

African Renaissance

ISSN: 1744-2532 (Print) ISSN: 2516-5305 (Online)

- Indexed at: EBSCO, ProQuest, J-Gate and Sabinet
- Accredited by IBSS and SCOPUS

Vol. 16, (No. 1), March 2019

Pp 167 – 185

Rethinking the sickle cell awareness campaign in West Africa: Evidence from Nigeria

DOI: <https://doi.org/10.31920/2516-5305/2019/v16n1a9>

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Abstract

Emergent statistics on the geographic distribution of sickle cell anaemia is indicative of the failure of current strategies in tackling this endemic public health issue in Africa and Nigeria in particular. As part of continued preventive

education policy, Delta, one of the states in Nigeria susceptible to the ailment initiated the “operation know your genotype campaign” to educate people of marriageable age on the need to take premarital genotype test to avoid incompatible mating. Using a mixed methods involving in-depth interviews of experts and survey of 300 Asaba adults, the study sought to determine the campaign’s effectiveness in creating awareness and influencing individuals to undertake genotype compatibility test. The findings indicate low awareness and knowledge of the genotype test and compatibility campaign. Ignorance about the causes of sickle cell anaemia persists and many respondents do not know their genotype, suggesting that the campaign may have been unsuccessful in creating needed awareness of and motivation for individuals’ to go for the genotype compatibility testing. The campaign battled against religious beliefs and traditional myths that might have muted its desired impact.

Keyword: Sickle cell anaemia, premarital genotype compatibility, genotype screening, selective mating, audience reception.

Introduction

Statistics on the geographic distribution of sickle cell incidence and its consequences show that the odds are stacked against Africa, particularly Nigeria. While five percent of the world’s population carried the haemoglobinopathies (WHO, 2006), one out of every four Nigerian bears the mutant gene (Akinsete, 2016; WHO, 2006). Each year, of the approximately 300,000 infants born around the world with the sickle cell disease, (WHO, 2006) more than 200,000 (WHO, 2006) and about 150,000 (Akinsete, 2016; Alege, 2015; WHO, 2006) originate from Africa and Nigeria respectively. Mortality rate before the age of ten is 95 percent in Nigeria, compared to 96 percent survival rate in the United Kingdom and the United States of America (Alege, 2015). Undoubtedly, Nigeria, indeed, bears a disproportionate weight of the burden of this public health crisis. For communities hard hit by this preventable disorder, public knowledge appears to offer the only glimmer of hope. The expectation is that public knowledge would transmute into favourable attitudinal disposition, and this attitude will itself induce an intention to adopt the idea of premarital genotype screening and selective mating. As part of continued preventive education policy to shore up public knowledge about the consequences of sickle cell anaemia. Delta,

one of the states in Nigeria susceptible to the ailment is using mass media platforms to educate people of marriageable age on the need to submit themselves to premarital genotype test as a prelude to selective mating.

The media campaign known as “operation know your genotype” has been running for about two years with the objective of generating awareness and knowledge of genotype compatibility as the only cost efficient and enduring panacea to preventing possible genotype mishap. Ultimately, the campaign hopes to reset the attitude of youths in order to embrace genotype testing and selective mating. The purpose of the study therefore, was to determine participants’ reception of the campaign, level of awareness, knowledge concerning healthy compatible genotype, and the direction of their attitude to the issue of genetic mating. The study also examined the influence of demographic variables on the pattern of awareness, knowledge and attitude. It was hypothesized that participants’ age, gender, level of education and religion will significantly influence awareness, knowledge and attitude towards genotype compatibility and, that awareness will significantly influence the association between knowledge and attitude towards genotype compatibility.

Literature review

Sickle Cell a public health scourge.

