



Influence of Health Information Literacy on Health-related Quality of Life of Tuberculosis Patients in Lagos State, Nigeria

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Abstract

Introduction: Tuberculosis is a deadly disease that commonly has an adverse impact on patients' health-related quality of life across multiple health domains. Meanwhile, health information literacy may help to alleviate or reduce the negative impact while improving treatment outcomes. This study aimed to determine the influence of health information literacy on health-related quality of life of tuberculosis patients in Lagos State, Nigeria.

Methods: This study adopted the survey design. A sample size of 310 was obtained using Taro Yamane formula. Multistage sampling technique was used to select TB patients from twelve Directly Observed Treatment Centers across the three senatorial districts in the State. Data were collected using validated health literacy and health-related quality of life questionnaire. The data were analyzed using descriptive statistics, simple linear and multiple regression analysis.

Results: The results revealed that the mean age of the respondents was 35.87 years±11.95. The results revealed that health information literacy ($t(295)=8.513, P<0.05$) had a positive and significant influence on health-related quality of life. The results also showed that the ability to identify specific information need ($\beta<0.171, P<0.05$) and use information ($\beta<0.154, P<0.05$) had a positive and significant effect on health-related quality of life of tuberculosis patients.

Conclusion: Based on the findings of the study, it was concluded that health information literacy influence health-related quality of life of tuberculosis patients.

Keywords: Nigeria, Health information literacy, Health-related quality of life, directly observed treatment, Tuberculosis.

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Introduction

Tuberculosis (TB) is an airborne disease that spreads when people with infectious tuberculosis cough, sneeze, spit, or talk release *Tuberculosis bacilli* into the air (1). TB remains one of the world's most serious public health diseases globally. In 2021, eight countries accounted for more than two thirds of global TB cases: India, Indonesia, China, the Philippines, Pakistan, Nigeria, Bangladesh and Democratic Republic of the Congo (2).

With 170,000 deaths annually, Nigeria is still ranked a high TB burden country and highest in Africa (3). As a result of the Covid-19 pandemic, Lagos State was recently declared epicenter of TB in Nigeria (4). TB, like many other deadly diseases, has an adverse impact on patients' health-related quality of life (HRQoL) ranging from prolonged cough, inability to work, anxiety and fear, depression, and threat to survival which decrease the social and economic status in different dimensions (5, 6).

Many features of active TB disease can result in a decline in HRQoL of life in human domains ranging from physical, psychological, biological, emotional, and social relationship domain. This becomes more obvious in patients with long or protracted illness like TB. Thus, TB has been identified as a major threat that causes deterioration in patients' HRQoL globally (6). Adeyeye et al. (2014) further indicated that there was a consistent demonstration of poor quality of life associated with TB in practically all health domains (5). Osahon and Okolo's (2017) findings showed that the HRQoL of TB patients in South-east Nigeria was low (7). In Lagos, which was the setting of his study, Adebayo (2017) reported that the HRQoL of TB patients was significantly low (8). Meanwhile, Hicks, Barragan, Franco-Paredes, Williams, and del Rio (2006) asserted that health literacy was strongly associated with patients' knowledge of the disease; hence, it is a predictor of HRQoL (9).

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Salami and Odusanya (2020) revealed that low health literacy was associated with poorer functioning of physical and mental health domain, as well as increased usage emergency departments and health facilities (10). Hence, the effect of TB on patient's HRQoL could depend on the patients' level of health information literacy which has often been seen as determinants of symptoms recognition, early diagnosis, and ability to cope and adjust during and after treatment. Health information literacy is one of the central needs of patient's life because it has a significant impact on his/her chances of survival, well-being, and overall HRQoL. Even though quality information cannot replace quality health care, individuals required adequate about their ailment and treatment.

In the context of this study, health information literacy is the ability of TB patients to recognize health information needs, identify information sources, retrieve, evaluate, and understand health information and use them in making good health decisions. It remains one of the potentially significant predictors of TB patients' responses to health information seeking and decision-making. This is due to the fact that having sufficient information and understanding of health status allow the patients to take an active role in making health decisions.

