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Acceptability and affordability of point-of-care test in determining ABO and Rhesus D blood group of pregnant women at Eku General Hospital, EKU, Delta State, Nigeria

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Abstract*:* *Introduction:* The ease of access to blood group testing for pregnant women at ANC in remote communities can reduce pregnancy and perinatal complications.
Objective: To determine the acceptability and affordability of point-of-care Eldon Card blood-group -testing kit among pregnant women in a secondary level hospital.
Method: A cross-sectional descriptive study at the Ante Natal clinic (ANC) of a secondary health facility in a peri- urban setting was conducted. Institutional Ethical approval and participants' informed consent was obtained. Participants' blood group was determined with the ELDON Card point of care test kit and the affordability and Acceptability of this test kit was evaluated by means of a structured questionnaire administered sequentially to the clients. The data was recorded and transcribed to the excel spread sheet. Frequencies, means, and standard deviations were calculated. Levels of confidence was set at 95% CI;(values of $p<0.05$).
Results: Of the 175 pregnant women recruited 153 (87.4%) were < 35 years; 89 (50.9%) were primigravida and 147 (84.0%) were of the middle social class. Eight-two (46.9%) reported that there were very satisfied with the time it took to perform the test, 172 (98.3%) preferred the point-of -care kit to the routine laboratory test. 102 (58.3%) were satisfied with the outcome and 128 (73.1%) reported that a 500 Naira(0.5$)fee was affordable for the point-of-care test.
Conclusion: Pont-of-care ABO/Rh blood group test kit is acceptable method with limited affordability.

Keywords: Point-of-care, Blood-group test, Acceptability, Affordability

Resume: *Introduction :* La facilité d'accès au groupage sanguin lors de la CPN pour les femmes enceintes vivant en zone reculée, peut réduire les complications de la grossesse et périnatales.
Objectif : Déterminer l'acceptabilité et l'accessibilité financière du test au lit du malade du groupage sanguin Eldon Card, aux femmes enceintes dans un hôpital de niveau secondaire.
Méthodologie : Une étude descriptive transversale a été menée dans la clinique prénatale d'un établissement de santé secondaire situéen milieu périurbain. L'approbation éthique et le consentement éclairé des participants ont été obtenus. Le groupe sanguin des participants a été déterminé à l'aide du kit de test ELDON Card. Le caractère abordable et l'acceptabilité de ce kit de test ont été évalués à l'aide d'un questionnaire structuré administré de manière séquentielle aux clients. Les données ont été enregistrées et transcrites sur un fichier Excel. Les fréquences, les moyennes et les écarts types ont été calculés. L'intervalle de confiance est estiméeà 95 % avec une valeurs de $p<0,05$ considérée comme significative.
Résultats : Sur les 175 femmes enceintes recrutées, 153 (87,4 %) avaient moins de 35 ans, 89 (50,9 %) étaient primigestes et 147 (84,0 %) appartenaient à la classe socia-

le moyenne. Quatre-vingt-deux (46,9 %) se sont déclarées très satisfaites du temps nécessaire pour effectuer le test, 172 (98,3 %) ont préféré le test au lit du patient au test de routine au laboratoire. Cent deux (58,3 %) étaient satisfaits du résultat et 128 (73,1 %) ont déclaré qu'un tarif de 500 nairas (0,5 $) était abordable.
Conclusion : Le test de groupage sanguin ABO/Rh au lit du patient est une méthode acceptable, mais peu abordable.

Mots-clés : Test au lit du patient, groupage sanguin, acceptabilité, accessibilité financière.

Introduction

The ABO and Rhesus (Rh) blood groups are the most important blood group system known to man.Feto-maternal incompatibility can lead to haemolyticanaemia and death. Lack of awareness of these blood groups among pregnant women makes elimination of these complications challenging.[1] Routine laboratory test for ABO/Rh blood group has been the practice during antenatal clinic visits but the tests may not be available in peri-urban or hard to reach communities. Point-of-care tests are becoming more and more important in medical practice due to technological advancement and the need to make diagnosis promptly.[2,3] Because Blood group testing in the population generally is not routinely done and more so, it is not accessible to pregnant women in hard-to-reach areas, there is low level of awareness on knowledge of ones' own blood group in the population[5]. Point-of-care (POC) assessment of ABO and Rh blood groups especially in developing countries may increase awareness of blood groups among pregnant women and ensure full participation. The Eldon Card Blood group testing kit, a POC kit, is a test card impregnated with dry anti sera A, B and D for universal screening of blood groups. The procedure is not laborious or technical as nurses and doctors can be trained on its use within a short time. The accuracy is reported to be more than 99.9% when done according to the manufacturer's instruction[6]. The card can be laminated and carried by pregnant women to serve as a reminder of their ABO/Rh blood groups. It can also be very useful in a setting of emergency blood transfusion where the affected patient may be too unstable to volunteer information on her blood group. The study seeks to determine the acceptability and affordability of point-of-care test for ABO and Rh blood group using Eldon Card among pregnant women at this secondary level Hospital. Findings from the study may influence policy makers to change the approach to determining ABO/Rh blood group.