Sickle cell anaemia is a lifelong hereditary disorder of the blood. Sufferers of sickle cell anaemia received a mutant haemoglobin gene from both parents at birth. The haemoglobin (Hb) is the red blood substance that oxygenates the blood and consequently sustains the body system. There are two types of the gene critical for inheritance of sickle cell anaemia – A and S. Individuals who inherit two alleles (AA) from both parents are said to have normal haemoglobin, while children who inherit copies of the defective gene (SS) from both parents will have sickle cell anaemia. Heterozygous children are those who inherit a copy of the defective sickle cell haemoglobin gene from one parent. They are immune to the disease but are considered carriers of the sickle cell trait (Akinsete, 2016; Emechebe, Onyire, Orji & Achigbu, 2017; WHO, 2006). Victims of sickle cell experience spasms of acute and potentially fatal pain and discomfort (Akinsete, 2016; WHO, 2006). Beyond the physiological trauma of the victims, the condition also exerts its toll on the emotions and finances of indigent parents and relations who often times are forced to abandon their jobs and take up the role of care-givers (Ogedengbe,

2002; Olatunya, Ogundare, Fadare, et al., 2016). In chronicling the evolution of sickle cell disorder, medical historians have identified Sub-Saharan Africa as its cradle. There is a postulation that the mutant gene evolved in an effort by the body system to develop an in-built resistance to falciparum malaria, an invasive parasite that is transmitted by mosquitoes rampant in Africa. The sickle cell trait arms the carriers with some natural defense mechanism against the invasion of the blood stream by these deadly parasites. Thus, the sickle cells allele gives the host a comparatively advantageous survival chance. Thus, while heterozygotes were insulated from the ravaging onslaught of the malaria parasite, the AA homozygous population was decimated. As this situation became widespread, heterozygotes proliferated and survived and the S alleles became more common. Immigration and international trading helped disperse the sickle cells and spread it around the globe (Makani, Ofori-Acquah, Nnodu, Wonkam & Ohene-Frempong, 2013). Sickle Cell is highly prevalent in Nigeria. It is considered a public health scourge given the high mortality rate associated with sickle cell patients especially among victims within the age of ten. Mortality rate before the age of ten is 95 percent in Nigeria. In other words, only 5% of children born with sickle cell disorder live past the age of 10 (Alege, 2015). Undoubtedly, Nigeria, indeed, bears a disproportionate weight of the burden of this public health crisis. N

Overview of the Operation Know your genotype campaign.

Against the backdrop of escalating morbidity arising from sickle cell disease and the grim picture of victims languishing in pain and despair without adequate medical attention owing to limited resources of caregivers, government and non-government organisations have intensified awareness about the disorder and the need for intending couples to undertake genotype compatibility test. The “operation know your genotype”, a pet project of Delta State governor’s wife, is one of the efforts towards creating awareness around sickle cell. The operation know your genotype, is a public campaign designed to encourage premarital genotype screening, genetic counseling and selective mating among bachelors and spinsters of marriageable age in the state. Additionally, the media advocacy initiative aims to draw public attention

to the plight of those suffering from sickle cell anaemia. The “operation know your genotype” campaign is in deference to advice emanating from experts and non-governmental organizations, which considered a preventive measure based on public enlightenment the best and most enduring response to the deadly disease that had festered on myth which attributes the disorder to witchcraft (Akinsete, 2016; Alege, 2015; WHO 2006). Essentially, the campaign is designed to swirl around the activities and schedule of the governor’s wife, who is the face and voice of the campaign. As the face and voice of the campaign, the Governor’s wife will use her high political profile and connections to mobilize money for the no your genotype cause, source and commission donated sickle cell pieces of equipment to designated hospitals, and naturally engender local media coverage. Envisaged media mileage include news mentions of events associated with the campaign, news analyses on sickle cell disorder, media interviews with medical doctors highlighting the pains of sufferers and preventive measures such as genotype compatibility test, as well as editorial and special coverage in local print and broadcast media. Woven around slogans such as “please avoid marital accident” and “make your life that of the next generation a beautiful happy one,” the core of the media content was genotypes that are compatible and those that are incompatible. Prospects were instructed on the possible outcome of genotype matching – AA+AA = AA, AA(Good); AA + AS = AA, AS (Good); AA + SS = AS, AS (Good); AA + AC = AA, AC (Good); AS + AS = AA, AS, SS (Bad); AS + SS = AS, SS (Bad); SS + SS = SS, SS (Bad); AS + AC = AA, AC, SC (Need Advice); AC + SC = AS, AC (Need advice); AC + SS (Need Advice). In addition, prospects were admonished to eschew sentiments in their choices of conjugal partners. The editorial materials harped on the argument that, admittedly, amorous relationships are often overtaken by blind emotions; nevertheless, dispassionate decisions that will preclude the offspring of such matrimonial unions from eternal yet avoidable trauma and possible premature death remain the only logical and wise option, especially in a society where marriage is viewed as consummated only with the birth of children. It was assumed that the resulting media attention and impression would consequently lead to public consciousness about the inheritable nature of the disorders. The mainstream media campaign was complemented by posters, fliers and billboards that were distributed around places of worship.

