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Knowledge, Attitudes, and Practices on Rhesus Factor Determination among Women of Reproductive Age: A Case Study from Oyo State

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Abstract

Background: The Rhesus (Rh) factor is an inherited red blood cell surface antigen. Although preventive measures such as anti-D immunoglobulin have reduced the global burden of Rh haemolytic disease, Rh incompatibility remains a significant cause of perinatal and neonatal morbidity and mortality in low- and middle-income countries. The persistence of the problem has been linked to poor awareness, inadequate screening, and limited knowledge among women of reproductive age (15–49 years). This study examined the knowledge, attitudes, and practices regarding Rh factor determination among women of reproductive age in Ibadan North-East Local Government Area, Oyo State, Nigeria. **Methodology:** A descriptive cross-sectional design employing mixed methods was adopted. A total of 365 women of reproductive age (15–49 years) were selected through a six-stage sampling process from six communities within the study area. Data were collected using a pretested structured questionnaire and in-depth interviews. Knowledge was measured on a 9-point scale, with scores ranging from 0 to 5 classified as poor and from 6 to 9 as good. Attitudes were assessed on a 30-point scale, categorised into negative (0–20) and positive (21–30). Quantitative data were analysed using descriptive statistics and Chi-square tests at $p < 0.05$, while qualitative data were analysed thematically**. Results:** The findings revealed that 65.5% of respondents had poor knowledge of the Rh factor and Rh incompatibility, although 89.9% demonstrated positive attitudes toward Rh testing. Practices regarding Rh determination and management of incompatibility were generally favourable. Knowledge was significantly influenced by educational attainment, religion, occupation, and monthly income. Furthermore, attitude was positively associated with level of knowledge, underscoring the link between awareness and behavioural disposition. **Conclusion/ Recommendations:** The study highlights persistent knowledge gaps despite positive attitudes and reported practices. Targeted health education and sensitisation strategies are recommended to improve women's understanding of Rh incompatibility, strengthen antenatal screening uptake, and reduce preventable maternal and neonatal complications.

Keywords: Knowledge, attitude, practice, Rhesus factor, Women of Reproductive age

Introduction

The Rhesus (Rh) factor is an inherited antigen on red blood cells, present in about 85% of the population (Thorp, 2008). The Rh blood group system contains over 50 antigens, with D, C, c, E, and e being the most clinically relevant (Avent & Reid, 2000). Individuals expressing the Rh protein are Rh positive, while those lacking it are Rh negative, a group that includes blood types such as A−, O−, and AB− (Courage, 2019; Goodman et al., 2015; Aljuhaysh et al., 2017). Rh incompatibility occurs when an Rh-negative woman conceives an Rh-positive fetus, usually through inheritance of the D antigen from the father. Sensitisation generally results from foeto-maternal haemorrhage during pregnancy or childbirth, leading to the production of maternal antibodies against fetal red blood cells. These antibodies can cross the placenta, causing

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haemolytic disease of the newborn (HDFN) in subsequent Rh-positive pregnancies (Sarwar & Sridhar, 2024; Van der et al., 2023).

Prevention has greatly reduced Rh-related complications, particularly through the introduction of Rh immunoglobulin (RhIg), which neutralises Rh-positive fetal cells in the maternal circulation before sensitisation occurs. Since its adoption in 1968, RhIg has significantly lowered the burden of HDFN in high-income countries (Yahaya, 2024). Nonetheless, Rh disease remains a global concern. In 2010, an estimated 373,300 newborns were affected, with a prevalence of 276 per 100,000 live births (Alvin et al., 2013). While rare in developed countries, the condition still affects more than 150,000 infants annually in low- and middle-income regions (Mulinare et al., 2011).

Sub-Saharan Africa bears a disproportionate share of the burden, with Rh-negative women facing up to three times greater risk than non-African populations due to poor awareness and limited preventive measures (Abie, 2021). In Nigeria, the prevalence of RhD-related HDFN ranges between 2.5% and 11.3% (Oyapero et al., 2019). Without timely detection and management, incompatibility can result in neonatal jaundice, hyperbilirubinemia, neurological damage, stillbirths, and miscarriages—outcomes worsened by low awareness and inadequate antenatal care services (Memon, 2006; Chacham et al., 2016; Tessy, 2020).

