


RESEARCH ARTICLE

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Effect of health education on knowledge of iso-immunization among pregnant women in selected government hospitals in Lagos State, Nigeria

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Abstract

Objective: to assess the outcome of health education on the knowledge of iso-immunization among pregnant women in selected government hospitals in Lagos state.

Method: This was a quasi-experimental study where a semi-structured questionnaire was used to obtain data from 162 pregnant women who were selected by multi-stage Sampling in 3 selected government hospitals in Lagos state. Data collected were analyzed using SPSS version 24 and results were analyzed using frequency tables. An Independent t-test was used to test the mean difference between the two hypotheses. The level of statistical significance was set at a p-value of <0.05.

Results: The findings indicated that there were statistically significant differences between the level of knowledge among pregnant women at pre and post-health education intervention on isoimmunisation (Mean difference = 8.204, $t(160) = 33.602$, $p = .000$); and between the level of knowledge of management among pregnant women at pre and post health education intervention on isoimmunisation (Mean difference = 7.191, $t(160) = 23.234$, $p = .000$).

Conclusion: health education intervention program improved the knowledge of iso-immunization and its management among pregnant women. It was recommended among others that pregnant women should be given health talks about isoimmunisation, its causes, effects, and how it can be managed to improve their knowledge about isoimmunisation.

Keywords: Health education, Iso-immunization, Knowledge, Management, Pregnant women

Plain English Summary

Isoimmunisation is still an issue all over the world and could result in several undesirable effects. Suboptimal knowledge among women of reproductive age (especially in developing countries) contributes majorly to the consequences of isoimmunisation. This study was conducted to assess the effect of health education on knowledge of iso-immunization among pregnant women in selected hospitals in Lagos state. The intervention program improved the knowledge of iso-immunization among pregnant women. Educating

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pregnant women about isoimmunisation, its causes, effects, and how it can be managed, can help improve their knowledge about isoimmunisation and prevent associated consequences.

Introduction

Over the years, though the prevalence of Rh negative phenotype is significantly lower among Africans than Caucasians, Rh iso-immunization remains a major factor in perinatal morbidity and continues to compromise women's obstetric care in sub-Saharan Africa (1, 2). Rhesus disease accounts for 97% of hemolytic disease of the newborn (HDN) which is preventable when measures to prevent fetal-maternal hemorrhage in Rh-negative pregnancy, antenatal and post-natal immune prophylaxis with anti-D immunoglobulin are practiced correctly (3). Although the prevalence of Rh-negative phenotype is significantly lower among Africans compared to Caucasians, the prevalence of Rhesus D hemolytic disease of the fetus and newborn is on the rise in some settings in Sub-Saharan Africa and Rh alloimmunization remains a major factor responsible for perinatal morbidity. In Nigeria, the prevalence of Haemolytic Disease of the Foetus and Newborn (HDFN) due to Rhesus disease (RhD) is between 2.5% and 11.3% (2, 4, 5).

Haemolytic Disease of the Foetus and Newborn (HDFN) is caused by maternal alloimmunization to blood group antigens expressed by fetal red blood cells. In severe cases, HDFN induces fetal anemia with increased risks of fetal death, severe neonatal hyperbilirubinemia, and kernicterus (6). Hemolytic disease of the newborn is very preventable. Today, nearly all women with Rh-negative blood are identified in early pregnancy through blood tests. If a mother is Rh-negative and has not been sensitized, she is usually given a drug called Rh immunoglobulin, or RhoGAM. This specially developed blood product prevents an Rh-negative mother's antibodies from reacting to her baby's Rh-positive red blood cells. Mothers are typically given RhoGAM around the 28th week of pregnancy and again within 72 hours of giving birth.

Iso-immunization occurs in approximately 1 per 1000 births to women who are Rh negative, It is most common among Caucasians than blacks. The Southwest United States has an incidence approximately 1.5 times the national average, which likely is caused by immigration factors and limited access to medical care since blood typing is a routine part of prenatal care. Even so, only 17% of pregnant women with Rh-negative blood who are exposed to Rh-positive fetal blood cells ever develop Rh antibodies. Approximately 15-20% of white patients, as opposed to 5-10% of

black patients, have the Rh-negative blood type. Among individuals of Asian and American Indian descent, the incidence of Rh-negative blood type is less than 5% (7). The Rhesus D negative phenotype is low among Africans, with about 3.9% in Kenya, 4.1% in Guinea, 2.4% in Cameroon, and 4.4% in Nigeria (3).

