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RELATIONSHIP BETWEEN HEALTH LITERACY AND LEVEL OF EDUCATION ON HEALTH-RELATED BEHAVIOURS OF THE NIGERIAN POPULATION IN ANAMBRA STATE

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ABSTRACT: ***Background:*** *Health literacy challenges significantly impact the adult population in Nigeria across multiple dimensions. Current research indicates that health literacy and structured health education remain underdeveloped, with only 38% of adults having access to formal education. While the relationship between health literacy and health-related behaviours has been widely studied in global contexts, there is a notable lack of research specific to Nigerian populations. This study explores the interrelationship between health literacy, levels of educational attainment, and health-related behaviours among adults in Nigeria, aiming to better understand how these factors influence one another and impact health outcomes.* ***Methods:*** *A quantitative research design was employed, utilizing standardized questionnaires adapted from the Health Literacy Survey North Rhine-Westphalia. Education levels were classified according to the International Standard Classification of Education. Data were collected from a purposive sample of 50 men and women aged 30–60 and analysed using computer-assisted descriptive statistics and frequency distributions.* ***Results:*** *Findings revealed that participants with a high level of education (100%) were significantly more likely to seek out and utilize health information compared to those with medium (71%) and low (50%) education attainment. Additionally, 91% of highly educated participants obtained health information from healthcare professionals, whereas participants with medium (33%) and low (62%) education levels relied more on family and friends. Similarly, all participants in the high education group reported practicing health-conscious behaviours, compared to 75% in the medium group and 65% in the low education group. Despite these differences, a majority across all education levels reported difficulties in understanding written health information and a general underutilization of preventive health services.* ***Conclusion:*** *The findings demonstrate that although education level and health literacy significantly influence health behaviours, formal education alone does not guarantee the ability to comprehend and apply health information effectively. To improve health outcomes, it is essential to expand access to both formal and informal education, promote structured health education, and support lifelong learning opportunities. Achieving this goal requires increased investment in both the education and health sectors, alongside targeted training for health professionals. Further research on health literacy in Nigeria is recommended to address existing knowledge gaps and to inform the design of context-specific, evidence-based interventions.*

KEYWORDS: Health Literacy, Education Level, Health-related Behaviours, Structured Health Education, Health-conscious Lifestyle, Adults.

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BACKGROUND

Health literacy, acquired through both formal and informal education, is essential for developing health-related skills (Kickbusch, 2001; Nutbeam & Lloyd, 2021). It encompasses the cognitive and social abilities that influence individuals' motivation and capacity to access, understand, evaluate, and apply health information in order to make informed decisions and maintain or improve their health (Nutbeam, 2000; Schaeffer et al., 2016; Nutbeam & Lloyd, 2021).

Globally, health literacy is increasingly recognized as a critical determinant of both individual and public health outcomes. Evidence shows that inadequate health literacy is linked to limited access to formal education, poorer health status, reduced engagement in preventive health behaviours, mismanagement of chronic conditions, and increased healthcare costs (Berkman et al., 2011; Chang et al., 2024; WHO, 2024).

Recent studies further highlight that, although health literacy is widely acknowledged as a key social determinant of health and vital for developing health-related skills, low health literacy remains highly prevalent worldwide, particularly in many low- and middle-income countries (LMICs) such as Nigeria (Sørensen et al., 2015; Rajah et al., 2019; Kuyinu, et al., 2020; Nutbeam & Lloyd, 2021; de Jesus et al., 2024).

Nigeria, one of Africa's most populous countries, has an estimated population of 216 million and comprises 36 states and 774 local government areas (LGAs), with 53.52% of the population residing in urban areas and 46.48% in rural areas (National Bureau of Statistics, 2022; Enebeli et al., 2024). The country currently operates the 6-3-3-4 education system: six years of basic primary education, three years of junior secondary education, three years of senior secondary education, and four years of tertiary education.

In February 2024, the federal government proposed transitioning to a 12-4-year education model aimed at aligning with global standards, ensuring curriculum continuity, and improving standardization and quality assurance in the education sector (Igbokwe, 2015; Ikpefan, 2025). Although this reform is yet to be approved or implemented, Nigeria's education system continues to face persistent challenges. These include limited financial investment, inadequate infrastructure, a shortage of qualified teachers, and socio-economic constraints such as poverty and conflict. Together, these issues contribute to an unconducive learning environment that adversely affects both the quality and accessibility of education (Abdullahi & Abdullah, 2014; Fuller et al., 2023). As a result, disparities in educational attainment are evident across the Nigerian population, with individuals classified into low (L), medium (M), and high (H) education levels according to the International Standard Classification of Education (ISCED) (UNESCO, 2011; Fuller et al., 2023).

These educational disparities have significant implications for the health sector, particularly in the area of health education and health literacy. Nigeria's healthcare system operates under a decentralized, three-tier structure: primary health care (PHC) is managed at the local government level, secondary health care is overseen by state governments, and tertiary health care is administered by the federal government (Uzochukwu, 2017; FMoH, 2019).

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Despite this well-defined structure, the health sector continues to face persistent challenges, including systemic inequities, fragmentation services, a dual burden of infectious and non-communicable diseases, shortage of both human and material resources, and entrenched socio-cultural barriers (Abdullahi & Abdullah, 2014; Uzochukwu et al., 2015; Uzochukwu, 2017).

These structural weaknesses not only hinder efficient healthcare delivery but also significantly undermine health literacy across the population. Limited access to quality education and reliable healthcare information exacerbated by cultural and linguistic barriers impairs individuals' ability to make informed health decisions (Ofoli et al., 2020; Olabanji, 2023). According to the National Bureau of Statistics (2022), while 62% of Nigerians have attained education beyond the primary level, approximately 38% of adults still have limited or no access to formal education. This educational gap plays a crucial role in the country's low levels of health literacy and highlights the deep interdependence between the education and health systems.

Consequently, without addressing foundational deficiencies in the education sector, efforts to enhance public health and promote health literacy are likely to remain constrained and unsustainable.

In Anambra State, one of Nigeria most industrialized, health literacy is shaped by a combination of educational achievements and persistent systemic health challenges. The state's adult literacy rate has shown steady improvement, reaching approximately 92% adult overall and 78.4% among adult-females in 2024, placing it among the top three states in Nigeria for adult literacy (Fuller et al., 2023; Vanguard News, 2024; Ekanem, 2024).

Anambra has made notable strides in education, recording the lowest rate of out-of-school children nationally at just 0.2%, according to the State Commissioner for Education. This achievement is largely attributed to strategic investments, including the recruitment of over 5,000 teachers and the provision of free education from pre-nursery to senior secondary levels (Chuma-Udeh, 2024).