Studies across Nigeria and other countries have consistently shown limited knowledge of the Rhesus (Rh) factor and its health implications among women of reproductive age. Awareness of blood groups and Rh incompatibility is low despite the ease and affordability of testing (Salem & Singer, 2018). In Abuja, only about half of the women surveyed had heard of Rh incompatibility or understood its effects (Inokpuare, 2012). Likewise, Fikree et al. (2012) reported low awareness of blood groups and Rh factor among pregnant women, even though testing is affordable and widely available. Kio et al. (2016) found that fewer than half of expectant mothers had ever undergone Rh testing, and Diriba and Alemayehu (2015) observed that only 23.5 percent of Ethiopian university women possessed good knowledge of the subject. Similar findings were reported in other regions: Sadia, Ayaz and Anjum (2011) found that only 2 percent of Rh-negative women were aware of the potential complications during pregnancy; Mokaya (2014) noted that just 17 percent of women in Uganda understood Rh incompatibility and only 15 percent had heard of anti-D prophylaxis. In Nigeria, cultural beliefs, limited health literacy, and poor access to antenatal services are key contributors (Opara & Nwankwo, 2024), while similar gaps have been documented in Ethiopia, where antenatal attendance strongly predicts both knowledge and RhIg uptake (Geta et al., 2024; Diriba & Alameyahu, 2015). In Ogun State, only 39% of pregnant women correctly answered questions on Rh incompatibility, and just 42% had ever been tested (Kio et al., 2016). Evidence from traditional birth homes further underscores the danger of low awareness: Idowu et al. (2003) found that many Rh-negative women who delivered outside hospitals failed to receive anti-D prophylaxis, predisposing them to sensitisation in future pregnancies. Collectively, these studies indicate that awareness of Rh factor and incompatibility remains low even among educated women and health workers, highlighting an urgent need for sustained public sensitisation and consistent counselling during antenatal and premarital care.

Attitudes towards Rh-factor screening tests appear generally positive where knowledge exists, though misconceptions remain common. Kio et al. (2016) reported that while over half of respondents recognised the importance of maternal–foetal compatibility tests and were willing to undergo screening, a substantial proportion still considered the procedure embarrassing, reflecting limited understanding of its significance. Similarly, Diriba and Alemayehu (2015) found that only 42 percent of Ethiopian undergraduates held positive attitudes toward Rh-disease prevention, and both knowledge deficits and lack of preventive practice influenced respondents' views. In another study, pregnant women showed low understanding of screening tests taken during pregnancy and often held

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misconceptions about their purpose and value (Dilek and Ercan, 2018). These findings suggest that although many women express willingness to be tested, their attitudes are shaped by incomplete or inaccurate information, which underscores the importance of effective health education and culturally appropriate counselling. Attitudes are equally mixed: some women readily accept testing and preventive care, while others show reluctance due to misinformation or cultural barriers (Abimbola & Olasubomi, 2021). Evidence from Ethiopia further suggests that higher education and better understanding foster more proactive attitudes toward screening and compliance (Mulualem et al., 2024). Collectively, these findings highlight the importance of integrating health education into antenatal care to bridge knowledge gaps, improve attitudes, and promote preventive practices.

Practices related to Rh-factor determination and management remain inconsistent and often inadequate across studies. At Ambo University in Ethiopia, nearly all respondents demonstrated weak preventive practices; most did not know their blood group or their husband's (Diriba and Alemayehu, 2015). Similar gaps were observed in Iraq, where fewer than one-third of mothers were aware of both partners' Rh types (Shrba & Saheeb, 2013). Diriba and Alemayehu (2015) further reported that although over 40 percent of respondents had experienced abortions, only 2 percent of Rh-negative women received anti-D immunoglobulin. In Nigeria, Kio et al. (2016) found that only 42 percent of respondents had undergone Rh testing, mostly during the first trimester, while some still patronised traditional birth homes despite accessing tertiary facilities. These findings demonstrate that despite increased availability of screening, awareness, cost barriers, and health-system limitations continue to hinder optimal preventive practices against Rh incompatibility.

This study therefore investigated knowledge, attitudes, and practices regarding Rh factor determination among women of reproductive age (15–49 years) in Ibadan North-East Local Government Area, Oyo State, to address gaps that contribute to preventable maternal and neonatal complications.