Women of reproductive age need to have optimum knowledge of isoimmunisation, this knowledge will enable them to provide the necessary information needed for the prevention and treatment of isoimmunisation and its associated consequences. In Nigeria, a study investigated the knowledge and practice of expectant mothers about maternal-fetal blood incompatibility at Olabisi Onabanjo University Teaching Hospital in Ogun state. Results showed that the level of knowledge of maternal-fetal blood incompatibility of the expectant mothers was low (with only 39% correct response) and barely average of 56% for positive attitudes. The study recommends the need for creating more awareness and conducting appropriate intervention that addresses the gap in knowledge as highlighted in the study. This is to corroborate the health information these women receive from the clinic (8).

A study carried out in Saudi Arabia stated that the overall awareness of women of reproductive age about blood group RH (D) negativity was suboptimal at 41.7% so there is a need for structured health education programs by health workers to increase awareness and address women of reproductive age (9). The knowledge of the management of rhesus-negative pregnancies and pregnancies associated with clinically significant alloantibody is suboptimal and this has a significant implication for hemolytic disease of the fetus and newborn, and hemolytic transfusion reaction (10).

These studies have shown that knowledge of iso-immunization among pregnant women is still suboptimal, these studies also suggested the need for structured health education programs by health workers to increase the knowledge of women of reproductive age on isoimmunization. To the knowledge of the researcher, no intervention studies have been previously undertaken on knowledge of iso-immunization among pregnant women in Lagos State, Nigeria, thus the need for this study, which is set to investigate the effect of health education on knowledge of iso-immunization among pregnant

women in some selected government hospital in Lagos state, Nigeria.

Methods

Study setting

The State is located in the South–Western part of Nigeria, on the narrow plain of the Bight of Benin. Lying approximately on longitude 20 42'E and 32 2'E respectively, and between latitude 60 22'N and 60 2'N, Lagos State is bounded in the North and East by Ogun State of Nigeria, in the West by the Republic of Benin, and stretches over 180 kilometers along the Guinea Coast of the Bight of Benin on the Atlantic Ocean. With a territorial land area of 351,861 hectares, Lagos State is made of five administrative divisions, namely: Ikeja, Badagry, Ikorodu, Lagos [Eko], and Epe. The divisions were created in May 1968 under Administrative Divisions [Establishment] Edict No. 3 of April 1968. The Divisions are further divided into 20 Local Governments and 37 Local Council Development Areas respectively (11). The state consists of about 27 general hospitals (12), and two government teaching hospitals.

Study design

One group pre-test post-test quasi-experimental study was conducted in April 2022

Study population

The study population were pregnant women attending antenatal clinic in selected hospitals

Sample Size Determination

The sample size was determined by

$$n = \frac{Z^2pq}{d^2} \text{ (13)}$$

Z = standard normal deviate usually set at 1.96 corresponds to a 95% confidence interval

P = prevalence of knowledge and management of iso-immunization among pregnant women (11.3%) (2, 4, 5).

d = precision for the study which is 0.05

$$q = 1 - p$$

$$n = \frac{Z^2p(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 \times 0.113 \times 0.887}{0.05 \times 0.05}$$

$$n = \frac{0.3850}{0.0025}$$

$$n = 154$$

However, adding a 5% attrition rate the eventual sample size will be 154. Therefore, a sample of 162 (154+ 8) was selected for the study.

Sampling Technique

A multistage sampling method was employed in the selection of a representative sample from the source population. Stage one involved the selection of three of the 5 administrative divisions in Lagos State using simple random sampling (by balloting) and they were Ikeja, Ikorodu, and Lagos divisions. In stage two, one government hospital that offers maternal care was purposively selected from the three divisions, Stage three (Selection of the respondents): The total number of respondents to be selected from each hospital was determined by proportionate allocation. The respondents who met the criteria were selected using a convenience sampling technique.