Despite these advancements, significant gaps remain in health literacy and health-related behaviours, driven by systemic health challenges and insufficient dissemination of health information. For instance, a study by Ezeabasili (2024) found that pregnant women in Anambra State engage in risky health behaviours due to unmet health information needs often linked to low functional literacy, limited access to health education and underutilization of available healthcare services.

The evident disparities in educational attainment and healthcare delivery across Nigeria significantly hinder health literacy and limit participation in health education programs, particularly among vulnerable populations such as rural dwellers, women, and older adults (Abdullahi & Abdullah, 2014; Ekoko, 2020; Enebeli et al., 2024). This challenge is further exacerbated by the limited availability of targeted health education initiatives and the lack of culturally sensitive communication strategies.

Consequently, many individuals face difficulties in accessing, understanding, and effectively applying health information, which ultimately impairs their ability to make informed health-related decisions (Tenibiaje, 2014; Onwe, 2019; Ugwuegede et al., 2023).

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Problem Statement, Research Hypothesis and Study Aim

Although the relationship between health literacy and health behaviours such as nutrition, exercise, preventive screenings, and medication adherence is well established in high-income settings (Sørensen et al., 2012), there is a dearth of robust, context-specific evidence from Nigeria (Olabanji, 2023). Most existing studies in Nigeria focus on narrow population groups (e.g., pregnant women or students), or do not adequately examine how varying educational levels influence health-related behaviours (Atulomah & Atulomah, 2013; Ekoko, 2020; Olabanji, 2023). Moreover, interventions aimed at improving health literacy in Nigeria are limited in scope and often lack systematic implementation and rigorous evaluation. This gap underscores the urgent need for targeted research to explore the intersection of health literacy, educational attainment, and health behaviours within the Nigerian context.

Consequently, this study aims to provide insight and expand knowledge of the interplay between health literacy, educational attainment, and health-related behaviours among the Nigerian adult population, with particular focus on Anambra State.

Based on the research background and objectives, the study is guided by the following hypothesis: "The higher the level of education, the higher the health literacy skills and the better the health-related behaviour. The lower the level of education, the lower the health literacy skills and the poorer the health-related behaviour."

Accordingly, the study investigates the relationship between health literacy and health-related behaviours across different educational levels. The findings are expected to inform evidence-based recommendations for interventions aimed at enhancing health literacy and improving health outcomes, practically among adults in Anambra State.

METHODOLOGY

Study Design and Location

This study employed a quantitative research design, a structured approach that facilitated the collection of numerical data through standardized questionnaires. The quantitative method was chosen for its objectivity, reliability, and suitability for comparing patterns, particularly in examining the relationship between educational level and health literacy among residents in Anambra State, Nigeria.

Anambra State, located in southeastern Nigeria, has a population of over 5.5 million, with more than 60% living in urban centres such as Awka, Onitsha, and Nnewi (National Bureau of Statistics, 2020), These cities serve as commercial and industrial hubs, with a high literacy rate of about 92% and they have a relatively advanced and better funded health system compared to most states in Nigeria (Ndulue & Ayadiuno, 2021). Despite this, the education and health sectors face systemic challenges which persist particularly in relation to funding and implementation of education and health reforms, as highlighted in the background. The cities were chosen to capture a socioeconomically and educationally diverse sample.

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Sampling and Participant Selection

A purposive non-probability sampling method commonly used in exploratory research was employed, based on the principle that participants are selected according to theoretically relevant characteristics and criteria for answering the research question (Braun & Clarke, 2013; Creswell, 2014). The inclusion criteria are as follows:

- Age: 30–60 years, as individuals in this range are likely to have completed their education and can assess its impact on health literacy.
- Educational Level: Participants must belong to one of three ISCED educational levels (low, medium, or high).
- Location: Participants must reside in Awka, Nnewi, or Onitsha (the most developed cities in Anambra State).
- Language Proficiency: Participants must be able to read and write in English, the official language of Nigeria.
- Voluntary Participation: Participants give their informed consent voluntarily.

Participants were recruited through announcements and flyers made available in churches, hospitals and central town houses across the three cities between April to July 2023. Additionally, emails were sent to the gatekeepers of the institutions with an information sheet on research aim and procedure, asking for permission and consent for recruitment. Three local contacts (one man, two women) were employed to assist in the recruitment of participants. In agreement with the researcher, the three local contacts coordinated with the institutions' gatekeepers to gain approval and access to the participants.

The study included 50 participants (25 males and 25 females) aged 30 to 60 years, with varying educational backgrounds based on ISCED levels 1–8, categorized into low, medium, and high educational groups, allowing a clearer assessment of how educational attainment influences health literacy and health related behaviours.

Data Collection and Quality Criteria

Data were collected between July and September 2023 using a standardized questionnaire with 27 items with nominal scale (items categorization without any order or ranking) and ordinal scale (items categorization with a ranked order, but without equal intervals between the categories). The instrument was adapted from the HLS-NRW-Q (Schäffer et al., 2016) and written in English. Participants received the questionnaires via email or in person through the local contacts, with instructions to send the filled questionnaire via email. The questionnaire included demographic variables (age, gender, education, occupation, and income) and questions addressing health behaviour like health information seeking, comprehension, application, health consciousness and healthy lifestyle. Educational levels were classified using ISCED-2011 into low (0–2), medium (3–4), and high (5–8). Income levels were grouped into three categories—low, middle and high—based on Nigerian context (National Bureau of Statistics, 2020). Participants responded to the 27 items based on the nature of each question, with optional responses ranging from “yes to no,” “good to none,” as well as “very easy to very difficult,” or interval options like “1x yearly to do not go.” If a question could not be answered,

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participants also had the option to select "do not know." Completed questionnaires were returned via email or post. The recruitment and data collection process took a duration of about 26 weeks.

To ensure objectivity, all participants were provided with identical questionnaires. To maintain validity, precise definitions of variables were established, reliable measurement tools were used, and the questionnaires were pre-tested to assess their effectiveness. Furthermore, the data were rigorously analysed using appropriate statistical methods, and potential biases were mitigated through triangulation. In addition, transparent reporting was employed throughout the research process, including detailed documentation of the study design, data collection procedures, analytical strategies, and any deviations or limitations encountered. This transparency was to enhance the credibility and reproducibility of the findings (Krebs & Menold, 2014; Bortz & Döring, 2016).