Materials and Methods

A descriptive cross-sectional design with a mixed-methods approach was employed. A multistage sampling technique was adopted to ensure that participants were selected in a way that fairly represented the study area. The Ibadan North-East Local Government Area (LGA) was purposively chosen in the first stage because it comprised both urban and peri-urban communities and was easily accessible for fieldwork. In the second stage, the LGA was divided into its twelve administrative wards, which served as distinct strata. During the third stage, six wards were randomly selected by balloting to achieve adequate geographical spread and enhance the representativeness of the study. At the fourth stage, one community was randomly selected from each of the six wards. The fifth stage involved the use of systematic random sampling to select households within each community. Using a sampling interval of two, the second household was chosen as the starting point, after which every fourth household was included until the required number was obtained. Finally, in the sixth stage, one eligible woman of reproductive age (15–49 years) who met the inclusion criteria was randomly selected from each household. Overall, this six-stage sampling approach combined purposive, stratified, random, and systematic procedures to minimize selection bias and ensure that the respondents were a fair representation of women of reproductive age in the Ibadan North-East LGA. In total, 365 women were selected from six communities across the twelve wards of the local government area. To enhance the reliability and clarity of the study instrument, a pretest of the questionnaire was conducted among forty-one women of reproductive age drawn from two communities in Ibadan North-West Local Government Area, Oyo State. This area was selected because it shares similar demographic and cultural characteristics with the main study location. Only women within the defined childbearing age were included, while those younger or older were excluded. During the pretest, participants completed the questionnaire and were subsequently asked to

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indicate any items they found confusing, irrelevant, or difficult to understand. Their feedback led to the modification of some questions, language, and response options to ensure clarity and contextual appropriateness. The refined instrument was then assessed for internal consistency using Cronbach's Alpha, which yielded a reliability coefficient of 0.785, indicating that the questionnaire was reliable for data collection. Data were collected using a pretested structured questionnaire and an in-depth interview guide. The questionnaire assessed knowledge of the Rhesus factor and incompatibility, as well as attitudes towards Rh screening. In-depth interviews were conducted with Rh-negative women whose partners were Rh-positive to explore practices regarding Rh determination and management of incompatibility.

Knowledge was measured on a 9-point scale, with scores ranging from 0 to 5 classified as poor and from 6 to 9 as good. Attitude was assessed using a 30-point scale; scores of 0–20 indicated a negative attitude, while scores of 21–30 reflected a positive attitude. Qualitative data were analysed thematically using an inductive approach to identify patterns in practices related to Rh factor determination and incompatibility management. Quantitative data were analysed using descriptive statistics and the Chi-square test at a significance level of $p < 0.05$.

Results

Quantitative Findings

Socio-demographic characteristics of respondents

The ages of the respondents ranged from 18 to 49 years, with a mean age of 35.2 ± 7.4 years. Most of the respondents were married (88.2%), Yoruba (86.8%), Christians (73.4%), and 49.8% engage in business. See Table 1. The majority (59.2%) of the women have had up to two previous births. Most (97%) of the respondents were literate, having completed secondary education or higher.

Respondents' knowledge of the Rhesus factor

The results in Table 2 showed that 72.6% of the women knew their own blood group, and 45.8% knew their husband/partner's blood group. Only 46.8% knew their rhesus blood group, 32.9% were aware of the likely complications related to a negative blood group during and after pregnancy, and only 29.6% were aware of the consequences of blood incompatibility on the fetus/newborn. However, the overall result showed that the level of knowledge on the Rhesus factor and its incompatibility was poor (34.5%). The primary source of information on rhesus disease incompatibility was from the hospital (47.2%). See Figure 1. Death (79.3%) was the commonly reported consequence of blood incompatibility in the fetus/newborn from their responses. See Figure 2. The dominant rhesus blood group was Rhesus positive 153 (92.2%). Figure 3

Respondents' Attitude towards the Screening Test

The result of the respondent's attitude towards the Rhesus factor screening test is presented in Table 3. The women were assessed for positive and negative attitudes. In general, more respondents (89.9%) exhibited a positive attitude, 91.0% agreed that the Rhesus factor test is crucial for pregnant women, and 81.4% were not afraid to consider or undergo the test.

