

Original Research Article

Health literacy level in rural Bayelsa, Nigeria's Niger Delta Region

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ABSTRACT

Background: Health literacy data is critical for enhancing self-care abilities and improving healthcare outcomes. However, information on health literacy level in rural Bayelsa, Nigeria's Niger Delta region, is dearth. Objective of the study was to determine health literacy level of rural dwellers utilizing the services of Primary Healthcare Centers in rural Bayelsa.

Methods: A total of 800 participants were randomly selected through multistage sampling procedure in a cross-sectional survey. Demographic data assessment questionnaire and the Brief Health Literacy Screening Tool were used for data collection. Descriptive statistics was done to obtain summaries of demographic and health literacy data while independent samples t-test, and one-way between group analysis of covariance was conducted to determine area-based differences in health literacy scores and the impact of frequency of health center visit on participants' health literacy scores, respectively.

Results: Health literacy assessment showed that, 570 (71.25%) participants had limited health literacy; 142 (17.75%) had marginal health literacy, and 88 (11.00%) had adequate health literacy. Health literacy scores were significantly higher in the upland ($M=22.08$, $SD=8.64$), than riverine areas of rural Bayelsa ($M=18.66$, $SD=8.46$; $t(800)=8.02$, $p=0.00$, 2-tailed). Frequency of health center visit significantly accounted for 20% of the variance in participants' health literacy scores ($F(2, 796) = 95.72$, $p=0.00$, $\eta^2=0.20$).

Conclusions: Health literacy level is low, and indicates a public health emergency. Rural educational development and modification of rural healthcare communication pattern may reduce health illiteracy and its attendant effect.

Keywords: Bayelsa state, Health literacy, Nigeria, Rural health

INTRODUCTION

Healthcare has become complex in recent times, with profound effect on quality and outcome of care.^{1,2} With influences from social, cultural, environmental and disease variables, the complexities of modern-day healthcare, have more than ever, illuminated the need for patients' healthcare participation and competency

improvement.³ When patients participate in their care, and have competencies improved, their ability for self-care is enhanced and associated health conditions are timely and successfully resolved.³ However, the achievement of optimal levels of participation and competency improvement, depends largely, on patients' health literacy level.⁴ Health literacy is an important concept in the field of health promotion, indispensable for

the improvement of self-care abilities and healthcare outcomes.^{4,5} Specifically, health literacy defines the extent individuals can access/obtain, process, and understand basic health information and become motivated to use it in ways that maintain and promote health.^{6,7} It also determines the level of skills (reading, listening, understanding and interpretation of health information) individuals have, to adequately communicate with healthcare providers and genuinely make informed decision to act on information provided to meet identified health needs.⁸

Health literacy level can, therefore, enable the estimation of individuals' ability to process, to interpret, and to act on health related information provided by healthcare practitioners. Such estimation is necessary to aid healthcare providers choose appropriate communication types that suits the health literacy level of individuals, groups or communities.⁹ Choosing communication methods based on health literacy level, improves adherence to intricate health regimen and enhances ability for self-care.¹⁰ It is, therefore, essential to have a background knowledge of individual, group or community health literacy level in service locations, especially rural areas, where education is poor and access to information and the internet is inadequate.^{11,12}

Although, health literacy level in Nigeria is generally moderate, precise information about the health literacy level of rural residents in Bayelsa State is dearth. Bayelsa State is located at the core of Nigeria's Niger Delta; it is largely rural and riverine. Most of its communities are almost bounded by water, making access difficult and expensive.¹³ In rural Bayelsa, ample proportion of residents earn low, education is also poor, and internet facilities are unavailable.¹²

The dearth of health literacy data and the existence of seemingly unresponsive socioeconomic and educational conditions, therefore, creates the need for assessment and documentation of health literacy level of rural dwellers in Bayelsa State; as this will not only assist nurses and other healthcare professionals in providing patient/community-centred care, but also aid the development of Nurse-based interventions for health literacy optimization.

The study objective of the study was to assess the health literacy level of rural dwellers utilizing the services of Primary Healthcare Centers (PHCs) in Bayelsa State, Nigeria's Niger Delta region. PHCs were chosen as research centres because in Nigeria, primary level facilities predominately serve the rural areas where about 52.2% of the country's population lives (Primary health care systems (PRIMASYS)).¹⁴ We hypothesized that: no significant difference in health literacy level will exist between participants in the upland, and riverine areas of rural Bayelsa; and that the frequency of PHC visit will not significantly account for any variance in participants' health literacy scores.