Health information literacy has become a major determinant of health outcomes of patients and health professionals; nevertheless, it has not received due attention, especially among TB patients. It is necessary that TB patients be aware of their ailment to improve their health outcomes. Individuals in need of health information are expected to possess health literacy skills as a requirement to locate information, communicate the needs and preferences as well as respond to information and services (11). In this perspective, it is health information that is required for all facets of TB, either latent or active; it is needed for diagnosis, treatment, and appropriate management of diseases (12). The capacity and proficiency in understanding and using health information to make informed choices and decisions is crucial in maintaining health, especially when facing protracted illness like TB that required long duration treatment.

Several previous studies have been conducted in different countries on the influence of health information literacy on HRQoL of patients. In Kenya, Koech (2017) explored access to TB information and its influence on health-seeking behavior among TB patients. The findings of the study showed that an insignificant number of their respondents stated

that they did not get any information from the healthcare workers; hence they were dependent on the Internet (13). Jafari, Lamiyan and Hajizadeh (2018) investigated the relationship between health literacy and quality of life in Iranian women who had a mastectomy during their reproductive years. The finding showed a significant and positive relationship between health literacy and the overall quality of life. The study outcome also shows that women's health literacy is closely associated with their educational level (14). Xia et al. (2019) evaluated the association between health literacy and quality of life among cancer survivors in China. The result of the study revealed that cancer survivors with adequate health literacy were almost three times more likely than cancer survivors with insufficient health literacy to improve their health literacy (15).

Zhang, Gilmour, Liu and Ota (2019) examined the association between health literacy and quality of life among Chinese patients with chronic heart failure (CHF) in China. The study found out that, in the unadjusted model, low health literacy was linked to low quality of life. However, after control of covariates, the relationship was no longer statistically significant (16). Poor literacy can have a direct impact on a patient's health by limiting their personal, social, and cultural role as well as affecting their psychological well-being. In a similar study in different population, Couture (2017) examined the relationship between health literacy and the physical and mental components of quality of life among frequent users of health care services with chronic diseases in Quebec, Canada. The result showed that there was no relationship between health literacy and the physical and mental components of quality of life (17).

In light of these different empirical reviews, the relationship between health information literacy and health-related quality of life could be influenced by a variety of factors, including particular illnesses, cultural characteristics, and aspects of life. Although health information literacy and HRQoL are indispensable concepts in health care system, the link between them is still largely unclear, particularly for a population of frequent users of health care services like TB patients in Nigeria. It is the gap in this knowledge that this study intends to fill. The main objective of this study was to examine the influence of health information literacy on HRQoL life of TB patients in Lagos State, Nigeria.

Methods

The study used the survey design. The population of this study comprised 918 TB patients accessing

treatment in public Directly Observed Treatment (DOT) Centres in Lagos State, Nigeria. Multi-stage sampling technique was used. Simple random sampling was used to select six Local Government Areas (LGAs) across the three senatorial districts in the State. Purposive sampling was used to select two DOT Centres with highest burden of TB patients in the selected LGA. A sample size of 310 TB patients was determined using Yamane (1967) sample size formula below:

$$n = \frac{N}{1 + N(e)^2}$$

Where,

N=population of tuberculosis patients accessing treatment in the twelve (12) DOT Centres in Lagos State, Nigeria (918).