Methods

The study was conducted in Asaba, capital city of Delta state, South east Nigeria. Delta State is the hub of the Niger-Delta region and is considered the economic backbone of the country due to its rich deposit of crude oil. With an estimated population of 94,082 (National Population Commission), Asaba has all the trappings of a metropolitan city. Its promising economic outlook is aided by a large concentration of expatriates working in the oil and gas industry. The study was executed using what Creswell (2009) referred to as sequential explanatory mixed study, which is a combination of both quantitative and qualitative approaches. The quantitative survey phase was conducted first and the data analyzed. The findings were then further probed using qualitative in-depth interviews with four key respondents three health care officials and one public health administrator.. These respondents who helped provide insight into the possible predictors of the quantitative survey outcomes are Dr. Ijoma Nnodim, Chief Medical Director, Rose Valley Hospital, Asaba; Dr. Bamidele Adesoji Ogunfowokan, Chief Medical Director, Ark Medical Center, Asaba; Mrs. Anthonia Obi, Chief Nursing Officer and Genetic Counsellor, General Hospital, Ogwashi-Uku; and Mrs. Theresa Nwajei, Deputy Director Nursing Services, Ika South local government, all in Delta State. Using cross-sectional survey and multi-stage sampling technique, we then administered a total of 300 questionnaire to a stratified sample of spinsters and bachelors drawn from 14 wards in Asaba, Delta State, Nigeria. Asaba consists of 14 wards, using multi-stage sampling technique, three wards were first randomly selected from the fourteen wards making up the research area. The wards that emerged from the pool were ward two (Oko-Ogbele and Akpako), ward seven (Umuaji) and ward eleven (Government Reserve Area). From each ward, four streets were then randomly selected. An additional street was then added to ward eleven when the fourth street could not sufficiently account for the number of houses set as benchmark for final selection. The preset number was at least 40 houses. This was to allow for a pool large enough to provide for random sampling without replacement. Participants cut across both sexes but were confined to bachelors and spinsters above the age of eighteen. Participation was narrowed to bachelors and spinsters because this demographic group constitute the target of the campaign. The age range was deliberately limited to 18 years and above so as not to offend the cultural ethos of a

community that strongly believes that children and adolescents should be insulated from issue or discussion pertaining to marriage or sex. More than half of the participants (54.3%), were between the age range of 18 and 22. Females constituted 52.5% of those surveyed. Majority of the participants were Christians (81.6%). Nearly 68% of the participants had O'Level qualifications while 32.3% had higher level of academic qualification ranging from Higher National Diploma and Bachelor of Science degrees. First, the 31 item questionnaire was content validated and yielded a Cronbach Alpha score of 0.867 when tested for reliability. The construct, reception, was measured using indicators such as respondents' awareness of genotype and the genotype campaign, their knowledge of genotype compatibility as well as their attitude to selective mating. Once the researchers or any of their assistants selected a house, members of the household were approached for the voluntary participation of at most two people who met the condition for participation. The objective of the study was explained, anonymity and security were assured and then a copy of the questionnaire was handed out for self-administration. Out of the 300 questionnaires distributed 299 copies were returned, representing a 94% response rate. Out of which 282 were validated as useable copies after data cleaning.

Analysis

Qualitative data was analysed inductively using closely linked themes. Survey data was analysed using measure of central tendency, simple linear regression and stepwise regression. A five point Likert scale Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD), No Idea (NI) was used and where mean is $\leq 1.49 = \text{NI}$; $1.5 \text{ to } 2.49 = \text{SD}$; $2.5 \text{ to } 3.49 = \text{D}$; $3.5 \text{ to } 4.49 = \text{A}$; $4.5 \text{ to } 5 = \text{SA}$. The pre-set level of significance for this study was 0.05. The hypotheses or research questions presume that there is a significant relationship between the variables being considered. If the P-value which indicates the significance or the probability value exceeds the pre-set level of significance ($P > 0.05$), the hypothesis stated in alternative form will be rejected, however, if the P-value is less than or equal to 0.05 ($P \leq 0.05$), the hypothesis will be accepted. In order to eliminate redundancies, each table was organized around a single independent demographic variable to capture the interaction between the three dependent variables: awareness, knowledge and attitude. This way, redundancies were eliminated. The results of the

survey and in-depth interviews were interpreted and consolidated during analysis.