Table 1: Socio-demographic characteristics of respondents (N =365)

Variables	Frequency	Percentage

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Age (years)		
18-24	24	6.6
25-31	108	29.6
32-38	110	30.1
>38	123	33.7
Marital status		
Single	35	9.6
Married	322	88.2
Divorced	6	1.6
Widowed	2	0.5
Number of children		
1- 2	216	59.2
3- 4	131	35.9
5 and above	18	4.9
Ethnicity		
Yoruba	317	86.8
Igbo	25	6.8
Hausa	3	.8
Others	20	5.5
Religion		
Christianity	268	73.4
Islam	97	26.6
Level of education		
Primary	8	2.2
Secondary	106	29.0
Tertiary	247	67.7
None	4	1.1
Occupation		
Housewife	14	3.8
Business	181	49.6
Civil servant	57	15.6
Artisan	54	14.8
Others	59	16.2
Monthly income		
Less than 20000	107	29.3
20000-30000	97	26.6
31000-40000	36	9.9
41000-50000	23	6.3
>50000	102	27.9

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Method of delivery		
Caesarean	48	13.2
Vagina	298	81.6
Both	19	5.2

Table 2: Knowledge of the respondents on the Rhesus factor (N = 365)

Knowledge-based statement	Yes (%)	No (%)	I do not know (%)
I know my blood group.	265 (72.6)	70 (19.2)	30 (8.2)
I know my Rhesus blood group.	171 (46.8)	162 (44.4)	32 (8.8)
I know my husband/partner's blood group.	167 (45.8)	154 (42.2)	44 (12.1)
I have heard of rhesus disease/incompatibility.	168 (46.0)	184 (50.4)	13 (3.6)
I am aware of the likely complications related to a negative blood group during and after pregnancy.	120 (32.9)	215 (58.9)	30 (8.2)
I know if the Rhesus factor investigation/test is done before marriage.	143 (39.2)	173 (47.4)	49 (13.4)
I am aware of the precautions that should be taken if a mother's blood group is Rh-negative.	128 (35.1)	200 (54.8)	37 (10.1)
I am aware of the consequences of blood incompatibility on the fetus/newborn.	108 (29.6)	208 (57.0)	49 (13.4)
I know Rhesus disease/incompatibility can be prevented.	171 (46.8)	128 (35.1)	66 (18.1)

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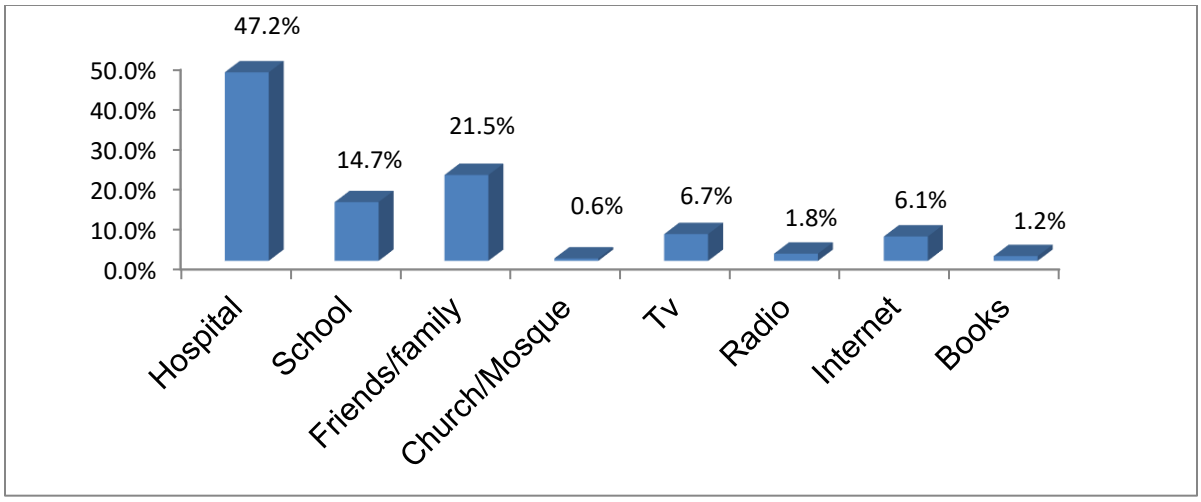

