

Knowledge And Attitude Towards Rhesus Factor Incompatibility Prevention In Pregnant Women Attending Antenatal Clinic In Public Health Facilities In Oghara, Delta State

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ABSTRACT

Introduction: Rhesus factor is an antigen and inherited protein found on the surface of red blood cells. The study assessed the knowledge and attitude towards Rhesus factor incompatibility prevention in pregnant women attending Ante-Natal Clinic in Public Health facilities in Oghara, Delta State.

Methodology: A descriptive cross-sectional study design was employed to collect data from 384 pregnant women attending antenatal clinics in Oghara, Delta State, using a structured questionnaire. Data analysis was done with SPSS version 25.

Results: Most participants were married, aged 21-25, Christian, Urhobo, and had tertiary education. While a significant proportion knew their own (69%) and their partner's (66.8%) blood group. A considerable number (46.9%) understood that Rh incompatibility could lead to abortion or premature labour, and 50.9%

recognized the need for close monitoring of Rh-negative pregnancies. Over half (55%) correctly acknowledged the importance of RhoGAM injections for Rh-negative mothers and 60.9% agreed that knowing both parents' Rh status is crucial. However, there was a misconception, with 53.1% believing the RhoGAM injection should be given after delivery.

Conclusion: The study concluded that pregnant women in Oghara possess substantial knowledge and positive attitudes regarding Rh incompatibility prevention. Despite the appreciable knowledge and attitude, some misconceptions regarding Rh incompatibility still exist, indicating a need for targeted education to address specific gaps in knowledge.

Keyword: Rhesus factor, pregnant women, knowledge, incompatibility

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INTRODUCTION

Rhesus (Rh) factor is an antigen and inherited protein found on the surface of red blood cells. Red blood cells with the antigen are said to be Rh positive (Rh+) and those without the surface antigen are said to be Rh negative (Rh-).¹ Rhesus-positive is the most common blood type. Having a Rh-negative blood type is not an illness and usually does not affect one's health. However, during pregnancy, Rh incompatibility can occur if a Rh-negative mother carries a Rh-positive foetus, leading to complications that may threaten both maternal and foetal health.² This condition arises due to the maternal immune system recognizing the foetus's Rh-positive red blood cells as foreign, potentially resulting in the production of antibodies that attack and destroy these cells.

Rhesus incompatibility is a significant global public health concern due to its association with hemolytic disease of the newborn (HDN). HDN is a serious condition characterized by the accelerated destruction of fetal red blood cells bound to maternal IgG antibodies, which target the Rh antigen inherited from the father.^{3,4} If left unmanaged, this immune response can cause severe anemia, jaundice, hydrops fetalis, or even fetal death. This maternal-fetal blood incompatibility contributes to high infant mortality rates, particularly in regions like Africa, where the reproductive risk for Rh-negative women is notably elevated.^{2,5} Hemolytic disease in newborns has been identified as a major contributor to fetal morbidity and mortality, especially in low-resource settings where screening and preventive measures are limited.⁶

The prevalence and impact of Rh incompatibility vary across different regions. In sub-Saharan Africa, the risk of Rh incompatibility among Rh-negative women

is three times higher compared to non-African populations, largely due to lower prevalence rates of Rh-negative blood and limited awareness of the condition.⁵ Despite the relatively low frequency of Rh-negative blood types among Africans, the consequences of neglecting Rh incompatibility can be severe. Studies in Nigeria indicate a rising prevalence of RhD-induced hemolytic disease of the fetus and newborn (HDFN), with estimates ranging between 2.5% and 11.3%.⁷ Evidence have shown a low level of knowledge and awareness regarding maternal-fetal blood incompatibility among expectant mothers in Nigeria. Oyapero et al., (2019) reported that only 39% of expectant mothers had adequate knowledge of maternal-fetal blood group incompatibility, and only 42% had undergone blood group testing.⁷