Results

Respondents' awareness and knowledge of genotype compatibility

Participants were asked to indicate whether or not they agreed with two statements regarding awareness of genotype compatibility and knowledge of the state run campaign on genotype compatibility on a five point scale based on the contents of the “operation know your genotype” campaign. Majority of the participants agreed they have heard of genotype compatibility (Mean=3.54, SD=1.85), but very few were aware that a campaign on genotype compatibility were carried out by the State government (Mean=1.89, SD=1.45). On the average, participants exhibited low awareness of genotype compatibility (Average Weighted Mean= 2.72, SD=1.65). As shown in Table 1, although many participants strongly agreed that the AA genotype was compatible with AA, AS and SS, there was a fair number of participants who think AS can marry AS (Mean= 3.55, SD=1.06). This category of respondents also disagreed with the statement that genetically incompatible couples were likely to give birth to SS genetic children (Mean=3.31, SD=1.70).

This implies that respondents' knowledge about the possible causes of sickle cell anaemia was low. A sizeable proportion of the respondents stated that they did not know their genotype (Mean=3.48, SD=1.75), which highlights the importance of genotype testing. There was unanimity among respondents that the agents of education and socialization in our community – parents, education system and religious bodies should be held accountable. Social media that is so popular with our youths is awash with misleading and mis-educating materials. Respondents were unanimous in advocating for the inclusion of sex education and genetic meeting in primary and secondary school curricular. Lack of genotype status knowledge as displayed by some respondents was blamed on the inertia of parents who failed to determine their own genetic status and that of their children. According to Dr. Ijoma Nnodim, the youths “are not getting the right information from the schools and from the social media. This explains why they don't have knowledge of the right genotype.” The experts also identified religious beliefs for misleading adherents into falsely thinking that faith

and prayers could alter genetic sequencing. One of the participants, Dr. Ogunfowokan Adesoji, suggests a revisiting of religious background arguing that “some people even when they are aware they are AS carriers will say by faith, nothing will happen”. As a way of promoting knowledge about genotype, Dr Nnodim advocated the use of evidence of genotype test as a precondition for school admission.

Table 1: Respondents’ knowledge of genotype compatibility

Items	Mean	SD
AA can marry AA	4.66	0.47
AA can marry AS	4.59	0.61
AA can marry SS	3.58	1.38
AS can marry AS	3.55	1.06
I know my genotype	3.48	1.75
Genetically incompatible couples are likely to give birth to SS genetic children	3.31	1.70
SS can marry AS	2.92	0.91
SS can marry SS	2.65	0.88
Average Weighted Mean	3.59	1.10

*If mean is ≤ 1.49 =NI; 1.5 to 2.49 = SD; 2.5 to 3.49 =D; 3.5 to 4.49 = A; 4.5 to 5 = SA

Respondents’ attitude towards genotype compatibility

Students were asked whether or not they agreed with a series of eight statements on genotype compatibility (Table 2). Participants felt it was best for AA to marry AA, while SS and AS should avoid marrying compatible partners. Many of the respondents stated that they are not favourably disposed to marrying incompatible partner (Mean= 3.65, SD=1.14). This suggests the respondents have appropriate attitude to genotype compatibility. However, the findings show that even though respondents know AA was compatible with SS, an average of 1.30 stated that they will not encourage AA to marry SS.

A plausible explanation for this attitude may be that participants could be apprehensive that an apparently healthy partner would end up being burdened by a sickly spouse. This was affirmed by the four experts who all stated that many people are aware of the complications and traumatic experiences of victims of SS disorder. They argued however, that the general public is unaware that advances in medical science has spawned knowledge, devices and drugs that have enhanced the management of

the condition as well as the life expectancy of victims. But Dr Nnodim insists public needs to be educated that “sickle cell is not a death sentence”.