Data Analysis

The data were initially processed and visualized using Microsoft Excel, which facilitated the creation of structured overviews and preliminary summaries through tables and charts. For more advanced statistical analysis, the dataset was subsequently imported into the International Business Machines Statistical Package for the Social Sciences (IBM SPSS) (Field, 2013). SPSS was used to conduct detailed descriptive statistical analyses, including frequency distributions, percentages and cross-tabulations, allowing for a more precise examination of the data.

This two-step approach ensured both clarity in data presentation and accuracy in statistical computation, consistent with methodological standards outlined by Holling and Gediga (2011) as well as Bortz and Döring (2016). Additionally, three academic experts who were briefed of the ethical and methodological requirements, as acknowledged in this manuscript, were involved in data analysis. They also proofread and approved the manuscript, ensuring accuracy, clarity, and scholarly rigor.

Ethical Considerations

This research was conducted ethically in accordance with the guidelines of Bielefeld University. Oral and written informed consent was obtained from participants. Privacy, anonymity, and data protection of participants were given utmost priority (Von Unger, 2014). All those involved in the research process were recognized and given due credit.

RESULTS

Significant disparities were observed across educational levels. All high-ISCED participants (100%) frequently sought out and effectively used health information, compared to 71% of medium-ISCED and 50% of low-ISCED participants. While 91% of highly educated participants trusted nurses as key health sources of health information, those with lower education level relied more on family and friends. Across all groups, many participants reported difficulty understanding written health information and 48% used preventive services only when symptoms appeared.

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Socio-Demographic Characteristics of Participants

In total, 50 participants across the three cities—Awka, Nnewi, and Onitsha—were fairly evenly distributed across educational levels. In the low ISCED group (ISCED 0–2), there were 16 participants: 5 from Awka, 4 from Nnewi, and 7 from Onitsha. The medium ISCED group (ISCED 3–4) included 17 participants, with 5 each from Awka and Nnewi, and 7 from Onitsha. The high ISCED group (ISCED 5–8) also comprised 17 individuals: 5 from Awka, 6 from Nnewi, and 6 from Onitsha. The table below presents detailed socio-demographic characteristics of participants.

Table 1: Participant Characteristics (N = 50)

Category	Subcategory / Detail	Value
Geographic Distribution	Awka	15
	Nnewi	15
	Onitsha	20
	Total	**50**
Age range (30–60)		
	Low (ISCED 0–2)	Average- 44 years
	Medium (ISCED 3–4)	Average- 43 years
	High (ISCED 5–8)	Average- 44 years
Gender Distribution		
	Female	25
	Male	25
Level of Educational		
	● Low (ISCED 0–2)	16 (7F, 9M)
	→ ISCED 0	38%
	→ ISCED 1	31%
	→ ISCED 2	31%
	● Medium (ISCED 3–4)	17 (9F, 8M)
	→ ISCED 3	82%
	→ ISCED 4	18%
	● High (ISCED 5–8)	17 (9F, 8M)
	→ ISCED 5	29%
	→ ISCED 6	35%
	→ ISCED 7	24%
	→ ISCED 8	12%
Income Distribution		
	● Low (ISCED 0–2)	
	Low income	62%
	Middle income	38%

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	High income	0%
	● Medium (ISCED 3–4)	
	Low income	6%,
	Middle income	71%
	High income	23%
	● High (ISCED 5–8)	
	Low income	0%
	Middle income	33%
	High income	67%
Religion	Christianity	35
	Moslem	6
	Traditional	7
	Unspecified	2
Occupation		
	Agriculture: Farmer	5
	Beauty & Textile: Hairdresser, Tailor	6 (3 + 3)
	Trade & Sales: Street Vendor, Food Vendor	7 (3 + 4)
	Security: Gate attendant, Police Officer, Soldier	8 (3 + 2 + 3)
	Education: Teacher, University Lecturer	4 (2 + 2)
	Healthcare: Nurse, Doctor	5 (3 + 2)
	Religion: Priest	3
	Transport: Tricycle Driver, Bus Driver	5 (3 + 2)
	Technical Work: Mechanic	2
	Unspecified:	3

The socio-demographic data reveal a clear relationship between education and income, with earnings increasing progressively from the low education group to medium and high education groups. The low education group has the lowest income levels, with no high earners, while the medium group is predominantly middle class but includes a notable proportion of high-income individuals. The high education group represents participants with high socio-economic status, with two-thirds earning high incomes and none falling into the low-income bracket.

Educational levels (ISCED) are well-distributed across the three cities (Awka, Nnewi, and Onitsha) with each level represented in all locations. Gender distribution is also balanced, with near-equal representation of men and women across all education groups. The participants' occupations are highly diverse, ranging from informal jobs such as farming, street vending, and driving to formal professions including teaching, nursing, and university lecturing.

The following section presents the identified influence of education level on health literacy and health-related behaviours.

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Information Seeking and Usage

Across all educational groups, at least half of the participants reported actively seeking and utilizing health-related information.

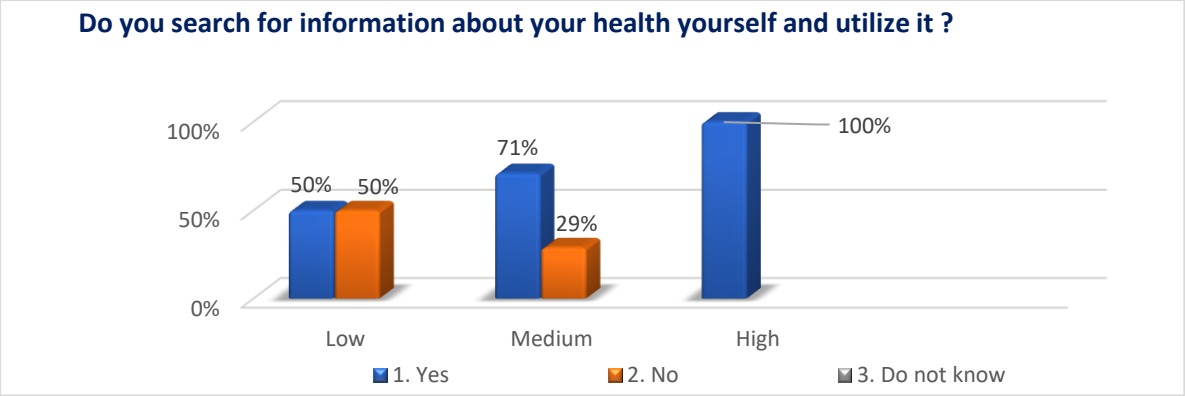

Figure 1: Searching for and utilizing health information

Results show that 100% of participants with high educational attainment reported this behaviour, followed by 71% in the medium group, and 50% in the low group. This suggests that participants with higher levels of education demonstrated a greater tendency and capacity to access and utilize health-related information, reflecting stronger communicative and interactive health literacy skills.