Antenatal care (ANC) is crucial in mitigating the risk of Rh incompatibility. It encompasses risk identification, screening, disease prevention, health education, and management of pregnancy-related complications; all aimed at maintaining healthy pregnancy outcomes.^{8,9,10} Through routine blood group testing, Rh-negative women can be identified early and managed appropriately to prevent isoimmunization. Preventive measures such as the administration of anti-D immunoglobulin (RhoGAM) during pregnancy and within 72 hours after delivery have significantly reduced the incidence of Rh sensitization and subsequent HDN.^{6,11} Regular ANC visits are recommended to reduce maternal and perinatal mortality, providing platforms for monitoring foetal and maternal health.^{12,13} Effective ANC enables early identification of potential complications, including Rh incompatibility, allowing for timely intervention. Hence, adequate knowledge of isoimmunisation among women of

reproductive age is vital for effective prevention and management, enabling them to make informed decisions and seek appropriate care.²

Studies have revealed varying levels of awareness and understanding regarding Rh(D) incompatibility among pregnant women as well as significant gaps and misconceptions around rhesus incompatibility. Yahia et al. (2020) found that 41.7% of pregnant women were aware of Rh(D)-negativity and anti-D immunoglobulin, with a prevalence of Rh-negative blood group at 11.1%.² Similarly, Abd Elhakim (2024) reported that almost all participants knew their blood group, but only 19.7% of them had good knowledge while 58.7% had poor knowledge regarding rhesus factor incompatibility.¹⁴ Ojo and Osuntusa (2021) found that pregnant women had fair knowledge of rhesus factor but were unaware of the importance of testing and its complications.¹ Abie (2021) demonstrated that only 39.1% of mothers had good knowledge of Rh incompatibility, with many lacking awareness of their husbands' blood groups and the mechanism of incompatibility.⁵ Kwamboka (2022) revealed even lower levels of awareness, with only 17.5% understanding rhesus incompatibility and a significant proportion attributing complications to supernatural causes.¹⁵

Despite advancements in screening and prevention, studies indicate a persistent knowledge and attitude gap regarding Rh incompatibility among pregnant women in rural and suburban communities in Nigeria. However, there is a dearth of study on rhesus incompatibility in Oghara Delta state. Furthermore, lack of awareness about the risks and prevention of Rh incompatibility continues to compromise efforts to improve maternal and neonatal

outcomes. These deficits in knowledge, attitude and practice regarding Rh incompatibility are further compounded by cultural and systemic barriers, including poor access to healthcare services, inadequate health education, and low uptake of ANC services. This study therefore aims to assess the knowledge and attitudes towards Rh factor incompatibility prevention among pregnant women attending antenatal clinics in public health facilities in Oghara, Delta State, Nigeria.

MATERIALS AND METHODS

Study area.

This study was conducted in Oghara, a town in Ethiope West Local Government Area, Delta State, Nigeria, predominantly inhabited by the Urhobo ethnic group. Oghara is an agrarian community, with residents engaged in farming activities such as rubber, cassava, palm oil, plantains, and fish farming. The town also contributes to crude oil production, adding to its economic significance in the region. Geographically, Oghara shares boundaries with Mosogar Kingdom to the east, Sapele LGA to the south, Edo State to the north, and Koko in Warri North local government to the southwest. Oghara has one tertiary health facility (Delta State University Teaching Hospital, Oghara), two secondary health facilities (General hospital Oghara and Nigerian Navy hospital, Oghara) and seven primary health centres that are government owned spread across five wards. The primary health centres (PHCs) include (Ijomi, Otefe, Edjamuyanwe, Ogharafe, Ovade, Oghareki and Oghareki model PHCs. It also has two tertiary educational institutions namely Delta State Polytechnic Otefe, and Western Delta University Oghara.

Study design and participants.

A facility based descriptive cross-sectional survey design was used for this study. The subjects were pregnant women residing in Oghara community and attending antenatal clinic in public health facilities in Oghara, Ethiope West Local Government Area of Delta State.

Sample size determination.

The minimum sample size for this study was calculated using Fischer's formula for sample size determination.¹⁶ Assuming maximum variability of 50% (where $P=0.5$), an error margin of 5% and a standard normal deviation of 1.96 at 95% level of confidence, the calculated sample size was 384. Considering a non-response rate of 10% the determined sample size was increased to 422.