Figure 1: Respondents' source of information on rhesus disease/ incompatibility

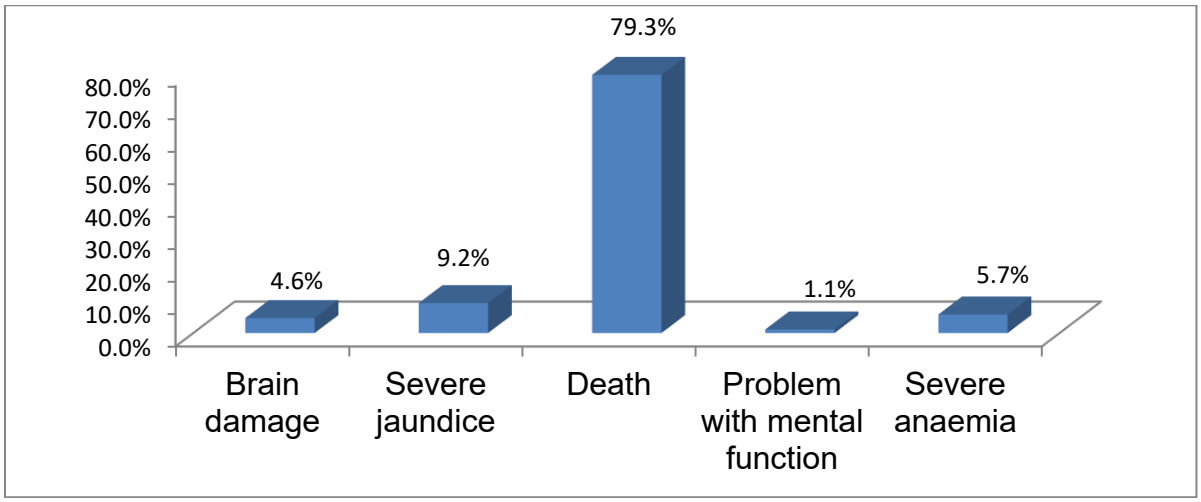

Figure 2: Respondents' knowledge of consequences of blood incompatibility on the foetus/newborn

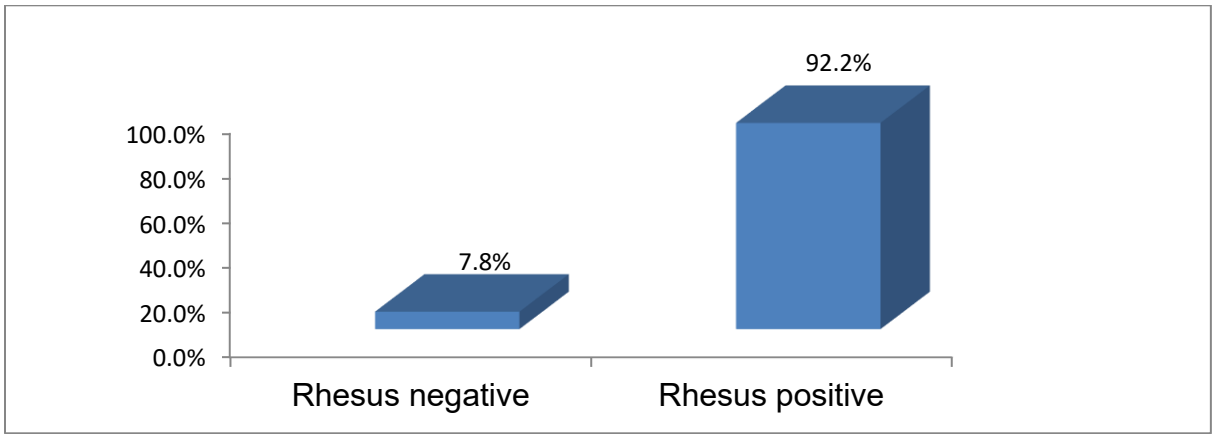

Figure 3: Respondents' Rhesus blood group

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Table 3: Attitude of respondents towards the Rhesus factor screening test (N = 365)

Attitude-based statement	Agree (%)	Undecided (%)	Disagree (%)
The Rhesus factor test is crucial for pregnant women.	332 (91.0)	27 (7.4)	6 (1.6)
All women should undergo the rhesus factor test, regardless of whether it is recommended or not.	336 (92.1)	23 (6.3)	6 (1.6)
I am not afraid to think or do the Rhesus factor test.	297 (81.4)	31 (8.5)	37 (10.1)
A woman should discuss rhesus incompatibility with her partner or husband.	334 (91.5)	25 (6.8)	6 (1.6)
I really care about my rhesus factor.	281 (77.0)	72 (19.7)	12 (3.3)
If I am rhesus negative and my baby is rhesus positive, I would prefer to get treatment from a traditional healer.	17 (4.7)	43 (11.8)	305 (83.6)
The Rhesus factor test is a relatively simple procedure.	18 (4.9)	50 (13.7)	297 (81.4)
The Rhesus factor test does waste time.	24 (6.6)	70 (19.2)	271 (74.2)
The Rhesus factor test result makes me feel unpleasant.	33 (9.0)	90 (24.7)	242 (66.3)
I am reluctant to do the rhesus incompatibility test because I am afraid of being positive	36 (9.9)	84 (23.0)	245(67.1)

