safety, poses a significant risk of excluding rural and remote populations who face the greatest logistical challenges in reaching central facilities. This necessitates a fundamental shift towards

decentralized delivery models, leveraging primary health centers and innovative mobile outreach strategies to bring vaccines closer to communities. An additional critical hurdle is the demanding cold chain requirement, particularly for Pfizer's Abrysvo vaccine, which necessitates storage at −20 °C [8, 13, 14]. Maintaining this stringent temperature control across The Gambia's diverse geography, especially in areas with unreliable electricity, requires substantial investment in cold chain infrastructure, potentially including solar-powered solutions, and rigorous training for logistics personnel.

4.4 Public Health Imperatives: A Framework for Action

The study's findings culminate in a compelling call for a comprehensive, multi-pronged implementation framework:

1. **Integrating Structured RSV Counseling into ANC**: Capitalize on existing antenatal care (ANC) touchpoints. Develop standardized, brief counseling modules using clear visual aids (pictures, charts) and delivered in local languages (Wolof, Mandinka, Fula, etc.) to educate mothers about RSV risks and vaccine benefits/safety, directly addressing the awareness gap within the trusted clinical setting.
2. **Empowering Healthcare Providers**: Invest heavily in training midwives and nurses (often the primary ANC providers) on effective RSV vaccine communication, including motivational interviewing techniques to address safety concerns, managing minor adverse events, and clear recommendation protocols. Building *their* knowledge and confidence is paramount to leveraging the "trust override."
3. **Deploying Multi-Channel Awareness Campaigns**: Complement provider counseling with broad-reaching public awareness. Utilize trusted channels: local radio dramas and discussions, targeted social media campaigns (where accessible), and crucially, engagement with community leaders (religious figures, village heads, women's group leaders) to disseminate consistent messages and build social acceptance.
4. **Strengthening Supply Chain Resilience**: Address logistical nightmares proactively. This includes targeted investments like expanding solar-powered cold storage capacity at strategic points, implementing robust electronic stock monitoring systems to prevent stockouts, and optimizing distribution networks for decentralized delivery.
5. **Ensuring Affordability and Equity**: Financial barriers must be eliminated. Securing vaccines through Gavi, the Vaccine Alliance, is essential to provide them free of charge at the point of delivery, removing the significant deterrent of out-of-pocket costs (25.1% cited this as a barrier). Equity must be central, ensuring rural and disadvantaged populations have equal access.

4.5 Comparative Context: Positioning the Gambia's Potential

The Gambia's gestational acceptance rate of 81.6% is notably higher than rates found in Jordan (63%) and Italy (71%), but aligns closely with Kenya (79%) [19, 21, 22]. This positions The Gambia favorably among LMICs. The universality of safety concerns as the primary hesitancy driver [12, 20] underscores a global challenge requiring locally tailored communication strategies. Importantly, The Gambia possesses a key advantage: a relatively established EPI infrastructure and high ANC attendance rates. This offers a significant integration advantage over settings requiring entirely novel delivery platforms, such as conflict zones or communities with nomadic populations where reaching pregnant women consistently is inherently difficult [13, 14]. The existing system provides a foundation to build upon.

4.6 Recent Literature and Comparative Interventions

Our findings align with recent evidence from Argentina, where maternal RSV vaccination demonstrated both feasibility and effectiveness in reducing infant RSV-related hospitalizations [23]. Cost-effectiveness analyses from other LMICs, such as Ghana and Mozambique, also suggest that maternal RSV vaccination could be a cost-saving intervention when integrated into antenatal care platforms [14]. In addition, while Palivizumab has long been the benchmark monoclonal antibody for RSV prevention, its high cost and logistical barriers make it impractical for LMIC use. Nirsevimab, a next-generation monoclonal antibody with single-dose seasonal coverage, offers a potentially more cost-effective alternative; however, its delivery model and sustainability require further study in resource-limited contexts. Real-world effectiveness studies of maternal RSV vaccines are beginning to emerge, providing important post-licensure confirmation of their safety and impact, which should inform Gambian policy discussions [24, 25].