Sampling procedure

The multistage sampling technique was used in this study to recruit participants. Four hundred and twenty-two (422) subjects were surveyed from public health facilities in Oghara. In the first stage the health facilities were stratified into tertiary, secondary and primary health facilities across the five wards in Oghara. In the second stage, one tertiary and secondary was selected from the list of the tertiary and secondary health facilities. Delta state university teaching hospital was purposively selected being the only tertiary health facility in the study area. One secondary health facility was also selected by balloting from the two secondary health facilities in the study area. In the third stage, five primary health centres were selected from the list of seven primary health centre in Oghara. In the fourth stage, every eligible and consenting pregnant woman was systematically selected and interviewed from the attendance register

of the antenatal clinic until the sample size was completed.

Study instrument and data collection.

Data was collected between August and October 2024 with pre-tested, self-administered structured questionnaires which consist of the following sections: socio-demographic characteristics, knowledge of blood groups, knowledge of Rhesus incompatibility and attitude towards rhesus incompatibility prevention. The questionnaire was validated by experts who reviewed the questions to ensure face and content validity. The questionnaire was also pretested among 20 respondents in two health facilities in Sapele local government area of Delta state to ensure the reliability of the instrument. The test-retest method was used to assess the reliability which yielded a correlation coefficient of 0.8 indicating high reliability of the study instrument.

Data analysis and management

Data analysis was done using IBM Statistical Product and Service Solutions (SPSS) version 26. Only descriptive statistics was done, and results presented using frequencies, percentages, and charts. Eight questions were used to assessed knowledge which was scored, summed, and graded into good knowledge (knowledge score of 4 and above) and poor knowledge (knowledge score of less than 4). Each correct response was scored one and incorrect response zero. Similarly, the attitude was assessed with five questions on a three-point Likert scale with: "agree", "neutral" and "disagree" as the responses. Responses that Agree with correct statements was score 2, neutral was scored 1 and disagree was scored zero; and the reverse was the case for incorrect statements. The total responses were

summed and graded as positive attitude (total score of 6 and above) and negative attitude (total score of 0 to 5).

Ethical consideration

Ethical approval (HREC/PAN/2024/048/0664) for this study was obtained from the Health Research Ethics Committee of Delta State University Teaching Hospital (DELSUTH). Informed consent was obtained from each participant prior to data collection. Participation was voluntary, and respondents were assured of the

confidentiality and anonymity of their responses.

RESULTS

Socio-demographic characteristics of Respondents

This study shows that most respondents were married (178; 42.2%), aged 21-25 years (135; 32%), had tertiary education (152; 36%) and belonged to the Urhobo tribe (198; 46.9%). Majority of respondents were Christians (404; 95.7%) and few were unemployed (34; 8.1%) and cohabiting (88; 20.9%) (table 1).

Table 1: Sociodemographic characteristics of respondents.

Variables	Frequency (422)	Percentage (%)
Marital status		
Single	156	37
Married	178	42.2
Cohabiting	88	20.9
Level of education		
No formal education	64	15.2
Primary education	82	19.4
Secondary education	124	29.4
Tertiary education	152	36.0
Religion		
Christian	404	95.7
Islamic	13	3.1
African traditional religion	5	1.2
Age group		
≤ 20 years	71	16.8
21-25 years	135	32.0
26-30 years	130	30.8
≥ 31 years	86	20.4
Tribe		
Benin	20	4.7
Ijaw	26	6.2
Ika	22	5.2
Isoko	13	3.1
Itshekiri	2	2.8
Ukwani	131	31.0
Urhobo	198	46.9

Employment Status		
Government employment	41	9.7
Private employment	72	17.1
Self-employment	89	21.1
Student	186	44.1
Unemployment	34	8.1
Parity		
0	112	26.5
1	105	24.9
2	82	19.4
3	57	13.5
4	66	15.6

Knowledge of blood group among the respondents

Most respondents knew their blood group (291; 69%) and their partner's blood group (282; 66.8%). The most common blood

group among the respondents (144; 34.1%) and their partners (138; 32.7%) was O+ respectively, while the least common was O- among the respondents (11; 2.6%) and B+ among their partners (1; 0.2%) (table 2).