METHODS

The cross-sectional survey research design was adopted to assess the health literacy level of residents utilizing the services of PHCs in rural parts of Bayelsa state. To ensure adequate representation, each of the 8 Local Government Areas (LGAs) that make up the state was divided into two parts: the upland and riverine areas. One PHC facility was randomly selected from both areas of each of the 8 LGAs. A total of 16 PHC, therefore, served as data collection centers.

Bayelsa State had a population of 1,704,515 with an annual growth rate of 2.9% in the last national census conducted in Nigeria in 2006.¹⁵ A population projection based on the annual growth rate of 2.9% was made to 2019 and a projected population size of 2,347,118 was gotten. A sample size of 400 was found to be adequate after calculating with Taro Yamen's formula for sample size determination ($n = N/1+N(e^2)$) based on the projected population size of 2,347,118 and an error margin of 0.05. However, to ensure that data obtained closely represent the population parameter, the calculated sample size of 400 was doubled, making a total of 800. The 800 samples were allocated equally across the 16 PHCs, each having a total of 50 participants. Consecutive case sampling method was used to select the 50 participants in each PHC. Specifically, every second person who visited the PHCs to access care was approached to participate in the study; nevertheless, the critically ill patients, emergency cases, the very old, and patients below 18 years were excluded.

According to Haun et al,¹⁶ when selecting an instrument, the style of administration, the purpose of measure, and the availability of time and resources should be considered. A validated 7-item questionnaire was developed and used for demographic data collection (age, gender, marital status, religion, highest educational attainment, rural part of residence, and number of PHC visit). The Brief Health Literacy Screening Tool (BRIEF) was also used to obtain data on health literacy, since it allows face-to-face administration, enables data collection in two minutes per participant (which saves time and resources) and provides classified information on health literacy level of an investigated population. The BRIEF is a 4-item tool that determines the degree patients can read, understand, exchange and use health information and resources. Each item has five responses and are weighted 1-5. The values for the five responses are added to get a total score that can range from a minimum of 4 to a maximum of 20. Total scores from 4-12, 13-16 and 17-20 were classified as limited health literacy, marginal health literacy and adequate health literacy, respectively. Limited health literacy interprets that respondents are not able to read most low literacy health materials including a prescription label, will need repeated oral instructions, and materials meant for them should encompass illustrations or video tapes. Marginal health literacy interprets that respondents may struggle with patient

education materials and may need assistance, and adequate health literacy means that respondents can read and comprehend most patient education materials.¹⁶ The scores of the four items of the BRIEF tool were also computed separately to determine participants' ability in the four different areas of health literacy that were assessed (ability to read, understand, exchange and use health information and resources). Minimum and maximum attainable Item scores were 1 and 5 respectively. The item scores of participants ranging from 1-2, 3, and 4-5 represented poor, marginal, and adequate ability respectively.

Data collection was done in separate occasions in the 16 PHCs and lasted for 138 days. Both the 7-item questionnaire for demographic data collection and the 4-item BRIEF tool for determining health literacy level, were administered by interview to consented patients after reporting to the attending healthcare providers to avoid interruption of clinical procedures. One research assistant was selected from each of the communities where the PHCs are located and trained to interpret questions to participants unable to understand English language. The data obtained were analyzed descriptively with the Statistical Package for Social Sciences (SPSS) Version 23 and presented in tables and figures. Scale values were calculated and interpreted according to the BRIEF specifications. After exploring the data for normality, the independent samples t-test at 95% confidence interval (CI) and P-value ≤ 0.05 , was also conducted to compare differences in mean health literacy scores between participants in the upland, and riverine parts of rural Bayelsa. A one-way between group analysis of covariance was additionally done to determine the variance, number of PHC visit accounts for, in participants' health literacy scores after adjusting for educational attainment as covariate. Eta square was computed to determine effect size of existing difference. The Ethical Committee of Bayelsa State Ministry of Health gave ethical approval; the Head health personnel of the PHCs gave administrative permit. The study commenced in March, 2020 and was concluded in September, 2020.

RESULTS

Sociodemographic characteristics of participants

A total of 800 participants were recruited. Males (264/33.00%) were less than females (536/67.00%). The sample mean age was 46.42 (SD±13); participants in the 40-49 age category (422/52.75%) were highest in proportion.