e=level of error tolerance 5%

$$n = \frac{918}{1 + 918(0.05)^2}$$

$$n = \frac{918}{1 + 2.295}$$

$$n = \frac{918}{3.295}$$

$$n = 278.603$$

$$n = 279$$

Adjusting the sample size for 10% non-response

$$n_f = \frac{n}{1 - f}$$

$$n_f = \frac{279}{1 - 10\%}$$

$$n_f = \frac{279}{1 - 0.1}$$

$$n_f = \frac{279}{0.9}$$

$$n_f = 310$$

A questionnaire was the instrument used for data collection. Health information literacy was measured through the scale adopted from the study of Akomolafe and Opeke (2019) (18). HRQoL was assessed using the WHOQOL-Bref version by World Health Organization. It consists of 24 items and 3 main components. Four-point Likert scale was used to assess the level of HRQoL. The instruments were validated appropriately and the reliability test score was done using Cronbach Alpha. The Cronbach Alpha scale for health information literacy was 0.72, and HRQoL 0.90; signifying the internal consistency and reliability of the research instrument. Ethical clearance was obtained from the Babcock University

Health Research Ethics Committee - BUHREC 433/21. Permissions was obtained from Lagos State Ministry of Health, and each of the head of the DOT Centres. The study was carried out between November, 2021 - January, 2022. Informed written consent was taken from all the study participants for voluntary participation. Out of the 310 copies of questionnaire administered, 298 copies were returned for data analysis. Data were analyzed using SPSS version-23. Descriptive statistics including mean and standard deviation, and frequency distribution were used to analyze the data. Inferential statistics (simple linear and multiple regression) was used to answer the research hypotheses.

Results

The demographic and economic characteristics of the respondents are shown in Table 1. Over half of the 199 (66.8%) respondents were males, while 99 (33.2%) were females. The mean age and standard deviation of the respondents were 35.87 years±11.95 years. As to marital status, 152 (51.0%) were married. Of the 298 respondents' educational qualification, 140 (47%) completed secondary education, while 28 (9.4%) had no formal education. 148 (49.7%) of the respondents were self-employed, while 2 (0.7%) were unemployed. The respondents' monthly income level per month revealed that 129(43.3%) earned less than ₦30, 000, while 63(21.1%) had no income.

The result of hypothesis two is presented in Table 2. The results revealed that health information literacy ($t(295)=8.513$, $P<0.05$) had a positive and significant influence on the HRQoL of TB patients in Lagos State. This result implies that health information literacy is a key determinant of HRQoL of TB patients in Lagos State. Therefore, the null hypothesis, which states that health information literacy will not significantly influence HRQoL of TB patients in Lagos State, Nigeria, was rejected and the alternative hypothesis is accepted. This result demonstrates that health information literacy could be viewed as an important predictor of HRQoL that can make a significant improvement in treatment outcome.

The β values of Table 2 show that there is a significant positive correlation between health information literacy and the HRQoL of tuberculosis ($\beta<0.443$, $P<0.05$). This finding suggests that, TB patients with high health information literacy are likely to experience high HRQoL. The R^2 (0.197) of the simple regression analysis revealed that health information literacy contributed 19.7% to the changes in HRQoL of TB patients. The F-test (1, 296) of 72.470 substantiated the model's usefulness in forecasting

Table 1: Respondents’ Demographic Information of Tuberculosis Patients

Demographic Variables	Frequency (n)	Percent (%)
Gender		
Male	199	66.8
Female	99	33.2
Age		
18-29 years	102	35.1
30-41 years	109	37.5
42-53 years	53	18.2
54-65 years	21	7.2
> 66 years	6	2.1
Mean age in years (standard deviation)	35.87(±11.95)	
Marital status		
Single	125	41.9
Married	152	51.0
Divorced	05	1.7
Widow/Widower	13	4.4
Separated	03	1.0
Highest educational qualification		
No formal education	28	9.4
Primary	41	13.8
Secondary	140	47.0
University/Tertiary	89	29.9
Occupation status		
Self-employed	148	49.7
Civil servant	19	6.4
Private organization worker	51	17.1
Retired	09	3.0
Student	40	13.4
Unemployed	2	0.7
Others (Pastor, Clergy, Corper, Drivers, Housewives)	29	9.7
Personal Income per month [₦444 (\$1)]		
< ₦30,000	129	43.3
₦ 30,001 - ₦ 59,999	70	23.5
₦ 60,000 – ₦ 89,999	25	8.4
₦ 90,000 +	11	3.7
No income	63	21.1

