



Characterizing Attitudes Toward Maternal RSV Vaccines Among Pregnant and Lactating Persons in Kenya: Key Considerations for Demand Generation Efforts for Vaccine Acceptance

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This study examined attitudes toward maternal RSV vaccines among pregnant and lactating persons in Kenya. First pregnancy was associated with higher vaccine hesitancy among pregnant and lactating people, and social norms were associated with higher vaccine hesitancy among lactating people. Understanding maternal RSV attitudes is critical for vaccine acceptance.

Key words. Kenya; maternal immunization; RSV; vaccine hesitancy.

INTRODUCTION

Respiratory syncytial virus (RSV) is the leading viral cause of lower respiratory tract infection (LRTI) and bronchiolitis in infants and is a major cause of hospitalization and mortality globally [1]. In 2019 there were 33 million RSV-associated LRTI episodes in children 0–60 months, with >95% of these cases occurring in low- and middle-income countries [1]. Passive immunization using monoclonal antibodies can avert serious

illness in infants but is not widely available outside of high-income settings [2].

In Kenya, between 2010 and 2018, the rate of RSV-associated hospitalized severe acute respiratory illness was 304–404 cases/100 000 children; the highest mortality burden was in children <6 months [3]. Recent RSV maternal vaccine phase 3 trial results indicate vaccine efficacy of ~82% at 90 days and 70% at 180 days post-birth [4].

Maternal vaccination is an important strategy to prevent maternal, neonatal, and infant disease; vaccination in pregnancy confers protection to infants through the period of highest risk of severe disease [5]. Maternal acceptance of vaccination is influenced by perceived risk of disease, perceived vaccine effectiveness, social norms about vaccination behaviors during pregnancy, among other factors [6]. An RSV vaccine given to pregnant persons during their pregnancy may emerge as early as 2024; however, product availability does not necessarily translate into uptake, and accessibility is critically important in low- and middle-income settings. In fall 2022, we surveyed pregnant and lactating persons in Kenya to characterize attitudes toward maternal RSV vaccines to inform demand generation needs, as maternal RSV vaccine introduction may be considered for Kenya.

METHODS

We recruited participants from 20 health facilities split across two counties: Nakuru (rural), and Mombasa (urban). The selected health facilities represented a range of health facility types, from level 1 (community outpatient units) through level 5 (specialized referral hospitals), which served people of varying ethnicities and socioeconomic status.

All data collectors went through a data collector training. Recruitment procedures varied by facility, due to differences in facility structure and patient volume. Generally, participants were approached consecutively upon arrival at antenatal clinics, maternity wards, or maternal and child health units; facility staff referred participants who may have been missed upon arrival to study personnel. If a participant met the inclusion criteria (18+, currently breastfeeding or second or third trimester of pregnancy, and able to consent), oral consent was obtained and surveys were administered in either English or Swahili using tablets with all data stored on encrypted servers. This study received ethical approval from (*blinded for review*) and (*blinded for review*).

To explore participants' familiarity with the clinical presentation of RSV, we began each survey by showing each participant a short, 10-s video of a baby with RSV that had RSV-characteristic wheezing. We did this as there is generally conflation of RSV

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with other respiratory illnesses and by showing all participants a video, hoped to increase the validity of survey item responses. Survey items were drawn from constructs from the behavioral and social drivers of vaccination framework (BeSD) [7], including perceived prevalence of RSV for babies (1 item), perceived risk of RSV for mothers (1 item), perceived risk of RSV for babies (2 items); we used 5-point Likert scales as these were knowledge questions (strongly agree to strongly disagree; don't know). We asked about social norms of RSV vaccine acceptance (2 items), self-efficacy for vaccination (1 item), perceived barriers of vaccination (1 item), maternal immunization vaccine safety (2 items), maternal immunization vaccine effectiveness (2 items); we used 4-point Likert scales as these were attitudinal or belief questions (strongly agree to strongly disagree). We also measured vaccine hesitancy (4 items). A vaccine hesitancy score was developed that was a composite score of the 3 or 4 items, depending on whether it was a participant's first pregnancy (3 items) or subsequent pregnancy (4 items), with scores of 0–1 classified as lower hesitancy and scores of 2 or more classified as higher hesitancy. We asked participants questions related to gender, age, trimester, number of children, and highest level of education.