Materials and Method

This was a cross-sectional and descriptive study carried out in a secondary public health facility, at Eku in Delta State between 1st March 2021 and September 30 2021. The subjects were pregnant women who presented to the antenatal clinic for routine care. Ethical approval was obtained from the Ethics committee of the Delta State University Teaching hospitality (DELSUTH). Eku is within the catchment area of DELSUTH and about 30 minutes' drive away from Oghara. Informed consent was obtained from the participants after counselling and education of the importance of knowledge of blood groups. All consenting women were recruited. Women who did not meet inclusion criteria were; Women who did not give consent to participate and Women whose pregnancy was beyond 28 weeks. The subjects were recruited consecutively as they presented. Socio-demographic data such as age, educational level, occupation, parity, spouses' educational level and occupation were obtained. Their social class was determined by using Oyedeji social classification.[6]

Their ABO and Rh blood groups were determined using the POC Eldon card test kits according to the manufacturer's specifications under aseptic procedure. The acceptability and affordability of the tool was assessed by another set of investigators using a pretested proforma by asking the following questions: describe your experience with the procedure on a five point rating scale; how would you rate the time taken for the procedure; would you prefer this POC test to routine laboratory test; how satisfied are you with the outcome of the test; how acceptable to you is 500 naira fee for this point-of-care if it were to replace the routine laboratory test; would you recommend this test to anyone you think require ABO/ Rh blood test?
The data were entered into Microsoft Excel Spreadsheet and then analyzed using SPSS version 22. Means and standard deviations were determined for continuous variables and frequencies and percentages were determined for categorical variables, and the results were presented in tables and figures.

Results

One hundred and seventy-five pregnant women were recruited for the study with a mean age of 28± 5yrs. Five (2.9%) were in the upper social class, 147 (84.0%) middle class and 23(13.1%) lower class. Eighty- nine (50.9%) were primigravida, 77 (44.0%) were multigravida and 9 (5.1%) were grand-multigravida. The parity ranged from para one to para five with a mean of 2± 1.3. One hundred and fifty-two (86.9%) women were Urhobo and the others belonged to various minority ethnic groups.

Table 1 showed the distribution into age groups, parity, social class, and educational level.

Table 1: Distribution into age group, parity, social economic class, and level of education

Variable	Frequency (%)
Age (yrs)	
Below< 35 years	153 (87.4)
Above >=35 years	22 (12.6)
Social Class	
Upper class	5 (2.9)
Middle class	147 (84.0)
Lower class	23 (13.1)
Parity	
Primigravida	87 (49.7)
Multigravida	77 (44.0)
Grand multigravida	11 (6.3)
Level of Education	
Tertiary	10 (5.7)
Secondary	98 (56.0)
Primary	67 (38.3)

The commonest blood group was O positive accounting for 48.6% (85/175) and the least was A negative accounting for 1.1% (2/175). No patient had AB negative blood as shown in table 2.

Table 2: Distribution of ABO and Rh blood group among pregnant women

ABO/Rh Blood Group	Frequencies (%)
O positive	85 (48.6)
A positive	35 (20.0)
B positive	23 (13.1)
AB Positive	10 (5.7)
Total Rh Positive	153(87.43)
O negative	15 (8.6)
B negative	5 (2.9)
A negative	2 (1.1)
AB negative	0 (0.0)
Total Rh Negative	22(12.57)
All Pregnant women (Rh Positive) + (Rh Negative)	175(100)

Twenty-two (12.57%) of women were Rh D negative relative to 153 (87.43%) who were Rh D positive.

Fifty- seven (32.6%) pregnant women reported that their experience with the point-of-care test was very good, 117 (66.9%) reported their experience was good and only one (0.6%) reported that their experience was fairly good. Eighty-two (46.9%) reported that the time was very adequate, 88 (50.3%) reported that the time was just adequate, five (2.9%) reported that the time was longer than expected. One hundred and seventy-two (98.3%) preferred the point-of-care tool to the routine laboratory while three (1.7%) did not prefer the point-of-care tool to routine laboratory test. Seventy-one (40.6%) were highly satisfied with the outcome, 102 (58.3%) were satisfied with the outcome and two (1.1%) were fairly satisfied with the outcome. Thirty-nine (22.3%) reported that a token fee of 500 Naira(0.5$) was highly affordable for the point-of-care test, 128 (73.1%) reported that it was affordable, four (2.3%) reported that it was barely affordable and three (1.7%) reported that it was not affordable as shown in Table 3.