Table 4: Correlation between knowledge and attitude score

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		Correlation		
Pearson correlation	**Attitude**	Correlation Coefficient	1.000	0.408
		P-value		<0.001*
		N	365	365
	Knowledge	Correlation Coefficient	0.408	1.000
		P-value	<0.001*	
		N	365	365

*Statistically significant

Based on the individual scores on knowledge and attitude, a significant correlation was observed between their scores (r=0.408, p<0.001)

Table 5: Socio-demographic characteristics of the In-depth Interview participants (N=5)

	Study participants				
Variables	A	B	C	D	E
Age	27	36	37	49	40
Marital status	Married	Married	Married	Married	Married
Number of children	1	3	3	4	1
Ethnicity	Yoruba	Yoruba	Yoruba	Yoruba	Delta
Religion	Christian	Christian	Christian	Islam	Christian
Level of education	Tertiary	Tertiary	Tertiary	Tertiary	Tertiary
Occupation	Civil servant	Business	Community health officer	Civil servant	Business
Monthly income	20,000-30,000	>50,000	20,000-30,000	>50,000	>50,000
Method of delivery	Vagina	Vagina	Vagina	Vagina	Vagina

Qualitative Findings

Practice regarding Rhesus factor determination and management of Rhesus Incompatibility

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The recall on the discovery of rhesus incompatibility amongst the participants with their husbands was assessed. The majority of the participants discovered their rhesus incompatibility with their husbands during their pregnancy period at the hospital:

"*At the hospital around the November period last year, 2020*" (A, age 27 years)

"*...when I got to the hospital, they did my blood test and they noticed I am B negative*" (B, age 36 years)

"*In 2006, after the birth of my child. This was because milk was coming out of my breast, so they said I should go and do a hormonal profile. So, I was asked about the blood group, and it was from there I discovered about rhesus and found out we were not compatible*" (E, age 40 years)

However, one of the respondents discovered her rhesus incompatibility with her husband during the wedding process:

"*We were planning for our wedding, so we now went for a test. We did the genotype and the Rhesus factor, and I was told I was negative while my husband was positive*"(C, age 37 years)

Most of the participants discovered their rhesus incompatibility during their first trimester at private and government hospitals:

"*Yes, during my first trimester at a private hospital*" (A, age 27 years)

"*First trimester and first pregnancy at a government hospital*"(B, age 36 years).

"*Yes, private hospital*" (C, age 37 years)

"*During my first trimester, at a government hospital*" (D, age 49 years).

However, one of the participants discovered it "*In 2006, after the birth of the child"* (E, age 40 years).

Steps taken to avoid the complications/consequences of the newborn.

The reported steps taken to avoid the complications/consequences on the newborn were mainly a conventional method, and this could be because they were discovered in the hospital:

"*I did not take any step immediately; it was after I delivered that I was given more education on it. That was when I was told the precaution and how I would go about it. It was then that I decided to buy the drugs*" (A, age 27 years).

"*I did not take any step, since they did the test for me and they have already told me I will take an injection. So, I had it in mind to take it, so that is why I took it*" (B, age 36 years)

"*I went for test after the test, they gave me a drug. I also took the injection after delivery*" (E, age 40 years)

Only two of the participants reported on the cost of injection and the number of times they bought and took the drugs:

"*I bought it for ₦32,500.00, bought one, and took it once*" (A, age 27 years).

"*...the first one, we bought it for ₦19,000.00, but when I gave birth to the twins, we bought the second one for ₦24,000.00 because it varied*" (B, age 36 years)

"*...the first one I bought was at the rate of ₦14,500, and while the second was at the rate of ₦30,250*"(C, age 37 years)

Experience that led to seeking medical advice

The observation, based on the experience that prompted any of the participants to seek medical advice, was made from the perspective of their initial knowledge of the rhesus incompatibility at the hospital. Primarily, the information obtained and the advice given to see their doctors to manage the situation described their experiences:

"*When I was first informed, I was told to go and see the doctor, so that the doctor could explain*

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to me better, but during those periods, I did not have any idea about the rhesus, so when the doctor was trying to explain to me, I did not understand what she was saying. Until after my delivery, I then got to understand better what she was trying to say..." (A, age 27 years)

"... when I had my baby, I was given an injection". (E, age 40 years)

Two of the participants, however, reported no experience whatsoever:

"*No experience*" (B, age 36 years).
"*Not at all*" (D, age 49 years).