Table 2: Simple linear regression analysis of health information literacy and health-related quality of life of tuberculosis patients

Predictors	B	Beta (β)	T	P	R ²	Adj. R ²	F	ANOVA (Sig.)
(Constant)	1.468		12.000	0.000	0.197	0.194	72.470	0.000
Health information literacy	0.386	0.443	8.513	0.000				

Dependent Variable: Health-related quality of life; Predictor: (Constant), Health information literacy; DF (F-Statistic)=1, 296; DF (T-Statistic)= 295; Source: Field Survey Results (2021)

HRQoL based on health information literacy. The forecasting of the established simple regression model in Table 2 is thus expressed as:

$$HRQoL = 1.468 + 0.386 HIL + e \quad \text{Model 1}$$

Where:

HRQoL=Health-Related Quality of Life

HIL=Health information literacy

e=Error term (All uncaptured variables that can

influence HRQoL but not included in the model)

The regression model 1 showed that while holding health information literacy to a constant zero, HRQoL was 1.468, implying that in the absence of health information literacy, HRQoL of TB patients in Lagos State was positive. The result of the simple regression model indicates that when health information literacy is improved by one unit on a measurement

Table 3: Multiple regression analysis of health information literacy (dimensions) and health-related quality of life of tuberculosis patients

Predictors	B	Beta (β)	T	P	R ²	Adj. R ²	F	ANOVA (Sig.)
(Constant)	1.510		11.212	0.000	0.219	0.203	13.613	0.000
Ability to identify	0.129	0.171	2.143	0.033				
Ability to access	-0.108	-0.136	-1.533	0.126				
Ability to retrieve	0.046	0.069	0.737	0.462				
Ability to evaluate	0.093	0.140	1.479	0.140				
Ability to understand	0.101	0.152	1.711	0.088				
Ability to use	0.116	0.154	2.042	0.042				

Dependent Variable: Health-related quality of life of tuberculosis patients; Predictor: (Constant), Health information literacy; DF (F-Statistic)= 6, 291; DF (T-Statistic)=290; Source: Field Survey Results (2021)

scale, there will be a corresponding positive increase in TB patients’ HRQoL by 0.386 (38.6%). This finding showed that HRQoL moved in the same direction with health information literacy of tuberculosis patients in Lagos State. However, it is vital to identify the dimensions of health information literacy that contribute to HRQoL of TB patients in Lagos State, Nigeria. Therefore, a multiple regression model was developed for this purpose in Table 3.

Table 3 shows the multiple linear regression analysis result for the influence of health information literacy (dimensions) on HRQoL of TB patients on HRQoL of TB patients. The indicators of health information literacy (ability to identify, access, retrieve, evaluate, understand and to use) were regressed against HRQoL using multiple linear regression analysis in Table 3. According to the results in Table 3, ability to identify ($t(290)=2.143, P<0.05$) and ability to use health information ($t(290)=2.042, P<0.05$) had positive and significant influences on HRQoL of TB patients in Lagos State. On the other hand, ability to access ($t(290)=-1.533, P>0.05$), ability to retrieve ($t(290)=0.737, P>0.05$), ability to evaluate ($t(290)=1.479, P>0.05$), and ability to understand ($t(290)=1.711, P>0.05$) had insignificant influences on the HRQoL of TB patients. The result shows that ability to identify contributes more to the HRQoL of tuberculosis patients while ability to use information contributes the least.