Table 2: Respondents’ attitude towards genotype compatibility

Items	Mean	SD
AA is encouraged to marry AA	4.61	0.49
SS should avoid marrying SS	4.41	0.92
AS should avoid marrying AS	4.19	1.16
AS should avoid marrying SS	4.11	1.08
AA is encouraged to marry AS	4.02	1.23
I cannot marry an incompatible partner	3.65	1.14
AA is encouraged to marry SS	3.32	1.30
I can marry an incompatible partner	2.78	1.02
Average Weighted Mean	3.89	1.04

* If mean is ≤ 1.49 =NI; 1.5 to 2.49 = SD; 2.5 to 3.49 =D; 3.5 to 4.49 = A; 4.5 to 5 = SA

Exposure to genotype compatibility messages

As can be seen from Table 3 most of the participants heard about the genotype compatibility mainly from counsellors (Mean= 3.53, SD= 1.09) and their parents (Mean= 3.53, SD= 0.83). Followed by church/Islamic organized marriage programme (Mean= 3.49, SD= 1.04) and friends (Mean= 3.24, SD= 1.15). Surprisingly, lower number of participants were exposed to the genotype compatibility campaign through radio, newspapers and social media. This suggests that many participants were not exposed to the genotype compatibility media campaign. It could be that the campaign was not directed to the appropriate target. This finding highlights the urgent need to either broaden or refocus the campaign to capture parents. The campaign managers might need to capitalize on the influence of parents on their adolescents and young adults. Respondents regretted this situation because media contents unlike word of mouth by friends or parents are heavily researched and consequently credible. They attributed this disturbing revelation to inadequate partnership between the mass media and the medical communities. Dr. Adesoji put it tellingly when he said that “the audience may doubt the competence of a journalist speaking on a strictly medical issue”. Another respondent observed that the obsession of the media with money might discourage media operators from developing content that cannot be easily sold to advertisers. Anthonia Obi, a chief nursing officer, agreed. To promote

knowledge around sickle cell and genotype compatibility, she suggested that government should consider the possibility of formulating policy that will compel media houses to devote certain airtime/space to the issue.

Table 3: Media of exposure to genotype compatibility messages

Items	Mean	SD
I heard of genotype compatibility from other counselors	3.53	1.09
I heard of genotype compatibility from my parents	3.53	0.83
I heard of genotype compatibility at a church/Islamic organized marriage programme	3.49	1.04
I heard of genotype compatibility from my friends	3.24	1.15
I heard of genotype compatibility on radio	3.22	1.24
I heard of genotype compatibility at a health workshop by an health agency/NGO	3.21	1.00
I read of genotype compatibility in newspaper /magazine	3.21	1.00
I came across genotype compatibility in the social media	3.15	1.19
I heard of genotype compatibility on TV	2.93	1.05
Average Weighted Mean	3.28	1.06

*If mean is ≤ 1.49 =NI; 1.5 to 2.49 = SD; 2.5 to 3.49 =D; 3.5 to 4.49 = A; 4.5 to 5 = SA

Influence of Age on participants' awareness, knowledge and attitude towards genotype compatibility

It was hypothesized that participants' age will significantly influence awareness, knowledge and attitude towards genotype compatibility. As shown in Table 4, age had a positive influence on awareness of genotype compatibility ($p < 0.05$). The model however shows a weak positive correlation coefficient ($r = 0.250$), suggesting that young respondents were less aware of genotype compatibility while the older respondents were more aware of genotype compatibility. Similarly, there was a significant correlation between age and knowledge ($p < 0.05$). Again, the correlation coefficient was weak ($r = 0.175$) which suggests that the younger youths in Asaba were the less likely to have the knowledge of genotype compatibility while the older youths were more likely to have knowledge of genotype compatibility. Age significantly explains variability towards genotype compatibility ($p < 0.05$). This suggests that age could explain 8.9% variation of attitudinal inclination towards genotype compatibility. What this means is that chronological maturation progressively determines the level of awareness, depth of knowledge and consequently

altitudinal disposition to issue of genotype compatibility. This is plausible given the fact that with increasing age comes improved capacity of the brain to process and hold information. The aversion for risk taking also grows.