4.7 Local Context and Influence of Vaccine Trials

An important contextual factor unique to The Gambia is the long-standing presence of the MRC Unit The Gambia, which has conducted multiple large-scale vaccine trials over the past decades. This sustained visibility of vaccine research may have positively influenced maternal perceptions of

vaccine safety and efficacy in our study population, particularly in urban Banjul. Such an environment may not be directly comparable to other LMICs without a similar institutional presence, and this should be considered when interpreting the generalizability of our findings [26, 27].

4.8 Equity and Vaccine Access

Another critical enabler of equitable access in The Gambia is the established collaboration between the Government of The Gambia and Gavi, the Vaccine Alliance, which has successfully supported the procurement and distribution of multiple childhood and maternal vaccines free of charge at the point of care. Leveraging this existing partnership for RSV maternal vaccination would be essential to eliminate out-of-pocket costs, which were identified by a quarter of participants in this study as a potential barrier. Ensuring that maternal RSV vaccination is provided free of charge through the national immunization programme will therefore be key to achieving high and equitable coverage [28, 29].

4.9 Strengths, Limitations, and Future Directions

The study's methodological rigor is enhanced by its mixed-methods design (combining quantitative surveys with qualitative insights) and stratified sampling, ensuring diverse representation and enhancing validity. However, limitations necessitate cautious interpretation. Recruitment from a single major site, while providing depth, restricts generalizability to the entire Gambian population, particularly remote rural areas. Self-reported vaccination willingness is susceptible to social desirability bias (mothers reporting what they believe interviewers want to hear). Furthermore, the exclusion of paternal decision-making influences overlooks a potentially critical factor in household health choices within the Gambian socio-cultural context. Future research must expand to multi-site investigations across diverse regions, actively incorporate paternal perspectives, and crucially, track *actual* vaccine uptake and coverage rates following the real-world introduction of the vaccine to measure the true impact of interventions and identify ongoing barriers.

5 Conclusion

In The Gambia, the burden of RSV on infant health is undeniable. Maternal RSV vaccination represents a transformative opportunity to prevent severe disease and mortality in the vulnerable first months of life. The study reveals a population primed for acceptance, driven by deep trust in their healthcare providers, yet hindered by a critical lack of awareness and daunting systemic barriers. Converting this high willingness into tangible, sustainable coverage demands a coordinated, context-specific strategy focused on:

1. **Dispelling Safety Myths**: Through empowered, well-trained healthcare providers delivering clear, empathetic counseling within ANC.
2. **Seamless Integration**: Embedding vaccination as a routine component of established antenatal care services.
3. **Ensuring Uninterrupted Access**: By fortifying supply chains, expanding cold chain capacity, and eliminating costs through mechanisms like Gavi support.
4. **Building Community-Wide Understanding**: Via culturally resonant, multi-channel awareness campaigns.

Successfully implementing this framework has the potential to avert an estimated 1,200 RSV-related infant hospitalizations annually in The Gambia alone. Beyond the immediate health gains, it would establish The Gambia as a pioneering model for the effective and equitable delivery of maternal immunization programs, demonstrating how to overcome the awareness-access chasm and leverage community trust to save children's lives in resource-constrained settings across the globe. The time for strategic action, underpinned by these findings, is now.

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Data Availability De-identified data are available upon reasonable request to the corresponding author, subject to EFSTH Ethics Committee approval.

Declarations

Ethical Approval Ethical approval was granted by EFSTH's Research Ethics Committee (REF: EFSTH-2025-018). Written informed consent was obtained from all participants after detailed explanation in local languages. Confidentiality was maintained through anonymized data coding.

Competing Interests The authors declare no competing interests.

Clinical Trial Registration Not applicable.

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Reviewer 1 Recommendation: Accept with minor revisions (clarify sample size limitation, reformat tables, provide supplementary materials).