The β values in Table 3 show that there is a significant positive correlation between ability to identify and HRQoL of TB ($\beta<0.171, P<0.05$) and ability to use and HRQoL of TB patients ($\beta<0.154, P<0.05$). This suggests that TB patients who possess high abilities in identifying and using health information literacy experience high HRQoL. The *Adj. R²* (0.203) of the multiple regression analysis revealed that the health information literacy (dimensions) explained 20.3% of the changes in HRQoL of TB patients in Lagos State. The F-test (6, 291) of 13.613 showed that the regression model could be used to forecast HRQoL

based on health information literacy (dimensions). The forecasting of the established multiple regression model in Table 3 is thus expressed as:

$$HRQoL = 1.510 + 0.129 AI + 0.116 AU + e \quad \text{Model 2}$$

Where:

HRQoL=Health-related quality of life

AI=Ability to identify

AU=Ability to use

e = Error term (All uncaptured variables that can influence HRQoL but not included in the model)

The regression model 3 shows that when holding health information literacy (dimensions) to a constant zero, HRQoL would be 1.510, implying that without health information literacy (dimensions), HRQoL of TB patients in Lagos State would be positive. The result of the multiple linear regression model indicated that when ability to identify and ability to use were improved by one unit on a measurement scale, there was a corresponding positive increase in TB patients’ HRQoL by 0.129 and 0.116, respectively. The result showed that ability to identify was the highest predictor of HRQoL than ability to use. It is obvious from this result that TB patients in Lagos State would experience better HRQoL when their ability to identify and ability to use health information are improved.

Discussion

While studies have independently linked health information literacy to HRQoL of different category of patients, little or no studies had considered that of tuberculosis in Nigeria. This study examined the influence of health information literacy on health-related quality of life of tuberculosis patients in Lagos State, Nigeria. Hypothesis one sought to examine the influence of health information literacy on HRQoL of TB patients in Lagos State, Nigeria. The result revealed that health information literacy had a positive and significant influence on the HRQoL of TB patients in Lagos State. This result implies that health information literacy is a key predictor of

HRQoL of TB patients in Lagos State, Nigeria. This outcome may be attributed to high educational level among the respondents, which is often linked to more self-confidence and self-efficacy toward illness and social environment. One can then assume that the higher the educational attainment, the better the HRQoL. The finding corroborates the results of Jafari et al. (2018) in Iran, who found out that health information literacy had a positive and significant influence on HRQoL of women that had mastectomy during their reproductive years (14).

In the same line with the finding of the present study, the outcome of Panahi et al.'s study (2018), which was carried out in Iran, showed a strong positive association between health literacy and physical and mental aspects of quality of life, as well as overall quality of life (19). Similarly, the finding of this present study supports that of Jovanić et al.'s study (2018) in Serbia, who found that health literacy was highly statistically significant and an independent predictor of quality of life (20). Therefore, the explanation could be that health information literacy can be a driver of individual patient's aspects of behavior, lifestyle, stress management, feeding habit, and overall HRQoL. As such, health information literacy can be used as a measure of intervention during the treatment of patients because patients that are highly literate and educated can better understand and interpret health information their caregivers give them or receive from somewhere else. By implication, health information literacy offers the possibility of reduction in hospitalization and mortality rates, reduction of health complications, prolonged treatment duration, and improved health-related quality of life. However, this finding is not consistent with the findings of Couture (2017) who reported that there was no association found between health literacy and quality of life (17).

Hypothesis two states that health information literacy indicators have no significant relative influence on HRQoL of TB patients in Lagos State, Nigeria. The result showed that the ability to "identify specific information need" and ability to "use information" had positive and significant influence on HRQoL of TB patients in Lagos State, Nigeria. The finding also indicated that the ability to identify specific information need and use health information contributed more to the HRQoL of TB patients than all other measured indicators. This buttressed the view of Asadi-Lari, Tamburini and Gray (2004), showing that "patients may have a need for more or better information on some aspects of health. (21)" This supported the findings of Oladimeji et al. (2018)

conducted among TB patients in Oyo State, Nigeria. Their study found out that the level of knowledge of patients about tuberculosis in the study was high (22). This further buttressed the outcome of Xia et al. (2019) conducted in China, who found out that cancer survivors with adequate health literacy were almost three times more likely than cancer survivors with insufficient health literacy to have improved health literacy (15). The outcome of the present study suggested that the patients under study had the cognizance to identify their information needs. This may be attributed to high level of education among the respondents of this study. Level of educational attainment has been identified as a key determinant of symptoms identification, adherence and treatment and the likelihood to report very good health-related quality of life (23).