Table 4 Simple Linear Regression analysis predicting influence of age on Awareness, Knowledge and Attitude towards Genotype Compatibility

Variable	Model_ Hypothesis 1			Model_ Hypothesis 2			Model_ Hypothesis 3		
	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.
C	3.366	12.011	0.000	24.383	55.007	0.000	25.017	42.031	0.000
Age	0.250	4.324	0.000	0.175	2.971	0.003	0.298	5.216	0.000
R ²	0.063			0.031			0.089		
Adj. R ²	0.059			0.027			0.085		
F-Statistic	18.697			8.825			27.211		
Prob.(F-Stat)	0.000*			0.003*			0.000*		
Dependent Variable	Awareness Genotype Compatibility			Knowledge Genotype Compatibility			Attitude Genotype Compatibility		

Influence of Gender on participants’ Awareness, Knowledge and Attitude towards Genotype Compatibility

It was postulated that participants’ gender will influence their level of awareness, knowledge and attitude to genotype compatibility. Table 5 indicates that being a male or female insignificantly influenced awareness of genotype compatibility ($p > 0.05$). Meaning that gender plays no role in respondents’ exposure or accessibility to issue of genotype compatibility. In the same vein, gender no significant influence respondents’ knowledge of genotype compatibility ($p > 0.05$). However, being a male positively influenced attitude towards genotype compatibility ($p < 0.05$). This indicates that being a male in Asaba is more likely to be associated with increased positive attitude towards genetic mating. There was strong negative attitude towards genotype compatibility by female respondents ($p < 0.05$). The negative attitude of female to genotype compatibility is in

stark contrast with the favourable disposition of male to this issue, thus suggesting that females may be impervious to the idea of genetic matching. This revelation is more disturbing given the fact female dominates the numerical distribution of respondents in the sample. The respondents collectively attributed this pattern to our patriarchal culture. Males are more socially visible and are able to negotiate greater access to information. A conservative culture that precludes a woman from wooing a desired man and that consequently limits her options to only males that court her will unwittingly nurture a culture of concealment. The fact that the financial burden of family upkeep rests primarily on the man was also offered as a possible reason.

Table 5 Simple Linear Regression Testing the Influence that Gender has on Awareness, Knowledge and Attitude towards Genotype Compatibility

Variable	Model_ Hypothesis 4			Model_ Hypothesis 5			Model_ Hypothesis 6		
	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.
C (Male)	4.551	30.446	0.00	25.410	109.51	0.000	25.858	95.976	0.000
C (Female)	4.422	28.149	0.000	25.817	105.870	0.000	30.146	106.469	0.000
Male	0.036	-0.595	0.552	0.072	1.208	0.228	0.548	10.972	0.000
Female	0.036	0.595	0.552	-0.072	-1.208	.228	0.548	10.972	0.000
R ² (Male)	0.001			0.005			0.301		
R ² (Female)	0.001			0.005			0.301		
Adj. R ² (Male)	-0.002			0.002			0.298		
Adj. R ² (Female)	-0.002			0.002			0.298		
F-Statistic (Male)	0.354			1.460			120.384		
F-Statistic (Female)	0.354			1.460			120.384		
Prob.(F-Stat) (Male)	0.552			0.228			0.000*		
Prob.(F-Stat) (Female)	0.552			0.228			0.000*		
Dependent Variable	Awareness Genotype Compatibility			Knowledge Genotype Compatibility			Attitude Genotype Compatibility		

Influence of education on participants’ Awareness, Knowledge and Attitude towards Genotype Compatibility.

It was theorized that participants’ level of education positively influence their awareness, knowledge and attitude toward genotype compatibility campaign. As Table 6 shows level of education significantly influenced participants ‘awareness of genotype compatibility (p<0.05). This shows that increase in level of education will likely increase awareness of genotype compatibility.

Interestingly, level of education had no significant influence on participants’ knowledge of genotype compatibility ($p>0.05$). It was expected that level of education would significantly alter knowledge by creating and sustaining an appetite for informed decision. It emerged however, that the level of education positively influenced attitude towards genotype compatibility ($p<0.05$). This implies that increase in level of education will likely increase attitude towards genotype compatibility. This finding was reassuring in the light of the influence of education and knowledge. This compensated for the little influence that education had on knowledge. The intriguing inversed relationship between education and knowledge of genetic mating was taken up with our expert respondents and the consensus was that certain intervening sources such as traditional myths or religious beliefs that are antithetical to genetic mating could have undermined the natural progression from awareness to knowledge. More so, that awareness requires only random and superficial attention while knowledge demands deliberate information processing.