We conducted univariable logistic regression of sociodemographic factors and behavioral and social driver constructs with vaccine hesitancy as the outcome of interest to explore factors that may be associated with higher levels of vaccine hesitancy, adjusting for pregnancy status (pregnant vs lactating/not pregnant).

RESULTS

The sample included 400 participants, all identifying as female; 25% were pregnant and 75% were lactating. The majority of the sample were ages 18–29 (67%), among those that were pregnant, the majority were in their third trimester (55%), and 33% had completed primary school, with 33% having one child. The majority (87%) had higher perceived RSV prevalence, higher perceived RSV risk (54%), higher supportive norms (80%), higher self-efficacy (87%), lower perceived barriers (83%), high confidence in vaccine safety (97%) and high trust in vaccine effectiveness (89%); see [Supplementary Table 1](#).

In univariable logistic regression, among pregnant people, the only factor associated with higher vaccine hesitancy was primigravida/multigravida status—people who were experiencing their first pregnancy (primigravida) were more than 3 times as likely to be characterized as having higher vaccine hesitancy compared with those not in their first pregnancy (multigravida) ([Table 1](#)). Among lactating people, there were two factors associated with higher vaccine hesitancy—primigravida/multigravida status and social norms. People who were experiencing their first pregnancy were more than 3 times as likely to be characterized as having higher vaccine hesitancy compared

with those not in their first pregnancy. People who had lower social norms of RSV vaccine acceptance were more than 2 times as likely to be characterized as having higher vaccine hesitancy compared with those who had higher social norms of RSV vaccine acceptance ([Table 1](#)).

DISCUSSION

Awareness about RSV disease from participants in our study was relatively high. This finding is not in line with two other studies that examined RSV disease awareness, but these studies were conducted in noncomparable settings (Australia and England). This may be due to the fact that participants in our study were asked whether they had heard of RSV disease using both the term “RSV” as well as local words, while these other studies only used the terms “RSV” or “bronchiolitis.” Perceived risk of RSV was also relatively high in our study, with more than 90% having moderate or higher risk perception. In terms of vaccine readiness, having higher awareness and risk perception about the disease that a maternal vaccine can help prevent are foundational for nudging individuals toward acceptance, according to the BeSD framework [7].

More than three-quarters of our participants indicated that they had higher supportive norms, higher self-efficacy, lower perceived barriers, higher confidence in vaccine safety, and higher confidence in vaccine effectiveness; all of these factors are critical for vaccine acceptance [8]. However, when examining factors associated with higher vaccine hesitancy, for lactating participants, having lower supportive norms had higher vaccine hesitancy. This is in line with other studies examining maternal vaccination uptake: a review of maternal influenza vaccination also found that social norms were linked to receipt of maternal influenza vaccine [9]. This also points to the importance of influencing not just the pregnant woman herself, but those around her—including her partner, family, and friends—to create a supportive environment that is supportive of maternal vaccination [10]. Among both pregnant participants and lactating participants, those who were experiencing their first pregnancy were more likely to have higher vaccine hesitancy, suggesting the need to engage with people about the value of vaccines during their first pregnancy, or even more ideally, before their first pregnancy. Demand generation strategies are necessary to convert vaccine intentions into vaccine acceptance. Related to risk perception, RSV-associated respiratory tract infection is one of the most common causes of infant hospitalization and mortality globally. Besides awareness of and risk perception related to RSV, education efforts should focus on the safety and benefits of vaccination for the unborn child as studies have consistently shown that perception of potential harm to the baby is the primary reason for vaccine refusal [11].