The findings indicate a clear relationship between educational level and the ability to independently search for health information. As educational attainment increases, so does the capacity to seek, interpret, evaluate, and apply health information in ways that support adaptation to changing health circumstances, which is essential for making informed health decisions and participating meaningfully in daily life.

Initial Contact for Health Needs

Findings on health consultation behaviour by literacy level revealed distinct patterns among the three groups. However, across all groups, nurses were most frequently identified as the healthcare professionals' participants would contact for health consultations.

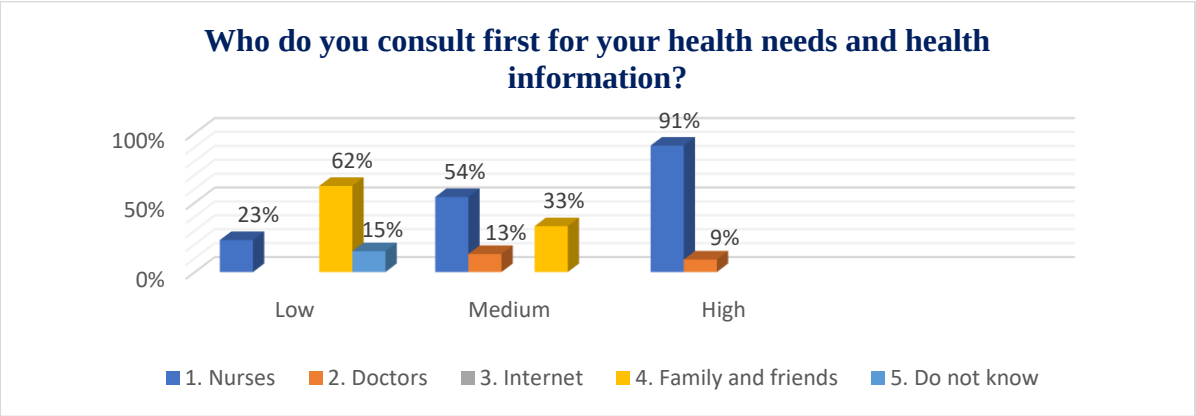

Figure 2: Initial contact for health needs

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In the low literacy group, the majority of respondents (62%) reported consulting family and friends first when faced with a health need, while 23% indicated they would consult nurses. A smaller proportion (15%) stated that they did not know whom to consult.

Among participants with medium literacy, 54% reported consulting nurses first, 33% would turn to family and friends, and 15% would consult doctors.

In the high literacy group, a substantial majority (91%) reported consulting nurses first for their health needs, and only 9% reported consulting doctors. Notably, no respondents in this group reported turning to family and friends, using the internet, or being unsure about whom to consult.

These findings suggest a strong association between literacy level and the choice of first point of contact for health concerns. Individuals with lower literacy are more likely to rely on informal sources, such as family and friends, or to express uncertainty, whereas those with higher literacy level show a marked preference for consulting healthcare professionals particularly nurses as their initial source of advice.

Notably, none of the participants across all literacy groups identified the internet as a source of health information. This absence is particularly striking given global trends in increasing reliance on digital platforms for health-related information.

Understanding Written Health Information

Comprehension of written health information such as brochures and flyers varied substantially across the three groups.

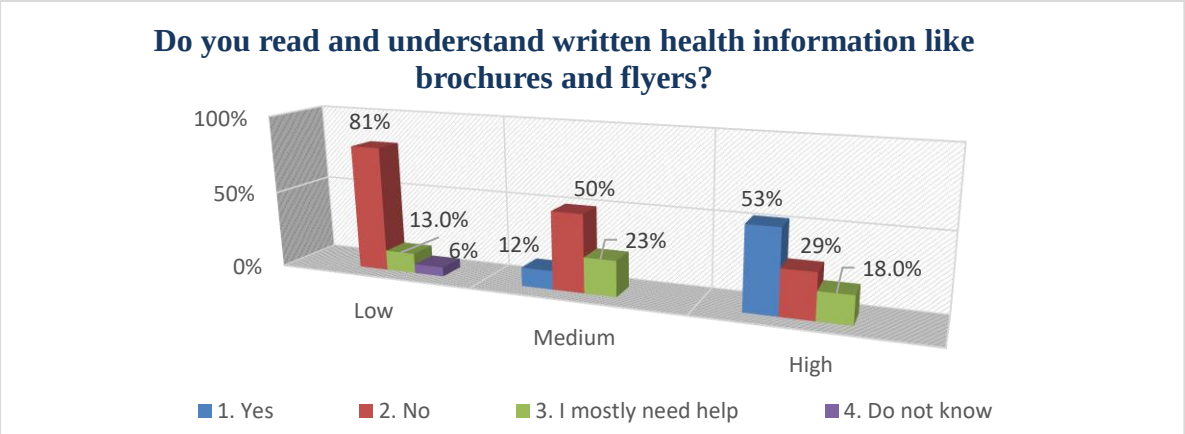

Figure 3: Reading and understanding written health information

Within the low literacy group, only 6% of participants indicated that they could read and understand written health information, whereas 81% reported being unable to do so, and 13% stated that they mostly needed help. Among participants with medium literacy, 50% affirmed their ability to understand written materials, 12% reported being unable, 23% mostly needed help, and 15% were uncertain. In the high literacy group, 53% reported understanding the information, 29% indicated they could not, and 18% mostly needed help; notably, none in this group selected "do not know."

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These findings reveal that while comprehension of written health information improves with increasing literacy levels, a considerable proportion of individuals in each group including 47% of those in the high literacy category still experience difficulty or uncertainty in understanding such materials. This underscores the persistent challenges associated with health literacy, even among those with higher educational attainment.

Frequency of Health and Medical Check-ups

The results reveal notable disparities in how frequently individuals from different educational groups attend health check-ups. This appears to be influenced by educational attainment.