Table 6 Simple Linear Regression Testing the Influence that Level of Education has on Awareness, Knowledge and Attitude towards Genotype Compatibility

Variable	Model_ Hypothesis 7			Model_ Hypothesis 8			Model_ Hypothesis 9		
	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.
C	1.872	6.694	0.000	26.021	51.522	0.000	23.229	36.590	0.000
Level									
Education	0.510	9.928	0.000	-0.052	-0.876	0.382	0.422	7.797	0.000
R ²	0.260			0.003			0.178		
Adj. R ²	0.258			-0.001			0.175		
F-Statistic	98.571			0.767			60.800		
Prob.(F-Stat)	0.000*			0.382			0.000*		
Dependent Variable	AwarenessGenotype Compatibility			Knowledge Genotype Compatibility			Attitude Genotype Compatibility		

Influence of Religion on Awareness, Knowledge and Attitude towards Genotype Compatibility

Contrary to our hypothesis, religion as can be seen from Table 7 had no significant influence on participants’ awareness of and knowledge of genotype compatibility ($p>0.05$). Surprisingly, there was no positive correlation between religion and attitude to genotype compatibility ($p>0.05$). In the light of the pluralistic religious setting and the antipathy of most religious bodies to the issue of genotype screening and genetic mating, it is gratifying to see that religion recorded an insignificant influence on genotype compatibility among respondents.

Table 7 Simple Linear Regression Testing the Influence that Religion has on Awareness, Knowledge and Attitude towards Genotype Compatibility

Variable	Model_ Hypothesis 10			Model_ Hypothesis 11			Model_ Hypothesis 11		
	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.	Coeff	t-Stat.	Prob.
C	4.586	13.172	0.000	25.517	47.115	0.000	27.839	37.116	0.000
Religion	-0.017	-0.291	0.771	0.010	0.169	0.866	0.005	0.080	0.936
R ²	0.000			0.000			0.000		
Adj. R ²	-0.003			-0.003			-0.004		
F-Statistic	0.085			0.028			0.006		
Prob.(F-Stat)	0.771			0.866			0.936		
Dependent Variable	Awareness Genotype Compatibility			Knowledge Genotype Compatibility			Attitude Genotype Compatibility		

Influence of Awareness on knowledge and attitude towards genotype compatibility.

As indicated in Table 8 awareness significantly influenced participants’ knowledge and attitude towards genotype compatibility ($p < 0.05$). In other words, respondents who are aware of genotype compatibility, were more likely to acquire knowledge leading to a more positive attitudinal disposition towards genotype compatibility. In the first regression analysis, knowledge of genotype compatibility could only explain two percent variation in attitude towards genotype compatibility, however, when awareness was introduced in the second model, there was a change of 29.9 percent in the degree of explanation of attitude towards genotype compatibility. This suggests that awareness of genotype compatibility, significantly increases participants’ knowledge and attitude towards genotype compatibility. The analysis suggests that awareness of genotype compatibility will more likely improve knowledge and attitude towards genotype compatibility, hence, awareness of genotype compatibility is foundational and important for acquisition of knowledge and attitude towards genotype compatibility.

Table 8. Stepwise Regression testing the influence of Knowledge on the association between Awareness and Attitude towards Genotype Compatibility

Variable	Model 1_ Hypothesis 13			Variable	Model 2_ Hypothesis 13		
	Coeff	t-Stat.	Prob.		Coeff	t-Stat.	Prob.
C	32.892	15.584	0.000	C	33.965	19.237	0.000
Knowledge	-0.141	-2.381	0.018	Knowledge	-0.329	-6.291	0.000
				Awareness	0.578	11.059	0.000
R ²	0.020			0.319			
Adj. R ²	0.016			0.314			
F-Statistic	5.671			65.218			

Prob.(F-Stat)	0.018*	0.000*
DependentVariable	Attitude Genotype Compatibility	Attitude Genotype Compatibility