Over half (522/65.25%) were married, 142 (17.75%) were single, 54 (6.75%) were divorced/separated, and 82 (10.25%) were widowed. The category of participants that had tertiary education was the least in proportion 104 (13.00%), and those with a record of 11 or more PHCs visits were 322 (40.25%), only (Table 1).

Table 1: Demographic characteristics of participants.

Demographic characteristics	Frequency (N)	Percentage
Age of respondents		
18 - 29	78	9.75
30 - 39	184	23.00
40 - 49	422	52.75
50 and above	116	14.5
Mean age	46.42 (SD±13)	
Gender		
Male	264	33.00
Female	536	67.00
Marital status		
Married	522	65.25
Single	142	17.75
Divorce/separated	54	6.75
Widowed	82	10.25
Highest education attained		
No formal education	212	26.50
Primary education	326	29.50
Secondary education	248	31.00
Tertiary education	104	13.00
Rural part of residence		
Riverine	400	50.00
Upland	400	50.00
Annual PHC visit		
1 - 5	242	30.25
6 - 10	236	29.50
11 and above	322	40.25

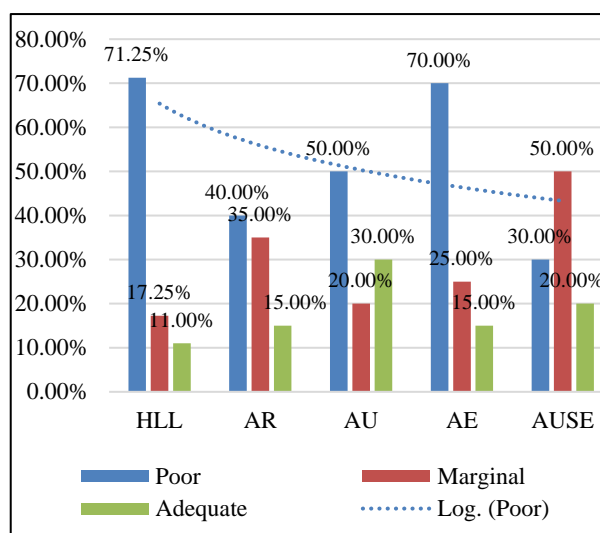


Figure 1: Health literacy levels.

Health Literacy scores ranging from 4-12 = limited health literacy; 13-16 = marginal health literacy; and 17-20 = adequate health literacy while, Item scores from 1-2 = poor; 3 = marginal; and 4-5 = adequate. Abbreviations: HLL = health literacy level; RA = ability to read low literacy materials; AU = ability to understand health information; AE = ability to exchange health information; AUSE = ability to use health information and resources.

Table 2: Independent sample t-Test results comparing level of health literacy between participants living in upland and riverine parts of rural Bayelsa.

Rural part of residence	N	Mean (m)	Standard deviation (SD)	T	Df	Sig. (2-tailed)	95% CI	Eta squared
Upland	400	22.08	8.64	8.01	798	0.00	0.87-2.56	0.003
Riverine	400	18.66	8.46					

Table 3: One-way between group analysis of covariance testing for impact of number of PHC visit on health literacy level after controlling for education.

Annual PHC visit	N	Adjusted mean/standard error	Unadjusted mean/standard deviation	F	Sig	Eta squared	Sig/Eta square of covariate
1-5	242	8.10 (0.228)	7.32 (2.328)	95.72	0.000	0.20	0.000 (0.25)
6-10	236	9.79 (0.290)	9.11 (3.587)				
11 and above	322	12.04 (0.260)	13.12 (4.258)				

Level of health literacy

The classification of scale scores based on the BRIEF health literacy screening tool, indicates that, 570 (71.25%) participants had limited health literacy; 142 (17.75%) had marginal health literacy, and 88 (11.00%) had adequate health literacy (Figure 1). Item analysis further showed that, only 120 (15.00%) participants had adequate ability to read health literacy materials, 240 (30.00%) had adequate ability to understand health information, 160 (20.00%) had adequate ability to use health information/resources, and 120 (15.00%) had adequate ability to exchange health information (Figure 1).

Health literacy variation between participants in the upland and riverine areas

Independent samples t-test computed to compare the health literacy scores of participants in the upland and riverine areas showed that, significant difference existed (Upland: $M=22.08$, $SD=8.64$; Riverine: $M=18.66$, $SD=8.46$; $t(800)=8.02$, $p=0.00$, 2-tailed). The effect size of the difference determined through eta square was, however, small in magnitude (0.003) (Table 2).