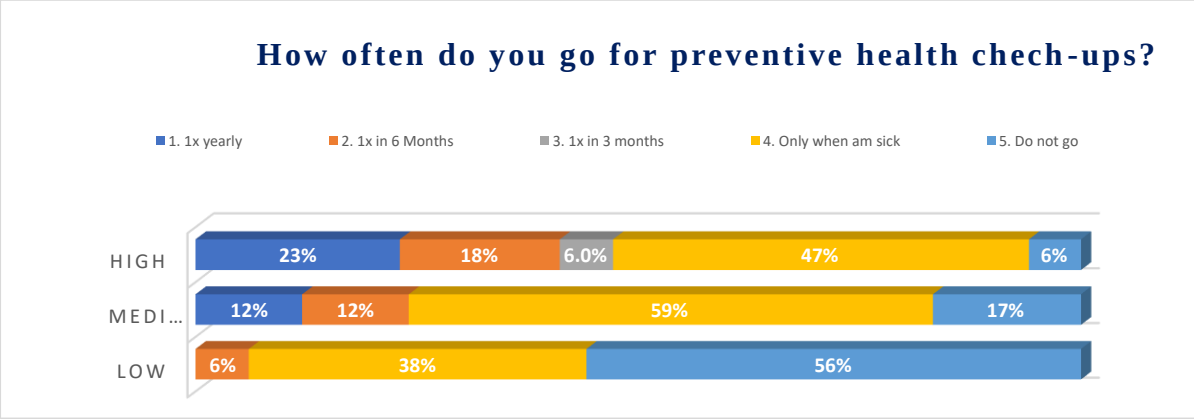

Figure 4: Frequency of utilizing preventive healthcare services

Individuals in the high literacy group are more likely to engage in regular health check-ups, with 23% attending once yearly and 18% attending every six months. In comparison, only 12% of the medium literacy group and 6% of the low literacy group report annual check-ups, with even fewer in these groups attending more frequently. Strikingly, the majority across all groups report seeking check-ups only when they are sick: 47% in the high literacy group, 59% in the medium group, and 38% in the low literacy group. Additionally, a significant portion of the low literacy group (56%) do not attend health check-ups at all, compared to 17% in the medium group and just 6% in the high literacy group.

Despite these disparities, the results indicate that the predominant pattern across all educational levels is to seek medical care only when illness occurs. This suggests that preventive healthcare is not widely practiced, even among those with higher education. The tendency to visit health facilities mainly when sick may reflect gaps in health education, limited awareness, or accessibility barriers, or cultural attitudes that undervalue preventive care.

Paying Conscious Attention to Health by Living a Healthy Lifestyle

The majority of the participants across all educational groups reported consciously paying attention to their health by maintaining a balanced diet, avoiding risk factors such as tobacco and alcohol, and engaging in physical exercises. Nevertheless, the results reveal significant differences between the groups.

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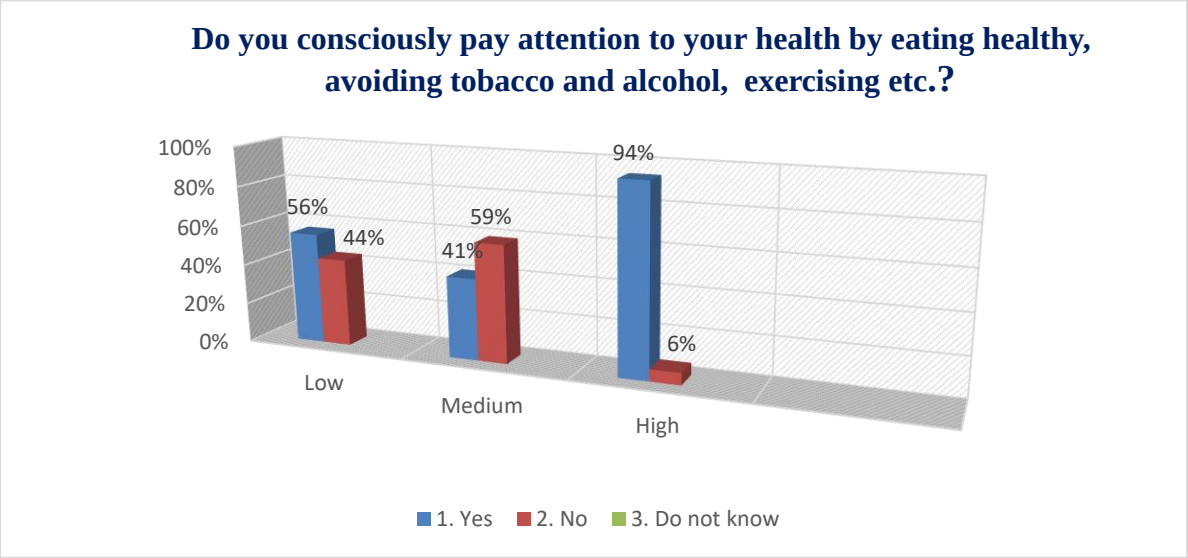

Figure 5: Consciousness of health and healthy lifestyle

The majority of participants in the high (94%) and low (56%) education groups reported consciously paying attention to their health, while this applied to only 41% of those in the medium education group. Compared to other findings in this study, a noticeable discrepancy emerges between the medium and low education groups: the 15-percentage-point difference suggests that participants with lower education report greater attentiveness to their health than those in the medium group.

It is worth noting that some individuals in the low education group reported having chronic health conditions, which may prompt more intentional health monitoring. Nevertheless, the high education group again stands out, with a particularly high proportion (94%) of participants reporting conscious engagement in health-promoting behaviours consistent with other findings. These results suggest a positive association between higher educational levels and intentional health-related behaviours. As literacy increases, so does the likelihood of individuals to actively adopt healthy lifestyle choices. This underscores the potential influence of education on public health outcomes and highlights the importance of targeted health education initiatives, especially for individuals with medium and lower literacy levels. The findings support the assumption that a higher level of education correlates with better health behaviours and, consequently, greater health competence.

Willingness to Participate in Health Activities and Health Information Programs

Willingness to participate in health-related activities, such as outreach programs and training sessions or seminars, varies noticeably across education levels. Overall, a clear trend emerges: the higher the level of education, the greater the reported willingness to engage in such activities.