Discussion

The results show that in spite of the enormous health and economic burden associated with sickle cell, awareness about the condition remains low. This is consistent with literature. A surfeit of empirical studies attests to the communication challenge besetting sickle cell disorder related issues. For instance, in India, a study by Gamit, Kantharia, Gamit, Patni, Parmar and Kaptan (2014) to determine the knowledge, attitude and compliance with medical advice on the management of sickle cell disease suggest that elementary knowledge concerning the cause and manifestation of sickle cell anaemia was lacking among the population. In Nigeria, similar studies conducted by Adewoyin, Alagbe, Adekun and Idubor (2015) in Edo state among graduates of university enrolled on a compulsory National Youth Service Corp programme and another by Ugwu (2016) on undergraduates of Ebonyi State University, uncovered findings showing deep-seated misconceptions as to the cause, transmission and prevention of sickle cell disease. Almost all those interviewed agreed that the level of awareness need much to be desired. Cynthia, a high ranking officer with Sickle Cell Aid Foundation (SCAF) stated that a considerable number of youths are becoming increasingly aware about sickle cell especially the need to do genotype testing. The SCAF which is dedicated to increasing awareness and ensuring people with sickle cell disorder get access to quality healthcare, has in the past seven years organized several awareness programmes such as ‘know your genotype campaign’ where people are giving free genotype test. However the campaigns are often episodic and event specific. For instance, SCAF is very visible during the World Sickle Cell Day (June 19th) Moreover, their activities are often limited to few states, mainly the major cities of Lagos and Abuja and this limits coverage. For instance, in 2017, SCAF estimated that it reached about 250000 through awareness campaigns. Like many non-profit organisations, SCAF is constrained by funding.

“More and more youths are becoming aware of sickle cell disorder but a greater percentage of youth especially in the rural area where scourge is more prevalent are yet to be reached. We do not have the budget to embark on large scale awareness campaign”, Cynthia said.

A member of the publicly funded National Sickle Cell Foundation, agreed that awareness of sickle cell disorder has not increased significantly and emphasized the need for elaborate awareness and sensitization campaign targeting the millions of healthy carriers of the sickle cell gene across the country. There are of over 40 million Nigerians who are healthy carriers of the sickle cell gene. “It is a crisis situation. We must target the unmarried carriers and provide them with the right genetic counselling. That is one way of decreasing the spread”, he said. He alluded to budget constraints as a major impediments to carrying out awareness campaign. Interestingly, the National Sickle Cell Foundation appears more medical oriented and undertakes very infinitesimal awareness activities. In fact, awareness creation is not one of its overarching goals. As evinced from the qualitative and quantitative data, awareness about sickle cell disorder and genotype compatibility among youths in Asaba, remain low. While the “know your genotype campaign” succeeded in reaching SS disorder patients, the campaign do not appear to resonate with the larger public. The campaign battled against religious beliefs and traditional myths that might have muted its desired impact

Conclusion

Although attitude towards the concept of selective mating was moderately high, generally, the respondents exhibited low awareness and knowledge of the genotype test and compatibility campaign. It emerged that age significantly influenced awareness ($p < 0.05$), knowledge ($p < 0.05$), and attitude ($p < 0.05$). Gender had significant influence on attitude ($p < 0.05$). There was also a positive correlation between education and level of awareness ($p < 0.05$), and attitude ($p < 0.05$) towards genotype compatibility test. Ignorance about the causes of sickle cell anaemia persists and many respondents do not know their genotype, suggesting that the “operation know your genotype” campaign may have been unsuccessful in creating needed awareness of and motivation for participants’ to go for the genotype compatibility testing. On the strength of these findings, the study concludes that the campaign as planned and executed, recorded modest success given the revelation that most respondents were neither aware of its message nor of its sponsor. Pursuant of these findings and conclusion, the study recommends a re-examination of the campaign strategy. There is need to rethink the reliance on media in creating awareness about genotype compatibility. A

media focused strategy that exclusively relies on the whimsical discretion of journalists to spin news stories and editorial around the schedule of a political figure is ineffective in creating the needed awareness, knowledge and positive attitude towards premarital genotype screening and selective mating. A comprehensive and systematic approach is required to animate the campaign. Beyond the haphazard approach, a campaign that delivers media content in coordinated sequence and concentrated dosages is key to the success of a cause that aims to supplant an emotion-laden attitude. In addition, the campaign content should come in different version and tailored to reflect the peculiar tastes and outlook of each demographic segment. Media content easily resonates with audience when it embodies elements that capture their perspective. Blanket targeting will make little impact. Finally, given the high showing of both parents and religious bodies as influential sources of information on genotype compatibility, the revitalized campaign should also focus on these institutions and maximize their influence in a two-step communication flow strategy.

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