Impact of number of PHC visit on health literacy after controlling for education as covariate

After controlling for education as covariate, number of PHC visit significantly accounted for 20% of the variance in participants' health literacy scores. ($F(2, 796) = 95.72$, $p=0.00$, $ETA\ squared=0.20$). Strong relationship also existed between educational attainment and health literacy level (The $ETA\ squared=0.20$) (Table 3).

DISCUSSION

Demographic characteristics of participants

Age

The age of participants is one of the prominent demographic characteristics considered essential to discuss, because of its influence on health, illness, and behaviour. The sample mean age was, however, the focus since it is a better parameter for generalization than the percentage distribution of age in categories. Specifically, 46.42 ($SD\pm 13$) was derived as the sample mean age, and it indicates that most participants that sought care in the PHC facilities were older adults of approximately age 46 and above. The sample mean age could also represent the age range chronic disease process is initiated among rural dwellers since chronic disease generally begins from age 45 to over 65.17 Although participants' medical diagnoses were ignored, considering the interplay between age and chronic disease, and the proportion of older adults in this study, it is reasonable to also infer that most participants had chronic disease or diseases capable of becoming chronic if improperly managed. The speculation of possible prevalence of chronic illness in rural Bayelsa is based on previous report in the United States that, 80% of older adults had one chronic condition and about 50% had at least two.¹⁷ The translational scientific implication of the age data, however, is to increase attention and care given to older persons, especially in rural areas. Healthcare resources should be mobilized to rural areas where inadequacy is mostly experienced.

Comparatively, our participants' age data is similar to a study in rural Delta State, Nigeria, where most respondents (58.1%) were aged 51 and above.⁴ It is, however, dissimilar with findings of Pasha et al who had

more primary care patients (28.54%) in the 26-35 age category.¹⁸

Gender

Gender analysis is key to understanding the experience of health and how to intervene to prevent illness. It is also an important factor implicated for variations in health and illness among male and female.¹⁹ Thus, it is important to highlight the implications of gender-based data in this study. Specifically, gender distribution showed that the proportion of female participants (0.67) doubled that of male participants (0.33). Although, the reason for the huge gender imbalance cannot be directly explained from the data obtained, given that participants were PHC users, it could plausibly be that the female participants had a better health seeking behaviour or were more associated with illness than their male counterparts. The imbalance may also have been influenced by gender differences in social, economic, and biological determinants of health and illness. The findings and assertions on gender supports the assertion that women generally report health problems than men.²⁰ It, however, contrasts with the research report that women living in rural areas have the tendency to rely on traditional healers for medical needs and as such, are less likely to use modern health facilities.²¹

Level of education

The level of education participants had attained is striking. Data obtained showed that only 0.31 and 0.13 of 800 participants had secondary and tertiary education respectively. This reflects earlier research report about the poor state of rural education in Bayelsa State.¹² The finding is also similar to that of Ekoko, whose work was done among women in rural part of Delta State in the Niger Delta region of Nigeria.⁴ In Ekoko's report, more than half (51.1%) of the respondents had no formal education while only 11.6% had tertiary education.⁴ Education is a strong determinant of health and disease; it is also an essential tool for engineering health literacy optimization. The seemingly poor educational background of residents in rural Bayelsa, therefore, indicates the need for an upgrade in rural education to help improve poor educational and health indices of rural dwellers.

Level of health literacy

Health literacy assessment with the BRIEF health literacy screening tool showed that, more than two-third (570/800) of the participants had limited health literacy. According to the interpretations of the BRIEF health literacy screening tool, limited health literacy implies that, participants are unable to read most of the low literacy health materials including prescription labels; therefore, requires repeated oral instructions and illustrations or video tapes for easy comprehension and initiation of expected corresponding task.¹⁶ This high

proportion (570/800) of limited health literacy indicates a serious public health problem, bearing in mind, the associated negative health effects. Limited health literacy has been strongly associated with increased morbidity, delay in treatment of diseases, and high rates of hospitalization and readmission.²²⁻²⁴ Individuals with limited health literacy may also be unable to make informed decisions about their health, and therefore, increase their likelihood to have prolonged ailments or die.⁴