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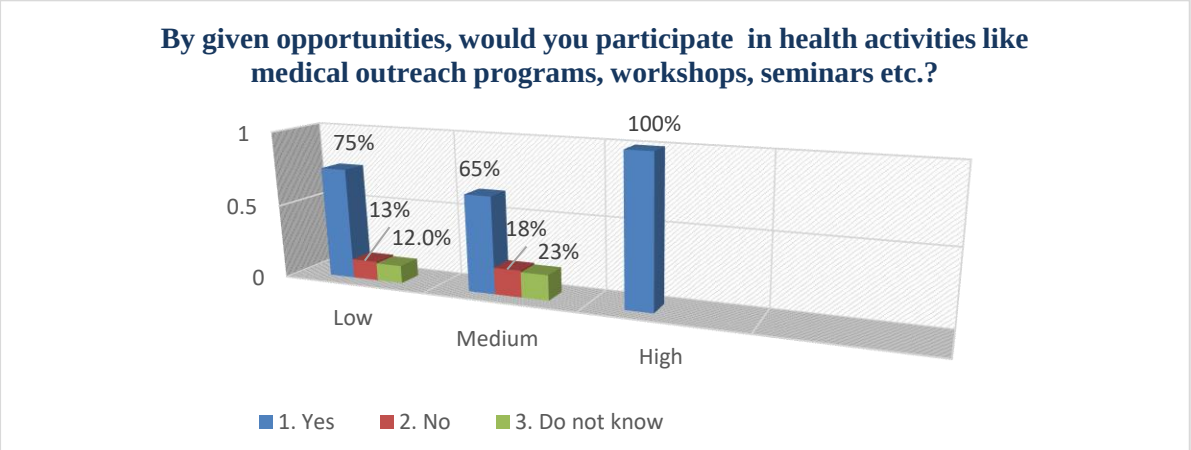

Figure 6: Willingness to participate in health activities and health information programs

Among participants with low education, 75% indicated they would participate in health-related activities, 12% said they would not, and 13% were unsure. In the medium education group, 65% expressed willingness to participate, 23% said they would not, and 12% were unsure. Notably, in the high education group, all respondents (100%) reported willingness to participate, with none responding with "no" or "don't know."

These results demonstrate a clear positive association between education level and willingness to engage in health-related opportunities. While a majority across all groups expressed interest, the proportion increases with educational attainment, peaking at 100% among participants with high education. This suggests that health promotion activities and educational interventions may be particularly well-received among more highly educated populations. At the same time, the findings underscore the importance of fostering participation among those with medium and lower education levels to ensure equitable access to health-related programs and resources.

DISCUSSION

This study aimed to provide insight into the interplay between health literacy, educational level, and health-related behaviours among the Nigerian adult population. The findings reveal a clear relationship between educational attainment and both health literacy and health behaviours. While health behaviours varied across all groups, they consistently improved with higher levels of education. These results highlight the need to strengthen support for individuals with medium and lower literacy in order to promote more equitable health outcomes.

Participants with higher education were significantly more likely to actively seek, interpret, and use health information, as well as consult healthcare professionals as their first point of contact for health concerns. This pattern aligns with both international and African literature, which consistently shows that higher health literacy promotes proactive health-seeking behaviours and a preference for formal healthcare sources (Sørensen et al., 2015; van der Heide et al., 2013; Jacobs et al., 2017; Chiweta-Oduah & Buchanan, 2025).

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Studies conducted in Ghana and Nigeria confirm that individuals with higher education are more likely to seek out information and consult health professionals, while those with lower literacy seek information less actively and often rely on informal networks (Tenibiaje, 2014; Onwe & Okocha, 2019; Akakpo & Neuerer, 2024). The reliance on informal sources for health needs raises concerns about the accuracy and reliability of the information received (Atulomah & Atulomah, 2013; Ekoko, 2020).

Interestingly, despite global trends of increasing internet access and use for health information among younger and more educated populations, as reported in numerous studies, none of the participants in the present study, who are primarily from the working-class population, reported using the internet as their first source for health consultations. This contrasts with the findings of Adegbilero-Iwari et al. (2021), who identified the internet as the primary source of health information amongst Nigerian undergraduates. The disparity likely reflects the difference in the study populations. University students generally have higher digital literacy and more reliable internet access, enabling them to use online health resources more readily. In contrast, working-class individuals may face barriers—such as limited access to digital infrastructure, lower digital competence, or cultural preferences for interpersonal communication—which lead them to rely more on traditional or face-to-face channels. In this regard, World Bank (2020) highlighted that access to and reliance on online health information can vary significantly due to disparities in digital infrastructure, internet availability and sociocultural norms between regions or study populations. Some cultural contexts, for instance, may prioritize face-to-face interactions when it comes to sensitive health topics, which may not be captured in more digitally connected populations (Whitehead et al., 2023; Cipta et al., 2024).

Another significant finding from this study is the prominent role of nurses as the primary source for health consultations for most participants. This differs from Adegbilero-Iwari et al. (2021), who found that Nigerian undergraduates primarily sought health information from physicians. This contrast likely reflects differing healthcare contexts that in Nigeria, primary healthcare (PHC) centres, often the first point of contact, are largely staffed by nurses rather than physicians (FMOH, 2016). Due to a shortage of physicians, nurses frequently take on expanded responsibilities, including health consultation, education and counselling, according to the national task-shifting and task-sharing policy (Okoroafor & Christmals, 2023).

Nurses' accessibility, affordability, and trusted presence within the communities make them the preferred and practical source of health information (Enebeli et al., 2024). Therefore, while Adegbilero-Iwari et al. (2021)'s sample of undergraduates with likely better access to physicians in urban or tertiary care settings prioritized doctors as sources of health information, the broader Nigerian adult population often relies on nurses as frontline health professionals, owing to their accessibility and trusted role within PHC settings (Fasoranti & Adeyeye, 2015; Bate et al., 2023; Enebeli et al., 2024).

A critical finding from this study is that a significant number of participants across all three groups reported difficulty in understanding written health information, regardless of their education level. This widespread challenge underscores that health literacy barriers in Nigeria are not limited to those with the least formal education but may reflect deeper systemic issues in health communication and information delivery.

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These findings are consistent with both international and African literature, which repeatedly identify language, culture, education quality, and ineffective communication as major barriers to health literacy (Nutbeam, 2000; Berkman et al., 2011; Kuyinu et al., 2020; Chang et al., 2024; de Jesus et al., 2024). In the Nigerian context, these challenges are further compounded by several factors. One key issue is language: most health materials are written in English, which is not the first language for the majority of Nigerians, and the use of medical jargon further complicates comprehension even for those with higher education (Diri, 2023; Chiweta-Oduah & Buchanan, 2025).

Additionally, the quality of formal education plays a significant role; underfunded schools and gaps in curricula mean that educational attainment does not always translate to functional literacy or critical thinking skills (Pierce & Foster, 2020). While interventions in Nigeria have demonstrated some effectiveness, they remain limited in scale. Experts recommend collaborative, multisectoral strategies involving government, healthcare professionals, non-governmental organizations (NGOs), and the media to effectively address these systemic challenges.