Table 2: Knowledge of blood group among Respondents

Variables	Frequency (422)	Percentage (%)
Knowledge of respondents' blood group		
No	131	31.0
Yes	291	69.0
A-	22	5.2
A+	81	19.2
B-	33	7.8
O-	11	2.6
O+	144	34.1
Knowledge of partner's blood group		
No	140	33.2
Yes	282	66.8
A-	36	8.5
A+	94	22.3
B+	1	0.2
O-	13	3.1
O+	138	32.7

Knowledge of Rhesus Factor Incompatibility among Respondents

Most respondents knew that RH incompatibility could lead to abortion or early labour (198; 46.9%); knew negative blood groups need close follow-up during

pregnancy (215; 50.9%) and knew that RhoGAM injection is necessary for Rh-negative mothers (232; 55%) (table 3). Overall, most respondents (283; 67.1%) had good knowledge of rhesus factor incompatibility (figure 1).

Table 3: Knowledge of Rhesus factor incompatibility among respondents

Variables	Frequency (422)	Percentage (%)
RH incompatibility leads to abortion or early labour		
I don't know	58	13.7
No	166	39.3
Yes	198	46.9
RH incompatibility needs no medical attention		
I don't know	64	15.2
No	311	73.7
Yes	47	11.1
Negative blood group need close follow up during pregnancy		
I don't know	54	12.8
No	153	36.3
Yes	215	50.9
Rh incompatibility leads to good health of all the children		
I don't know	54	12.8
No	127	30.1
Yes	241	57.1
Rh incompatibility leads to the death of the first baby.		
I don't know	48	11.4
No	218	51.7
Yes	156	37.0
Rh incompatibility needs more care during pregnancy.		
I don't know	59	14.0
No	144	34.1
Yes	219	51.9
RhoGAM injection is given to the mother of Rh –ve blood		
I don't know	50	11.8
No	140	33.2
Yes	232	55.0
Previous repeated abortions and/or premature labour can lead to RH incompatibility		
I don't know.	55	13.0
No	143	33.9
Yes	224	53.1

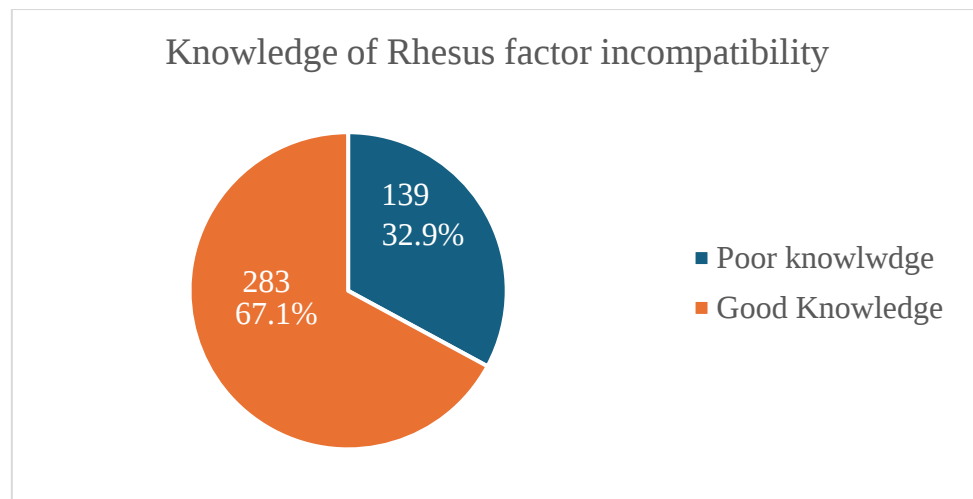


Figure 1: Level of knowledge of Rhesus factor incompatibility among respondents

Attitude towards Rhesus Incompatibility Prevention among Respondents

Most respondents disagreed that RhoGAM injection is unnecessary to prevent Rh incompatibility (249;59%), agreed that knowing the Rhesus factor status of both

parents is necessary 257;(60.9%), and believed the injection must be taken after delivery (224; 53.1%) (Table 4). Overall, most respondents (253; 60%) had a positive attitude towards rhesus incompatibility prevention (figure 2).

Table 4: Attitude toward Rhesus incompatibility prevention among Respondents

Variables	Frequency (422)	Percentage (%)
RhoGAM injection to prevent Rh incompatibility is not necessary		
Agreed	118	28.0
Disagreed	249	59.0
Neutral	55	13.0
Knowledge of the rhesus factor status of both the father and the mother is necessary		
Agreed	257	60.9
Disagreed	114	27.0
Neutral	51	12.1
Knowledge of the rhesus factor status of mother only is necessary		
Agreed	198	46.9
Disagreed	168	39.8
Neutral	56	13.3
Knowledge of the rhesus factor status of the father only is necessary		
Agreed	152	36.0
Disagreed	207	49.1
Neutral	63	14.9

The injection to prevent Rh incompatibility must be taken after delivery.