The time their injection was taken was mostly after delivery, and was reported by one of the participants:

"*After delivery. Yes, I was told I cannot take it till after delivery*" (A, age 27 years).

Also, the intake of the injection was observed to be based on their first delivery and was captured in one participant alone:

"*Yes, it was because it was the first delivery*" (A, age 27 years).

Coping methods during and after pregnancy

The responses on how money was gotten to cater for rhesus incompatibility were from the husbands, siblings, and family members:

"*From family, I had to start calling my sisters and dad. They were the ones who raised the money for me, and my husband too; he also raised part of the money*" (A, age 27 years).
"*Since I had known the injection was expensive because they had already told us that, my husband started saving it into my account. He told me I should not touch it at any time*" (B, age 36 years).

"*Since I discovered it, when I was pregnant, I started saving the money to buy the injection because the injection was expensive...*" (C, age 37 years)

"*The injection was cheap*" (E, age 40 years).

Likewise, the report on who gave support during the experience from the participants included husbands and family members:

"*I got support from my husband and family members*" (A, age 27 years)

"*My husband gave me support*" (B, age 36 years).

"*From husband and family members*" (C, age 37 years).

"*I got support from my husband*" (D, age 49 years).

"*My dad*" (E, age 40 years).

Discussion

This study examined knowledge, attitudes, and practices regarding Rhesus factor determination and incompatibility among women of reproductive age (15–49 years) in Ibadan North-East Local Government Area, Oyo State. Overall, the findings revealed poor knowledge, positive attitudes, and mixed but generally appropriate practices. These results underscore the persistent gaps in awareness and preventive strategies that contribute to maternal and neonatal risks associated with Rhesus incompatibility.

Although respondents knew their own blood group and, to a lesser extent, that of their partners. However, fewer than half were aware of their Rhesus status, and less than one-third understood the complications associated with Rhesus incompatibility. This finding aligns with earlier research in Nigeria and Ethiopia, where knowledge about the Rh factor remained limited despite the simplicity and low cost of testing (Salem & Singer, 2018; Kio et al., 2016; Diriba & Alameyahu, 2015). The hospital was reported as the primary source of information, reflecting a reliance on healthcare facilities as the primary channel for awareness creation. However, many women remained uninformed even after visiting health facilities, suggesting that routine health education may be insufficient or inconsistently delivered. Previous

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studies have similarly noted that knowledge gaps are influenced by cultural beliefs, low health literacy, and inadequate access to antenatal care (Opara & Nwankwo, 2024). These factors may explain the poor knowledge level observed in this study despite a high proportion of literate respondents. Despite the knowledge deficit, respondents demonstrated overwhelmingly positive attitudes towards Rhesus factor determination. Nearly 90% agreed that the test is important, most supported universal testing for women, and very few expressed fear or reluctance. This finding aligns with those from Ogun State, where over half of the women showed a positive disposition toward Rh testing (Kio et al., 2016).

Similarly, Abimbola & Olasubomi (2021) reported that women who were better informed about Rh incompatibility were more proactive in accepting preventive measures, while others expressed hesitation due to cultural influences or misinformation. The strong positive attitude observed in the present study may be partly attributed to the high literacy rate and religious background of the participants, factors previously linked to favourable health-seeking behaviours (Mulualem et al., 2024). Notably, the significant correlation between knowledge and attitude ($r = 0.408$, $p < 0.001$) demonstrates that improved knowledge can further strengthen the willingness to undergo testing and accept prophylaxis.

The in-depth interviews revealed that most women discovered their Rhesus status during hospital visits, particularly in the first trimester, while a few became aware before conception or after delivery. In terms of management, participants reported receiving anti-D immunoglobulin following delivery, which is consistent with recommended preventive practices (Yahaya, 2024). However, the high cost of the injection, reported between ₦14,500 and ₦32,500, posed a financial burden, with women relying on their husbands and extended family for support. These findings align with studies in Sub-Saharan Africa, where limited awareness, delayed diagnosis, and economic barriers persistently hinder the optimal prevention and management of Rh incompatibility (Abie, 2021; Oyapero et al., 2019). Encouragingly, none of the participants reported patronising traditional birth attendants, a positive shift compared to earlier reports where women often sought non-conventional care due to misconceptions (Memon, 2006; Chacham et al., 2016). The reliance on formal healthcare providers in this study suggests that hospital-based counselling and testing can positively shape women's practices, even in the presence of limited baseline knowledge.