Data Collection Instrument

Data was collected using a semi-structured questionnaire which has three (3) sections.

Section one: Respondents' sociodemographic characteristics, Section two: Knowledge of iso-immunization, Section three; Knowledge of Management of isoimmunisation.

Study Procedure

The study was in three phase

1. Pre-intervention phase
2. Intervention phase
3. Post-intervention phase

Pre-intervention phase

The researcher introduced herself and explained the objective of the study to them. They were informed that the study would be in 3 phases, the researcher mentioned the topics of the training and they agreed that each session would last 40-45 minutes. A convenient time for the participants was agreed upon for other sessions. A day of training was conducted for two research assistants. The pre-test instrument to determine their pre-intervention knowledge of isoimmunisation and management was administered to them by the researcher and two research assistants

Intervention phase

In the Intervention Phase, after the completion of the pre-test, the researcher introduced the study intervention, which include educational sessions. A total of four educational sessions on isoimmunisation were given for four consecutive weeks to the participants. Each educational session lasted for 40–45 minutes. The educational sessions were delivered using PowerPoint presentations with relevant pictures on isoimmunisation. The educational session included information such as a basic understanding of isoimmunisation, signs and

symptoms, complications, diagnosis, medical treatment, and prevention of isoimmunisation

Post Intervention Phase

This session was done two weeks after the last intervention session all the participants were given the post-test questionnaire on knowledge and management of isoimmunisation,(the same sets of questions used for the pre-test were administered at the post-test). The questionnaires were collected immediately after the post-test.

Data Analysis

The data collected (before and after intervention) were analyzed using SPSS version 24 and results were analyzed using frequency tables. An Independent t-test was used to test the mean difference between the two hypotheses. The level of statistical significance was set at a p-value of <0.05.

Research Questions

Results

Table 1: Participants' Socio-demographic Data

Variables	N = 162	
	Frequency	Percentage (%)
Age	19-28yrs	63 38.9
	29-38yrs	76 46.9
	39-48yrs	23 14.2
Marital Status	Married	151 93.2
	Single	7 4.3
Level of Education	No formal education	2 1.2
	Primary	2 1.2
	Secondary	28 17.3
	Tertiary	130 80.2
Religion	Christianity	121 74.7
	Islam	39 24.1
Occupation	Unemployed	6 3.7
	civil servant	39 24.1
	Business	112 69.1
	No response	5 3.1
No of pregnancy	One	67 41.4
	Two	38 23.5
	Three	27 16.7
	four and above	19 11.7

The findings from Table 1 revealed that the majority of the participants that participated in the study were between the ages of 29 and 38 years (46.9%), (93.2%) were married, (80.2%) had

This study sought answers to the following questions:

1. What are the pre and post-intervention knowledge of iso-immunization among pregnant women in selected hospitals in Lagos State, Nigeria?
2. What are the pre and post-intervention knowledge of the management of iso-immunization among pregnant women in selected hospitals in Lagos State, Nigeria?

Hypotheses

This study attempted to test the following hypotheses at a 0.05 level of significance.

H₀1: There is no significant difference between the level of knowledge among pregnant women at pre and post-health education intervention on isoimmunisation.

H₀2: There is no significant difference between the level of knowledge of management among pregnant women at pre and post-health education intervention on isoimmunisation.

tertiary education, (74.7%) were Christians,(69.1%) of them were into trading and business, and their parity shows that (41.4%) of them are pregnant for the first time.

Table 2: Pre and post-intervention mean knowledge score of participants on isoimmunisation

Knowledge of isoimmunisation	Category of scores	Pre		Post	
		F	%	F	%
Poor	0-8	100	61.7	-	-
Fair	9-13	62	38.3	41	25.3
Good	14-20	-	-	121	74.7
Total		162	100.0	162	100.0
Mean (%)		7.599 (38.0)		15.803 (79.0)	
Std. Deviation		2.128		2.265	

Results from Table 2 show the pre-intervention mean knowledge score of participants on iso-immunization.