The practice of engaging in preventive health screenings remains largely reactive, with individuals, including those in more educated groups, often seeking care only when symptoms appear. This pattern is frequently attributed to financial constraints and the lack of mandatory health insurance coverage, which results in the underutilization of preventive healthcare services due to the predominant out-of-pocket payments (Ofoli et al., 2020, Uzochukwu et al., 2015; Uzochukwu, 2017).

The expressed willingness of all participants with higher education to attend health-related events aligns with existing evidence that links educational attainment with greater personal agency and health responsibility (van der Heide et al., 2013; Kickbusch et al., 2013; Sørensen et al., 2015). Nonetheless, widespread willingness across all groups to participate in health activities suggests strong potential for inclusive health education interventions, particularly when these are tailored to overcome literacy and cultural barriers.

The identified positive association between higher education and health-conscious behaviours such as healthy nutrition, physical activity, and avoidance of harmful substances aligns with previous research suggesting that education enhances health literacy, self-efficacy, and the capacity to adopt a healthier lifestyle for long-term health benefits (Nutbeam, 2000; Schaeffer et al., 2016; Cipta et al., 2024).

Interestingly, the relatively higher health attentiveness observed in the low education group compared to the medium group may reflect contextual factors such as the presence of chronic illness, which can heighten personal motivation for health monitoring (Tenibiaje, 2014; Rajah et al., 2019; Olabanji, 2023). This suggests that health behaviour is shaped not only by educational attainment but also by lived health experiences and perceived vulnerability.

Furthermore, the increasing willingness to participate in health-related activities with higher education levels supports existing evidence that education fosters greater engagement in health promotion efforts (Nutbeam & Lloyd, 2021).

Overall, the findings confirm the hypothesis that higher education is associated with higher health literacy and more positive health-related behaviours. This is evidenced by the high

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education group reporting the highest level of health information seeking and utilization, better comprehension of written health materials, and the strongest willingness to participate in health-related events. In contrast, participants in the medium- and low-education groups demonstrated comparatively lower levels of both health literacy and health-promoting behaviours.

These results reinforce the central role of education in shaping health behaviours, while highlighting the multifaceted nature of health literacy as a function of both structural and individual factors. Expanding tailored health education initiatives and bridging communication gaps remain essential strategies for improving health behaviours and advancing public health outcomes across all population groups in Nigeria.

Study Limitations

While this study offers valuable insights into the research topic, it is important to acknowledge certain limitations. The small sample size and geographical scope limit the generalizability of the findings to the broader Nigerian population. Moreover, the use of purposive sampling introduces potential selection bias, which may have influenced the participants' responses and, consequently, the overall outcomes. The small, non-random sample also reduces the reliability and robustness of the study's conclusions.

In addition, the two-step data analysis process employing both Excel and SPSS may have increased the risks of data handling errors and constrained the depth of statistical analysis. Despite these limitations, the study provides valuable preliminary data that can inform and guide future larger scale and more representative investigations.

IMPLICATION TO RESEARCH AND PRACTICE

This study highlights the vital role of education in enhancing health literacy and promoting positive health behaviours among Nigerian adults. However, the significant gaps identified—particularly in understanding written health information, limited use of the internet as a health information source, and low engagement in preventive health services across all groups—underscore the need for strategies that improve access to both formal and informal education while advancing health education and literacy.

In practice, it is crucial to build capacity among healthcare workers and integrate health literacy into national policy frameworks. Health practitioners and policymakers should develop and optimize tailored health information, communication strategies, and digital literacy interventions that reflect varying literacy levels and cultural contexts. To ensure inclusivity and effectiveness, community-based health education initiatives should incorporate visual aids, oral storytelling formats or digital tools. Additionally, given that nurses were most frequently cited as primary sources of health information, it is important to assess the effectiveness of nurse-led health literacy programs, particularly for individuals with lower education levels. Understanding how such initiatives can be scaled and adapted for broader impact is essential to enhancing health literacy and fostering positive health behaviours across Nigeria.

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It is recommended that future research should explore effective approaches to improving health communication and digital literacy across diverse Nigerian populations, with a focus on addressing barriers related to access, skills, and cultural preferences.

CONCLUSION

The study demonstrates that educational level significantly influences health literacy and health-related behaviours. However, formal education alone does not guarantee the ability to comprehend or effectively apply health information. While higher educational attainment is associated with greater engagement in formal healthcare and health information-seeking, persistent challenges such as difficulties in comprehension and continued reliance on informal networks remain, particularly among those with lower literacy levels.

Addressing these barriers requires collaborative, multisectoral efforts aimed at promoting equitable access to health information and services. Although education is a critical determinant of health behaviours, comprehensive strategies must also tackle broader systemic and structural issues to improve overall public health outcomes in Nigeria.

FUTURE RESEARCH

Future research should explore how digital literacy and access impact health information-seeking, particularly among working-class and rural populations in Nigeria. Evaluating culturally sensitive interventions such as using local languages and the role of frontline health workers like nurses can provide valuable insights for developing effective health literacy strategies. Additionally, longitudinal studies are needed to assess the long-term effects of educational policies and health system reforms on health behaviours and outcomes.

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AUTHORSHIP AND CONFLICT OF INTEREST STATEMENTS

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2. AUTHOR CONTRIBUTION

Maria Oluomachi Enebeli conceptualized and designed the study and was responsible for data collection, formal data analysis and interpretation. Three local intermediaries in Nigeria assisted in recruiting participants. The study was a follow-up of the author's bachelor thesis which was supervised by Prof. Dr. Michaela Brause of Hochschule Bielefeld. The manuscript was proofread, corrected and approved by three persons in the academic field mentioned in the acknowledgements.

3. CONFLICT OF INTERESTS

The author declares that she has no competing interests.

4. FUNDING

The author received no specific funding for this work.

5. ETHICAL ASPECTS

The author indicates that this research was conducted ethically consistent as specified in the guidelines of Bielefeld University. Oral and written informed consent were obtained from participants. Privacy, anonymity and data protection of participants were given utmost priority. All those involved in the research procedure are recognized and given due credit.

6. ORIGINALITY

This manuscript is original, has not been published previously and is not under consideration by any other journal. However, the results were presented at the 4th International Conference of the German Society of Nursing Sciences that took place in May 2025 in Berlin, Germany.

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(https://conference.dg-pflegewissenschaft.de/wp-content/uploads/2025/05/2025_05_06_Abstractbook_International-Conference-DGP.pdf).