	224	
Agreed	140	53.1
Disagreed	58	33.2
Neutral		13.7

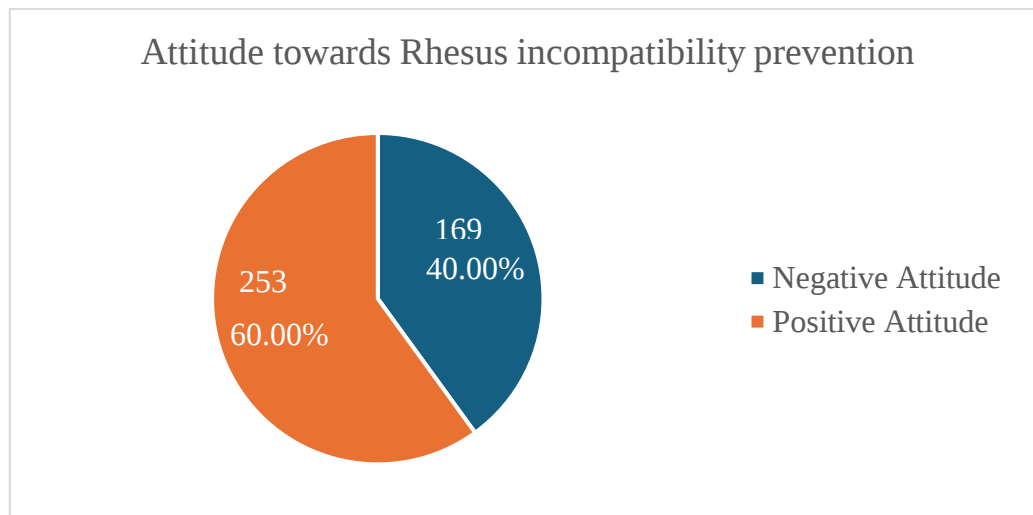


Figure 2: General attitude of respondents towards rhesus incompatibility prevention

DISCUSSION

Sociodemographic characteristics

This study revealed a significant proportion of married respondents, aligning with Nigerian societal norms and the positive influence of marriage on health-seeking behavior.^{17,18} However, the cohabitation rate of 20.9% found in this study was slightly higher than 11% found among undergraduates in Ebonyi state, Nigeria where sexual satisfaction, mutual assistance, poverty and peer pressure were some of the reason for cohabitation.¹⁹ This variation can be attributed to regional and cultural differences and changing social norms, particularly in urban and semi-urban areas like Oghara where western influences are very pronounced. The observation that most respondents in this study had tertiary and secondary education indicates higher educational attainment, more than the national average and mirrors

urban centres with higher levels of educational attainment and contrast with rural northern Nigeria with lower educational attainment.^{20,21}

The observation that overwhelming majority of respondents in this study were Christians aligned with Southern Nigeria's demographics where Christianity is the predominant religion,²² and implies a homogeneous religious landscape capable of influencing health behaviours.²³ The minimal adherence to African traditional religion observed in this study is similar to findings from a previous study in Oghara where such traditional beliefs were less common.²⁴ The finding that most respondents were aged 21-25years implies a youthful population in Oghara, similar to findings in Owerri where young adults represent a significant proportion of the healthcare-seeking population.²⁵ This is crucial for targeted health intervention that could bring about a sustained behaviour

change. The dominance of the Urhobo tribe in this study is consistent with the fact that Oghara is inhabited by predominantly Urhobo people. The high proportion of students found in this study indicates a young, academically engaged population similar to a previous study in southeast Nigeria where most respondents were students.²⁶ The relatively low unemployment rate observed in this study is in contrast with national average.²⁷ This could suggest better employment opportunities in Oghara or a significant reliance on informal sector employment not fully captured in the study.²⁷

Knowledge of blood group and Rhesus factor incompatibility

This study revealed that most respondents were aware of their blood group and their partner's blood group. This observation is comparable to findings from previous studies where most respondents knew their blood group and that of their husbands.^{1,14,28} However, it is in contrast with findings from rural regions of Nigeria, where lower levels of awareness have been reported due to reduced healthcare access and limited educational outreach.²⁹ The difference observed in this study could be attributed to the presence of robust healthcare infrastructures and educational institutions that emphasize the importance of knowing one's blood group in the study area.