Table 3: Pre and post-intervention knowledge of management of isoimmunisation

Pre and post-intervention on knowledge of management of isoimmunisation	Category of scores	Pre		Post	
		F	%	F	%
Poor	0-8	61	37.7	-	-
Fair	9-13	101	62.3	54	33.3
Good	14-20	-	-	108	66.7
Total		162	100.0	162	100.0
Mean (%)		8.068 (40.3)		15.259 (76.3)	
Std. Deviation		3.161		2.326	

Results from Table 3 show the pre-intervention knowledge of management mean score of participants on iso-immunization.

Hypothesis 1: There is no significant difference between the level of knowledge among pregnant women at pre and post-health education intervention on iso-immunization

Hypotheses Testing

Table 4: Independent t-test to show the difference between the level of knowledge among pregnant women at pre and post-health education intervention on isoimmunisation

	N	Mean	Std. Deviation	Std. Error Mean	df	T	Mean diff	P-value
Pre	162	7.599	2.128	.167				
Post	162	15.803	2.265	.178	160	33.602	8.204	.000

Table 4 presents the result of hypothesis one postulated in this study.

pregnant women at pre and post-health education intervention on iso-immunization.

Hypothesis 2 There is no significant difference between the level of management among

Table 5: Independent t-test to show the difference between the level of management among pregnant women at pre and health education intervention on isoimmunisation

	N	Mean	Std. Deviation	Std. Error Mean	df	T	Mean diff	P-value
Pre	162	8.068	3.161	.248				
Post	162	15.259	2.326	.182	160	23.234	7.191	.000

Table 5 presents the result of hypothesis two postulated in this study.

Discussion

The findings of the study showed that the mean difference between the pre and post-intervention knowledge of participants on isoimmunisation was 8.204 which implies that the intervention was effective. The increase in the knowledge observed at the post-intervention level could not have occurred by chance but due to the educational intervention. Implementing an inclusive health education intervention focusing on pregnant women was beneficial for improving knowledge of iso-immunization among pregnant women in selected government hospitals in Lagos. This suggests that there is a gap existing in the knowledge of iso-immunization among pregnant women. This outcome is in tandem with findings from studies that there is a need for structured health education programs by health workers to increase awareness and address women at reproductive age (9), education plays a vital role in improving health outcomes irrespective of participants' formal education. Thus, this intervention was required to improve the knowledge of pregnant women, this knowledge will enable them to provide the necessary information needed for the prevention and treatment of iso-immunization and its associated consequences. Also, the outcome of this study corroborates the findings of a study in Nigeria that investigated the knowledge and practice of expectant mothers about maternal-fetal blood incompatibility at Olabisi Onabanjo University Teaching Hospital in Ogun state. The study showed that the level of knowledge of maternal-fetal blood incompatibility of expectant mothers was low (with only 39% correct response) and barely average of 56% for positive attitudes, while only 42% of their respondents have ever done the test. The study recommends the need for creating more awareness and conducting appropriate intervention that addresses the gap in knowledge as highlighted in the study (8).

Education is an important component of prenatal care, particularly for women who are pregnant for the first time (14). A study done in Kampala supported the provision of information and education as a major component of ANC, It was a cross-sectional descriptive study and the study revealed that only 17.5% of women knew what rhesus incompatibility is, the majority 82.5% had no idea. 12.5% knew how it occurs, 7.5% weren't sure, and 80% did not know, only 15% knew Anti D used to prevent rhesus incompatibility, the majority 85% had never heard of it,7.5% attributed the complications(stillbirths/miscarriages) due to

rhesus incompatibility to witchcraft and curses. The price of Anti-D was thought to be so expensive by 20% of women the majority 80% said it was worth it. Only 25% acknowledged supernatural powers as a solution to rhesus incompatibility, the majority 75% would visit a hospital for a solution to this therefore, concluded that Knowledge about Rhesus incompatibility is still very low, women attending antenatal services in KIU-TH need to be educated about it, its complications, and its prevention (15). However, similarly in a study carried out in India on the prevalence rate of Rh D negative women for antenatal care, was 895 (4.29%). Out of that 304 (33.96%) of the Rh D negative women were of blood group B followed by blood group O of 292(32.62%), blood group A of 218 (24.35%), and blood group AB of 81 (9.05%), respectively. The study concluded that the prevalence of Rh D-negative women is low when compared to Rh D-positive women. There is a need for adequate counseling of pregnant women on the importance of Rh D negative factor during the antenatal period to prevent hemolytic disease of the newborn (16).