Table 3: Distribution of Responses from Acceptability / Affordability Questionnaire

Questions	Response	Frequency (%)
Describe your experience	Very good	57 (32.6)
	Good	117 (66.9)
	Fair	1 (0.6)
	Poor	0 (0.0)
	Bad	0 (0.0)
How would you rate the time?	Shorter than expected.	82 (46.9)
	Just adequate	88 (50.3)
	Longer than expected.	5 (2.9)
	Too long	0 (0.0)
	Unbearably long	0 (0.0)
Would you prefer this point-of-care test to routine laboratory check of ABO/Rh blood group?	Yes	172 (98.3)
	No	3 (1.7)
How satisfied are you with the outcome of the point-of-care test?	Highly satisfied	71 (40.6)
	Satisfied	102 (58.3)
	Fairly satisfied	2 (1.1)
	Poorly satisfied	0 (0.0)
	Disappointed	0 (0.0)
How acceptable to you is 500-naira(0.3$)fee for this point-of-care if it were to replace the routine laboratory test?	Highly acceptable	39 (22.3)
	Acceptable	129 (73.7)
	Fairly acceptable	4 (2.3)
	Not acceptable	3 (1.7)
Would you recommend this test to anyone you think require ABO/Rh?	Yes	175 (100)
	No	0 (0.0

Discussion

Majority of the studied women were primigravida, below 35 years of age and belonged to the middle socioeconomic class. This demographic pattern is similar to what has been reported in some other hospital based studies in Nigeria[7,8] Studies have shown that women with higher socioeconomic class are more likely to have better access to information and make informed decisions that will be of benefit to their health and that of their families[9,10] It is therefore understandable that a large proportion of the pregnant women of this study were quite satisfied and found the use of POC Eldon Card quite acceptable in preference to the standard Laboratory method of Blood Group determination. Our findings herein is dissimilar to that of another study among pregnant women in North-central Nigeria[11], where the majority of cases seen were in the lower socioeconomic class, a situation that may be more representative of the general population,nationally[12] as more women are of the Lower SES. Lower SES groups have lower access to information and their level of health information awareness might yield a different outcome in the local context, such socio-cultural context would require intensive health education as primary

reinforcement strategy to improve the level of awareness and to promote enhanced health information awareness on the need to utilize POC Eldon card as screening test where there is limited access to laboratory testing. Such moves might be recommended as initial steps to mitigate the negative influence of lower SES scenarios and low health information awareness.[13,14]

Over 90% of the subjects reported a very good experience during the procedure, and shorter duration of the investigation than expected relative to the standard laboratory method and were very satisfied with the outcome. Majority of the women would also prefer a point-of-care test to a laboratory ABO/Rh test. Though the researchers did not explore the reasons why the subjects would prefer the point-of-care test to routine laboratory test, it may most likely relate to the burden of moving from the clinic to the laboratory where these women would usually queue up with other patients and wait for long periods of uncertain duration before they are attended to. The preference and benefits of point-of-care test over laboratory test has also been reported in the literature by other authors. [15,16] The POC test kit will however enable identification of risk group who could be further retested for more precision and focus for care, it can thus serve as a screening test in that first phase. In settings where Laboratory facilities may not be readily accessible, it could be very helpful. However, point-of-care test may prove costlier with limited precision than routine laboratory test in some situations.[16]

Majority of the women (over 90%) also reported that a token fee of 500 Naira(0.5USD) is acceptable to them if they were to pay for the point-of-care test in place of routine laboratory test. Routine laboratory ABO/Rh test cost about 2,000 Naira($5USD), which is four times more than this POC test. However, with inflation, the actual cost price of Eldon Card point-of-care ABO/Rh test per individual may be much higher than the estimated cost of 500Naira(0.5USD) in the current day economic context in Nigeria and it is doubtful if majority of the subjects will still prefer point-of-care ABO/Rh blood test to laboratory test if they have to bear the entire cost of the test. More than 90% of Nigerians' expenditure for health is out-of-pocket and this can influence individuals and families choice of health care[17,18]. The options for the implementation of point-of-care ABO/Rh blood group check for pregnant women will therefore include providing it at a highly subsidized rate that pregnant women can afford or to provide it for those who can afford it at the actual cost price, while the routine laboratory blood test remains an option for those who cannot afford it. However, since Eldon Card can be laminated and carried as a blood group identification card by individuals for the rest of their lives, the long-term cost benefit thus appears to outweigh the immediate cost of the test.

This report is limited by the small number of cases assessed and the single site of this survey in an area with limited laboratory access. Therefore, for wider applicability in the interpretation of the acceptability of findings, more studies in remote settings with women from more diverse SES are required.

Conclusion

Point-of-care ABO/Rh blood group test may be considered acceptable method for most pregnant women attending antenatal clinic in communities with poor laboratory access and may be a viable option to the routine laboratory test particularly in hard-to-reach areas. The affordability of this POC test for families, compared to laboratory test is doubtful and may require some subsidy or health insurance coverage for implementation.

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Conflict of Interest
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