The respondents' understanding that Rh incompatibility can lead to adverse pregnancy outcomes such as abortion or early labour agrees with findings from a similar study in Ethiopia³⁰ However, some respondents remained largely unaware of rhesus incompatibility, which is similar to findings in Port Harcourt south-south Nigeria³¹ A considerable number of respondents in this study were

knowledgeable about the need for close follow-up for Rh-negative blood groups during pregnancy and agreed on the necessity of RhoGAM injections for Rh-negative mothers. This observation is similar to findings from a more urbanized area in Saudi Arabia with very robust antenatal care services that regularly highlights the importance of Rhesus factor testing and intervention.³² Conversely, in more rural and less accessible regions like Nigeria, awareness of rhesus incompatibility and knowledge of preventive measures like RhoGAM are significantly lower.³³ These regions often suffer from inadequate information and widespread misconceptions about medical interventions/ procedures.

Furthermore, this study revealed that most respondents had good knowledge of rhesus factor incompatibility, and the level of knowledge is higher than findings from previous studies in Nigeria.^{31,33,34} The observed differences in knowledge of blood group and Rh incompatibility between this study and findings from other studies could be due to the several interconnected factors such as preponderance of respondents with higher education, presence of robust healthcare infrastructure, societal beliefs, and the effectiveness of health interventions in the study area. The higher educational attainment of respondents in this study may be accountable for the higher level of knowledge about rhesus incompatibility observed in this study. Evidence has shown that higher educational attainment correlates with better health literacy, which could result in better understanding of medical conditions and interventions.³⁵ Additionally, the presence of robust healthcare infrastructure in Oghara facilitates the dissemination of critical health information, which is less prevalent

in rural communities with limited healthcare services. Societal beliefs may also account for the observed difference. Evidence has shown that regions with low level of education, where traditional beliefs are more dominant tend to have lower levels of health awareness and acceptance of modern medical practices.³⁶ Finally, effectiveness of government and non-governmental health education interventions also play a crucial role in improving overall health knowledge since areas receiving more targeted health education campaigns and resources tend to exhibit higher levels of public health knowledge.³⁷

The implication of these findings is that there is a relatively improved access to healthcare and education in Oghara and it underscores the need for broader intervention to increase knowledge of rhesus incompatibility among pregnant women. It also highlights the importance of healthcare accessibility and education in promoting and enhancing knowledge and practice of desired health behaviour.

Attitude towards rhesus incompatibility prevention

This study revealed that most respondents demonstrated substantial knowledge regarding Rh incompatibility prevention, recognizing the importance of RhoGAM injections and parental Rh status. This aligns with findings from other urban and semi-urban areas where educational attainment, healthcare access and positive attitude have been demonstrated to be associated with pregnant women's knowledge of rhesus incompatibility.^{28,30} However, a minority of respondents exhibited misconceptions about the necessity of RhoGAM injections and the importance of knowing both parents' rhesus status. This observation is in

contrasts with findings from rural and sub-urban areas in Nigeria, where higher levels of misconceptions and lack of awareness regarding Rh incompatibility and the role of RhoGAM injections were found, largely due to traditional beliefs and lower educational attainment capable of affecting health behaviour.^{29,31} Contrary to expectation, most respondents in this study exhibited a generally positive attitude towards rhesus factor incompatibility prevention. The positive attitude toward Rh incompatibility prevention observed in this study are likely due to higher educational levels of the respondents, presence of robust healthcare infrastructure and effective educational interventions in Oghara; all of which has been known to foster better health literacy and adherence to medical guidelines.^{32,35}

Conclusion

This study revealed a commendable level of knowledge and a generally positive attitude towards rhesus incompatibility and its prevention among the study participants. Although most respondents were well-informed about rhesus incompatibility and its prevention, some misconceptions persist, requiring a targeted and sustained culturally sensitive health education intervention.

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