The low level of knowledge observed in this study has important implications for maternal and neonatal health. Evidence from previous research shows that when women lack awareness of Rh incompatibility, they are more likely to delay screening and may miss the opportunity to receive anti-D prophylaxis, which increases the risk of haemolytic disease of the newborn (Oyapero et al., 2019; Abie, 2021). Studies from Ethiopia and Uganda have also linked limited understanding of the Rh factor among pregnant women with higher rates of neonatal jaundice and other perinatal complications (Geta et al., 2024; Mokaya, 2014). These findings suggest that gaps in knowledge are not only a matter of information but also have a direct influence on life-saving preventive behaviours. On the other hand, research has shown that when women are well-informed through structured health education, they are more likely to seek early testing, comply with prophylaxis recommendations, and achieve better pregnancy outcomes (Suby, 2012; Diriba & Alemayehu, 2015). The findings from this study therefore reinforce the need to strengthen educational interventions for women of reproductive age before and during pregnancy. The results also highlight a need for stronger health system support. Incorporating Rh factor testing and counselling into routine reproductive health services such as premarital screening and antenatal care would promote early detection and timely prevention. Health workers should receive regular training and guidance to provide accurate information to

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women, while the cost of anti-D immunoglobulin should be subsidised to make it more affordable. Policymakers could also consider including Rh factor screening and prophylaxis in maternal and child health policies, especially at the primary healthcare level where most women receive care. Such measures would help prevent avoidable neonatal complications and support Nigeria's efforts toward achieving the Sustainable Development Goal on reducing maternal and newborn deaths.

Conclusion and Recommendations

This study highlights notable knowledge gaps on Rh incompatibility among women of reproductive age, despite generally positive attitudes and moderately appropriate practices. To address these gaps and reduce preventable maternal and neonatal complications, context-specific strategies are needed. Community-based health education delivered through primary healthcare facilities, women's groups, and faith-based organisations has been shown in similar settings to improve maternal awareness and testing uptake (Abimbola & Olasubomi, 2021; Diriba & Alemayehu, 2015). Integrating Rh-factor testing and counselling into existing premarital and antenatal screening programmes can also ensure early identification and appropriate management of at-risk women.

In addition, public–private partnerships and government support could be leveraged to subsidise the cost of anti-D immunoglobulin and ensure its consistent availability. Finally, sustained public health campaigns using local media and community mobilisers are essential to dispel misconceptions and promote routine Rh testing. Implementing these evidence-based interventions will help strengthen prevention of Rh incompatibility and contribute to improved maternal and newborn health outcomes.

Limitations of the Study

First, the study was conducted in a single local government area, which may limit the generalisability of findings to other settings. Second, the use of self-reported data could have introduced recall or social desirability bias, particularly regarding sensitive practices and attitudes. Lastly, while the cross-sectional design was suitable for assessing associations, it does not allow causal inferences. Despite these limitations, the study provides valuable evidence to inform community-based interventions and policy strategies for improving maternal and neonatal health outcomes.

Implications for Health Promotion and Education

The findings highlight the need for intensified health promotion strategies to address knowledge gaps and strengthen appropriate practices on Rh incompatibility. Health education and public enlightenment should focus on blood group systems, Rh factor, patterns of inheritance, and the importance of routine testing. Community campaigns, school-based health education, premarital counselling, and antenatal services provide opportunities to deliver these messages effectively. Health workers play a pivotal role in sustaining awareness through counselling, mobilisation, and collaboration with community structures. Additionally, advocacy is necessary to ensure equitable access to preventive measures. Government and health institutions should prioritise policies that guarantee the availability and affordability of anti-D immunoglobulin, while integrating Rh factor testing and education as a routine component of reproductive and maternal health services.

Ethical Approval

Ethical clearance for this study was obtained from the Ethics and Research Committee of the Oyo State Ministry of Health (ref no: AD 13/479/4156^{B}).

Informed consent

Written informed consent was obtained from all participants. Literate respondents signed the consent form, while non-literate participants provided thumbprints for approval. They were informed of their right to withdraw at any stage without consequence. To safeguard confidentiality, personal identifiers such as names or any details that could reveal participants' identities were

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excluded from the study tools. The aims, benefits, and procedures of the study were explained in clear terms, and participants were assured that all information provided would be treated with strict confidentiality.

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Declaration of Competing Interest
The authors declare no conflicts of interest, financial or otherwise, that could have influenced this work.

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