This finding confirms the result of Olayemi and Abolarinwa (2021) who studied the health information needs of TB patients in Lagos, and their outcome demonstrated that TB patients acknowledged the need for health information to improve their health conditions (24). The ability to identify specific information needs involved the patient's ability to know their information need, type of information needs, and articulate them. This encompasses the skill to convert the need for information (about diagnosis, prognosis, treatment, etc.) into an answerable question. In certain cases, the knowledge gap may only appear as a vague impulse to know more about their ailment. It must be noted that health information needs of patients varied, and as such, it depended on various factors like the current health condition, socio-economic factors, level of literacy, social supports, environment, etc. Nevertheless, it must be stated that information needs of the patients for a specific situation are sometimes difficult to determine as they embroiled with anxiety, fear, and chances of survival when faced with chronic diseases like TB.

Conclusion

TB still remains a serious public health concern globally affecting HRQoL of its sufferers. Improving health information literacy of patients will lead to more informed decisions, enhanced prevention and well-being, decreased health risks, improved patient care, and improved HRQoL. Based on the findings of the study, it is concluded that health information literacy influence HRQoL of TB patients. Thus, it is recommended that management of DOT Centers and health care professionals should reinforce the need to paying more attention to health information

literacy in health educational programs as one of the interventions to improve the HRQoL. This can be achieved through a variety of methods such as using audio-visual information sources and mass media outlets.

This study had some limitations. It was limited to tuberculosis patients in DOT Centres in Lagos State, Nigeria; this may limit the generalizability of the study findings to other DOT Centres out of the State and other categories of patients. In addition, a dearth of similar studies on health information literacy of tuberculosis patients made the discussion of the findings difficult. Hence, other related studies with different population were mostly used. Notwithstanding the limitations, the study outcome draws the attention of health care providers to the need to adequately support health information literacy as a component for managing tuberculosis.