For future RSV vaccine acceptance, in addition to pregnant persons, training healthcare workers, including community

Table 1. Factors Associated With Higher Vaccine Hesitancy by Pregnancy Status, Univariable Logistic Regression (n = 400)

Factor	Pregnant Women (n = 101, 25.25%)			Lactating (Not Pregnant) Women (n = 299, 74.75%)		
	OR	P-value	95% CI	OR	P-value	95% CI
Age						
18–29	Ref			Ref		
30–44	0.39	.16	(0.10, 1.44)	0.50	.07	(0.24, 1.07)
First pregnancy						
No	Ref			Ref		
Yes	3.37	.02	(1.24, 9.15)	3.10	.001	(1.61, 5.96)
Gestational age^a						
Second trimester (13–26 weeks)	Ref					
Third trimester (from 27 weeks)	2.38	.104	(0.84, 6.75)			
Education level (highest level attained)						
Less than primary school	Ref			Ref		
Primary school	4.14	.20	(0.48, 35.99)	5.14	.123	(0.64, 41.18)
Secondary/high school	1.30	.83	(0.12, 14.12)	7.19	.06	(0.92, 56.29)
College/university or higher	2.78	.38	(0.28, 27.21)	6.90	.07	(0.87, 54.71)
Previous vaccination during pregnancy						
No	Ref			Ref		
Yes	0.12	.09	(0.01, 1.40)	0.39	.18	(0.10, 1.55)
Perceived prevalence						
Higher perceived RSV prevalence	Ref			Ref		
Lower perceived RSV prevalence	1.21	.76	(0.35, 4.19)	1.73	.21	(0.73, 4.08)
Perceived risk						
Higher perceived RSV risk	Ref			Ref		
Moderate perceived RSV risk	1.47	.48	(0.50, 4.28)	0.85	.63	(0.43, 1.67)
Lower perceived RSV risk	3.02	.14	(0.69, 13.14)	0.59	.49	(0.13, 2.68)
Social norms						
Higher supportive norms	Ref			Ref		
Lower supportive norms	2.83	.06	(0.95, 8.47)	2.53	.01	(1.27, 5.05)
Self-efficacy						
Higher self-efficacy	Ref			Ref		
Lower self-efficacy	3.16	.06	(0.98, 10.20)	1.93	.12	(0.84, 4.40)
Perceived barriers						
Lower perceived barriers	Ref			Ref		
Higher perceived barriers	0.54	.45	(0.11, 2.62)	1.27	.56	(0.57, 2.83)
Safety						
Higher confidence in vaccine safety	Ref			Ref		
Lower confidence in vaccine safety	8.32	.09	(0.72, 96.57)	0.72	.76	(0.09, 5.89)
Vaccine effectiveness						
Higher trust in vaccine effectiveness	Ref			Ref		
Low trust in vaccine effectiveness	0.94	.94	(0.24, 3.71)	1.59	.34	(0.61, 4.17)

^aPregnant individuals in the first trimester (<13 weeks) were excluded from this study.

health workers, midwives, nurses, and doctors, is a key strategy to increase vaccine acceptance [12]. Given the substantial efficacy recently reported for a maternal RSV vaccine [4], education of potential beneficiaries is critical to ensure uptake.

This study has limitations. We did not survey people who did not utilize health facilities and we did not measure maternal vaccination uptake. Social desirability bias is likely. We note that our analysis resulted in wide confidence intervals in many cases; future studies should consider larger sample sizes to allow for greater precision and should also ask about monoclonal antibodies or other RSV prevention methods. We focused on both

pregnant and lactating people because while a maternal vaccine would be given in pregnancy, given that the disease primarily affects infants, understanding attitudes of pregnant as well as lactating people will need to be taken into consideration for successful vaccine acceptance.

The underlying sociocultural, financial, and political forces that affect acceptability of future RSV vaccination programs need to be carefully assessed in all settings. This study is one of the first steps in better understanding these forces. An RSV vaccine for pregnant people will hopefully be available soon. We are at an opportune moment to build demand for a maternal

RSV vaccine through community sensitization, engagement with health care providers, and advocacy with policymakers.

Supplementary Data

Supplementary materials are available at the *Journal of The Pediatric Infectious Diseases Society* online (<http://jpid.oxfordjournals.org>).

Notes

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Potential conflicts of interest. All authors: No reported conflicts.

Data Availability. The data that support the findings of this study are available from the corresponding author, R. J. L., upon reasonable request.

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