7. DATA AVAILABILITY

Given the potentially disclosive nature of the entire interview questionnaires and written answers, they will not be made freely publicly available. They are deposited at Bielefeld University and reasonable requests for secure research access will be considered. Please contact the author: maria.enebeli@uni-bielefeld.de

Maria Oluomachi Enebeli

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RESEARCH QUESTIONNAIRE

July 2023

RESEARCH TOPIC:

"RELATIONSHIP BETWEEN HEALTH LITERACY AND LEVEL OF EDUCATION ON HEALTH-RELATED BEHAVIORS OF THE NIGERIAN POPULATION IN ANAMBRA STATE"

INSTRUCTIONS

Thank you for voluntarily accepting to participate in this research!

⇒ Please answer the questions in the order they appear in this questionnaire.

⇒ Please don't write your name, personal address or any other personal data in this questionnaire.

⇒ Please feel free to provide your answers; there are no right or wrong answers but your sincerity in answering the questions will be greatly appreciated.

⇒ Your answers will be handled with utmost confidentiality. No one except the researcher will have access to your answers or know how you answered the questions.

⇒ You can skip any question that you do not want to answer.

⇒ You can stop filling out the questionnaire or withdraw your consent to participate in the interview at any time you wish.

Demographic Information and Level of Education

Please tick the box where appropriate or write down your answers in the spaces provided.

Number	Question/Item	Answer
1	May I ask how old you are?	1: -------years 2: No specification
2	Gender	1: Female 2: Male 3: No specification
3	Please indicate your level of education choosing one of the specified options, based on ISCED (International Standard Classification of	0: none 0: nursery School 1: primary education 2: junior secondary education

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	Education) adapted to the Nigerian education system	3: senior secondary education, Technical Colleges, 4: Post-secondary (non-tertiary education), Advanced Technical Colleges 5: Polytechnics (OND-Ordinary National Diploma or HND-Higher National Diploma) 6: Bachelor 7: Master's 8: Doctorate
4	Did you undergo any professional apprenticeship or training?	1: Yes If yes, please indicate---------- 2: No
5	What do you do for a living? (Occupation)	----------
6	Please indicate approximately how much you earn or generate monthly Options 1-3: High Options 4-5: Middle Options 6-9: Low	1: Above 500,000 NGN 2: Between 200,000 to 500,000 NGN 3: Between 100,000 to 200,000 NGN 4: Between 50,000 to 100,000 NGN 5: Between 20,000 to 50,000 NGN 6: Below 20,000 NGN 7: I don't earn anything 8: I live on what I receive from Family, Friends or Benefactors and Benefactresses 9: No specification
7	What is your religious affiliation?	1: Christianity 2: Islam 3: Traditional Religion 4: None

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8	Knowledge and understanding of English Language (the official language in Nigeria)	1: Perfect 2: Sufficient 3: None 4. No specification
9	Knowledge and understanding of written Texts (English or any other language, local or foreign)	1: Perfect 2: Sufficient 3: None 4: No specification
10	Can you write in English or any other (foreign or local?) language?	1: Yes 2: Partially 3: No

Information on Health Status and Health Behavior

Please tick the box where appropriate or write down your answers in the spaces provided.

11	How would you judge your present health condition?	1: Good 2: Manageable 3: Bad 4: Do not know
12	Do you have any of the following underlying illnesses? Example *High blood pressure *Chronic Pain *Arthritis *Rheumatism *Diabetes *Hepatitis * Kidney problems *etc. If yes, please indicate the treatment taken so far to effect a cure (for example Medication, Surgery, physiotherapy etc.)	1: Yes 2: No 3: Do not know _____ _____ ----------
13	Do you take any long-term medication?	1: Yes 2: No 3: No specification

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14	If you take long-term medication, when you take medication, do you ask or inform yourself of the effects or side effects of your medication?	1: Yes 2: No 3: No specification
15	What do you do when you are sick?	1: Go to Hospital, Health Centre, or clinic 2: Go to a Chemist and buy medication 3: Tell my Family or Friends 4: Go to a Pastor or a Healer 5: Visit African traditional medicine practitioners 6: Go to native Doctor (Dibia) 7: I do not do anything
16	Who do you consult first for your health needs and health information?	1: Nurses 2: Doctors 3: Other healthcare professionals 4: Internet 5: Family and friends 6: Do not know
17	How often do you go for preventive health checkups?	1: At least once a year 2: At least once in 6 Months 3: Once in 3 months 4: I go only when I am sick 5: Do not go at all
18	Do you consciously pay attention to your health by eating healthy, avoiding tobacco and alcohol, exercising etc.	1: Yes 2: No 3: Do not know
19	By given opportunity, would you attend and participate in health activities like medical outreach programs, workshops, Seminars, Training etc.?	1: Yes 2: No 3: Do not know

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Information on Health Literacy

Please tick the box where appropriate or write down your answers in the spaces provided.

20	Do you wish to be informed on general Health Issues?	1: Yes 2: No 3: Do not know
21	Do you search for information about your health yourself and utilize it? For example, on healthy living, nutrition, diet, exercise, social activities that benefit your health, disease management, etc.	1: Yes 2: No 3: Do not know
22	Do you read and understand written health information like brochures and flyers?	1: Yes 2: No 3: I mostly need help 4: Do not know
23	When you are sick, do you wish to be informed or inform yourself of the symptoms, diagnosis and therapy of your sickness?	1: Yes 2: No 3: Do not know
24	Can you read and understand the results of your medical tests and treatments, leaflets or any other written information about your health status?	1: Yes 2: No 3: I always need help 4: Do not know
25	Indicate how difficult or easy it is for you to find information about sicknesses or diseases that affect you	1: Very easy 2: Easy 3: Difficult 4: Very difficult 5: Do not know
26	Indicate how easy or how difficult it is for you to take your medication or other treatment like measuring your blood pressure or blood sugar on your own without any help	1: Very easy 2: Easy 3: Difficult 4: Very difficult 5: I always need Help 5: Do not know

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27	Indicate how easy or how difficult it is for you to understand the Information given to you on health risks, symptoms, diagnosis, treatment, vaccines, preventive measures, etc.	1: Very easy 2: Easy 3: Difficult 4: Very difficult 5: I always need Help 5: Do not know

Adapted and prepared by Maria Oluomachi Enebeli

You have come to the end of the interview!

Appreciation

Thank you very much for voluntarily participating in this study!

I really appreciate your contribution to the success of this research.

Your contribution will help deepen the overall understanding of how health literacy and educational level influence health-related behaviours among adults in Nigeria. It is hoped that the findings will serve as a foundation for developing strategies to strengthen both formal education and health literacy, ultimately improving health behaviours in the Nigerian adult population.

Thanks!

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