Participants' educational background could, however, be implicated for the abysmally low health literacy level observed in this study. Education is a strong determinant of health literacy, and in rural Bayelsa, education is poor.^{12,25} This is reflected in the results of the Brief item analysis done in this study, in which, only 15%, 30%, 20% and 15% of the participants had the ability to adequately read, understand, use and exchange health information/resources, respectively (Figure 1). It is possible, therefore, that participants' poor educational background, influenced by undeveloped rural education, affected their health literacy level. In a similar study in rural part of Delta State, Nigeria, health literacy was also reported to be drearily low among respondents, as majority had no form of formal education.⁴ Rural educational development and modification of rural healthcare communication patterns is, therefore, necessitated to optimize health literacy level in rural areas. Healthcare communication patterns in rural areas should be adapted to suit the limited health literacy profile of the rural populace to significantly improve communication between healthcare providers and patients. Health literacy level will improve, and associated negative health outcomes of limited health literacy will reduce, when healthcare communication patterns are modified based on health literacy level.

Health literacy variation between participants in the upland and riverine areas

The health literacy level of participants in the upland area differed significantly ($p=0.00$) from participants in the riverine area. The mean health literacy scores (Upland=M22.08; Riverine=M18.66), specifically indicate a higher health literacy level in the upland area than in the riverine area. Although, the magnitude of difference is small (0.003) (Table 2) the finding implies that residential area can influence the health literacy level of an individual or a group, and therefore, highlights the need for careful analysis of the characteristics of service areas, when communication methods are being considered by healthcare practitioners.

Differences in educational development between the upland and riverine areas was implicated for the lower level of health literacy observed in the riverine area, since previous research has established a strong connect between low health literacy and low educational level.²⁵ Individuals with higher level of education have higher

health literacy level while, those with lower educational level have lower health literacy level.²⁵ In riverine communities of rural Bayelsa, educational development in terms of infrastructure and manpower, is worse than it is in the upland. Government presence and interest for education is also more visible in the upland areas than in the riverine areas. The chances of participants in the riverine areas to attain high health literacy levels as their upland counterparts would have, therefore, been lowered by their inability to access quality education.

Difficulty in accessing the riverine communities is another factor that may have influenced the difference in health literacy level. Most of the riverine communities are almost surrounded by water and takes a couple of hours to travel.¹³ The peculiar environmental structure, therefore, makes it difficult and expensive for government and developmental partners to access and invest respectively. Hence, in a typical rural riverine community, educational infrastructure, internet facilities, and education-based technologies that would have enhanced literacy level are lacking. Providing adequate access to quality education for residents in the rural riverine areas would, therefore, be an important step to improving health literacy. Although, studies done in rural riverine areas could not be accessed to compare with these findings, area-based differences in health literacy level have been reported by previous research.²⁵

Impact of number of PHC visit on health literacy after controlling for education as covariate

After adjusting for education as covariate, one-way between group analysis of covariance showed that, the number of previous PHC visit participants had made, significantly influenced their health literacy level ($F(2, 792) = 95.72, p=0.00$) (Table 3). Specifically, the number of PHC visit participants had made, accounted for 20% ($\eta^2 = 0.20$) of the variance in their health literacy scores. Those who had visited PHC facilities for 11 or more times had higher mean health literacy scores than those who had visited 6-10 times and 1-5 times respectively (Table 3). The finding, however, logically suggests that participants who had higher record of PHC visit, may have gained some form of knowledge and experience that optimized their literacy level than those that had fewer visits. Such knowledge and experience may have been gained from series of health education and counselling, participants may have received in their previous visits to PHC facilities, since healthcare providers frequently provide health education and counselling in care facilities to improve health related knowledge of patients. Thus, participants who had visited the facilities fewer times would have also participated in fewer health education and counselling sessions, and therefore, acquired knowledge and experience that may be inadequate to improve health literacy level. Significant improvement of rural health literacy will, therefore, seemingly require the initiation of community-based health education and counselling programs to serve as a

means of improving the health literacy level of majority of rural community residents who do not utilize PHC services.

Limitations

The study was limited to individuals who accessed care in Primary Healthcare Centres in rural communities. Some more insightful findings would have, however, been revealed if the entire community residents were sampled. Hence, caution should be exercised when generalizing the findings of this study.

CONCLUSION

Health literacy level in rural areas of Bayelsa State is low and could be described as a serious public health emergency. Health literacy optimization through educational development and modification of healthcare communication patterns in rural areas, is needed to reduce health illiteracy and its attendant effect.

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