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References

1. Webber R. Communicable diseases: A global perspective. Wallingford: CABI; 2012.
2. World Health Organization [Internet]. TB incidence. c2023. Available from: <https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022/tb-disease-burden/2-1-tb-incidence>
3. Olawale G [Internet]. Nigeria: High cost, ignorance, bane of TB treatment in Nigeria. c2015. Available from: <https://allafrica.com/stories/201511240359.html>
4. Onyedika-Ugoeze N [Internet]. 11000 new TB cases identified in Lagos, Ogun, Osun, Oyo in one year. [cited 03 April 2021]. Available from: <https://guardian.ng/news/11000-new-tb-cases-identified-in-lagos-ogun-osun-oyo-in-one-year/>
5. Adeyeye OO, Ogunleye OO, Coker A, Kuyinu Y, Bamisile RT, Ekrikpo U, et al. Factors Influencing Quality of Life and Predictors of Low Quality of Life Scores in Patients on Treatment for Pulmonary Tuberculosis: A Cross Sectional Study. *J Public Health Afr*. 2014;5(2):366. doi: 10.4081/jphia.2014.366.
6. Aggarwal AN. Quality of life with tuberculosis. *J Clin Tuberc Other Mycobact Dis*. 2019;17:100121. doi: 10.1016/j.jctube.2019.100121.
7. Osahon P, Okolo U. Health-related quality of life of tuberculosis patients assessing treatment in a tertiary health facility in South East Nigeria. *Journal of Pharmaceutical and Allied Sciences*. 2017;14(4):2578-83.
8. ADEBAYO BAI. An Assessment of Health-Related Quality of Life and its Determinants, Among Adults Diagnosed with Pulmonary Tuberculosis Attending Dots Facilities in Lagos State. *PUBLIC HEALTH*. 2017.
9. Hicks G, Barragan M, Franco-Paredes C, Williams MV, del Rio C. Health literacy is a predictor of HIV/AIDS knowledge. *Fam Med*. 2006;38(10):717-23.
10. Kuyinu YA, Femi-Adebayo TT, Adebayo BI, Abdurraheem-Salami I, Odusanya OO. Health literacy: Prevalence and determinants in Lagos State, Nigeria. *PLoS One*. 2020;15(8):e0237813. doi: 10.1371/journal.pone.0237813.
11. Mibei FC. Health literacy knowledge and experience of bachelor nursing students at a university in the Western Cape. 2016.
12. Waterston T, Pakenham Walsh N. Why health information needs to be accessible to all. *BMJ Paediatr Open*. 2018;2(1):e000352. doi: 10.1136/bmjpo-2018-000352.
13. Koech B. Access to tuberculosis information and its influence on health-seeking behaviour among tuberculosis patients at one healthcare Centre in Nairobi, Kenya: Moi University; 2017.
14. Jafari M, Lamiyan M, Hajizadeh E. Relationship between Health Literacy and Special Quality of Life and Body Image in Women Undergone Mastectomy in Reproductive Age. *Health Education and Health Promotion*. 2018;6(3):109-15.
15. Xia J, Wu P, Deng Q, Yan R, Yang R, Lv B, et al. Relationship between health literacy and quality of life among cancer survivors in China: a cross-sectional study. *BMJ Open*. 2019;9(12):e028458. doi: 10.1136/bmjopen-2018-028458.
16. Zhang J, Gilmour S, Liu Y, Ota E. Effect of health literacy on quality of life among patients with chronic heart failure in China. *Qual Life Res*. 2020;29(2):453-61. doi: 10.1007/s11136-019-02332-4.
17. Couture EM, Chouinard MC, Fortin M, Hudon C. The relationship between health literacy and quality of life among frequent users of health care services: a cross-sectional study. *Health Qual Life Outcomes*. 2017;15(1):137. doi: 10.1186/s12955-017-0716-7.

18. Akomolafe M, Opeke R. Health information literacy in everyday life: A study of pregnant women's in Ekiti State, Nigeria. *Library Philosophy and Practice*. 2019;2019:3561.
19. Panahi R, Osmani F, Sahraei M, Ebrahimi S, Nehadghashti MS, Javanmardi E. Relationship of health literacy and quality of life in adults residing in Karaj, Iran. *Journal of Education and Community Health*. 2018;4(4):13-9.
20. Jovanic M, Zdravkovic M, Stanisavljevic D, Jovic Vranes A. Exploring the Importance of Health Literacy for the Quality of Life in Patients with Heart Failure. *Int J Environ Res Public Health*. 2018;15(8). doi: 10.3390/ijerph15081761.
21. Asadi-Lari M, Tamburini M, Gray D. Patients' needs, satisfaction, and health related quality of life: towards a comprehensive model. *Health Qual Life Outcomes*. 2004;2:32. doi: 10.1186/1477-7525-2-32.
22. Oladimeji O, Tsoka-Gwegweni JM, Adeyinka DA, Makola L, Mitonga KH, Udoh EE, et al. Knowledge, attitude and perception of tuberculosis management among tuberculosis-infected patients in resource constraint setting: field experience from Oyo state, South-West, Nigeria. *International Journal of Community Medicine and Public Health*. 2018;5(5):1694.
23. Ochonma OG, Nwodoh CO, Maduakolam IO, Ingwu JA, Ogbonna PN, Ani GJ, et al. Examining the Influence of Socio-Demographics Including Geographical Factors on the Knowledge and Possible Use of Tuberculosis Treatment Centre: A Cross-Sectional Study of Patients in a Developing Country. 2017;3(2):40-9.
24. Olayemi OM, Abolarinwa TS. Internet use and e-health literacy among tuberculosis patients in the Directly Observed Therapy Centre, Lagos State, Nigeria. *Information Research*. 2023;28(1):30-49.