The findings of the study showed that the mean difference between the pre and post-intervention knowledge of participants on the management of isoimmunisation was 7.191 which implies that the intervention was effective. It could be deduced from these findings that the difference in the pre and post-intervention scores on the management of iso-immunization may be a result of the educational intervention training. This finding is supported by the study conducted which stated that 50% of the women around the world who require this type of immunoprophylaxis do not receive it, presumably due to a lack of awareness, availability, and/or affordability, thereby putting hundreds of thousands of fetuses and neonates at risk for Rh disease each year. The global failure to provide this generally acknowledged standard-of-care to prevent Rh disease, even 50 years after its availability, contributes to an enormous, continuing burden of fetal and neonatal disease and provides a critically important challenge to the international health care system (16). In support of the findings of this study, a study utilizing an Interpretive Description approach, semi-structured interviews were conducted with RhD-negative women about their pregnancies. The study took place within the geographic context of northern British Columbia (BC). Sixteen RhD-negative women that live in northern BC participated in the study. The analysis identified that RhD-negative women are uninformed and want to be involved in the

decision-making process regarding the prevention of RhD alloimmunization. RhD-negative women want information and to be involved in the decision-making process in the prevention of RhD alloimmunization. Working with RhD-negative women to develop decision aids and/or other educational tools to aid in the decision-making process is warranted (17).

It was also revealed from the findings of the study that there was a significant difference in the pre and post-intervention knowledge of the pregnant women on isoimmunisation. In support of these findings, similar studies concluded that the implementation of community-based health education improved maternal knowledge, positive attitude, and proportion of pregnant women counseled on Iron and Folic Acid Supplementation, with better improvement being recorded in the intervention group (18).

Furthermore, the findings of the study revealed that there was a significant difference in the pre and post-intervention knowledge of the management of isoimmunization among pregnant women. This finding agrees with the submission of another study that stated that the health information package program is effective and has helped pregnant women to improve their knowledge regarding anemia in pregnancy (19). Also, a study revealed that women who receive health education have additional knowledge and better insight so that the mother can generally understand Antenatal Care (20). Application of the health information package program by policy could contribute to the strengthening of the health-promotion activities of pregnant women and stimulate a change in their health-seeking behaviors. Furthermore, this could prevent one of the most prevalent health problems affecting pregnant women (19).

Conclusion

In conclusion, the Findings of this study showed that knowledge of isoimmunisation and its management among pregnant women improved significantly after the intervention. Given the findings and conclusions of this study, it is recommended that health talks about rhesus incompatibility, its causes, complications, and how it can be prevented and managed should be given to these women.

List of abbreviations

HDFN: Haemolytic Disease of the fetus and newborn
HDN: Haemolytic Disease of new-born
IgG: Immunoglobulin G
RBC: Red blood cells

RH: Rhesus
RHD: Rhesus disease

Declarations

Ethics approval, and Consent to Participate

Ethical consideration and consent to participate Ethical approval was granted by the Babcock University Health Research Ethics Committee (Reference number BUHREC 861/21), Health Research and Ethics Committee of Lagos State Teaching Hospital, (Reference Number: LREC/06/10/1801). Permission was granted by the Medical Director's office of the various general hospitals. Informed verbal consent was obtained from the respondents and the nature of the research was duly explained to them. Respondents were assured of the strict confidentiality of the responses provided. They were also informed of the voluntary nature of their participation and that they could withdraw at any point during the research.

Consent for publication

All the authors gave consent for the publication of the work under the creative commons Attribution-Non-Commercial 4.0 license.

Availability of data and materials

The data and materials associated with this research will be made available by the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

ABO and SJO conceived the original idea. ABO wrote the preliminary draft. SJO revised the original draft. ABO performed an extensive literature search. Both authors were involved in the entire revision process and final approval.

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