

Health literacy levels of mothers of under 5-year-old children in two districts in Ghana

ABSTRACT

Background and Objective: Health literacy is a vital part of access and use of health interventions and well-being framework. However, there is a dearth of knowledge on health literacy levels of primary caregivers of children in Ghana. This study sought to investigate health literacy levels of mothers of children under the age of five years.

Material and Methods: A community-based cross-sectional study was conducted among 1,234 mothers who had children aged <5 years in Ejisu-Juaben and Kwabre-East, two randomly selected districts, in the Ashanti Region of Ghana from January 1 to March 30, 2021. A consecutive sampling technique was used to select the mothers to participate in the study. Data was collected using the Health Literacy Questionnaire (HLQ) and analyzed using Statistical Package for Social Sciences (SPSS) software version 20. Sample mean scores were presented in the form of a table. A paired-simple t-test was used to examine the significant levels of the differences in the mean health literacy scores of the mothers in the two districts. A multiple logistic regression analysis was then used to examine the relationships between the demographic variables of the respondents and health literacy.

Results: On a nine-point health literacy scores, mothers scored above average on scale 1-5 (mean = 2.61, ranges 2.55-2.68), while scale 5-9 had mean = 3.39 (ranges 3.33-3.44). Scales 3 and 6, 'Actively managing my health' (mean = 2.68) and 'Ability to actively engage with healthcare providers' (mean = 3.44), had the highest scores while scales 1 and 7, 'Feeling understood and supported by healthcare providers' (mean = 2.55) and 'Navigating the healthcare system' (mean = 3.33), had the lowest scores. None of the HLQ scale items had a score below average. In the multiple logistic regression analysis, three variables had significant association with the mothers' health literacy: age, educational level and speaking English at home. There was no statistically significant difference ($p>0.05$) in the mean health literacy scores between the two studied districts.

Conclusion: The mothers' health literacy levels were above average. However, the results are not an indication of an outstanding performance. Thus, the country's healthcare professionals and policy makers still need to do a lot to ensure that mothers in the country attain the level of health literacy they need to improve their health, as well as that of their children.

Paper Type: Research Article

Keywords: Health literacy, mother, primary caregiver, children under five years, Ashanti Region, Ghana

► **Citation:** Kwasi Afriyie E, Kumah E, Kokuro C, Owusu-Aduomi Botchwey Ch, Afful Boateng A, Agyei-Baffour P. Health literacy levels of mothers of under 5-year-old children in two districts in Ghana. *Journal of Health Literacy*. Winter 2023;7(4): 21-31.

Emmanuel Kwasi Afriyie

Laboratory Services Directorate, Komfo Anokye Teaching Hospital, Kumasi, Ghana

Emmanuel Kumah

* Department of Health Administration and Education, Faculty of Science Education, University of Education, Winneba, Ghana. (corresponding) : emmanuelkumah@uew.edu.gh

Collins Kokuro

Department of Medicine, School of Medicine and Dentistry, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Charles Owusu-Aduomi Botchwey

Department of Health Administration and Education, Faculty of Science Education, University of Education, Winneba, Ghana

Agartha Afful Boateng

Department of Health Administration and Education, Faculty of Science Education, University of Education, Winneba, Ghana

Peter Agyei-Baffour

Department of Health Policy, Management and Economics, School of Public Health, Kwame Nkrumah University of Science and Technology, Ghana

Received: 28 August 2022

Accepted: 12 December 2022

Doi: 10.22038/jhl.2022.67555.1348

Introduction

The concept of health literacy, introduced in 1970, has gained prominence in the field of public health and health care (1). The World Health Organization (WHO) defines health literacy as the psychological and social aptitudes which decide the inspiration and capacity of people to access, comprehend and utilize data in manners which advance and keep up good health (2). The concept has gained global attention in recent times due to the increase in evidence that health inequalities and health outcomes are linked to people's level of health literacy (3). For example, research has shown that low health literacy is associated with lower use of preventive healthcare services [4], poor adherence to medications, increased hospitalization (5) and increased mortality (4). Also, with an increase in chronic diseases, patients' involvement in healthcare or treatment processes has been identified as a critical determinant of effective disease management (6). While addressing health literacy through organizational policy and planning, clinician training, public health policy and health protection is a right step in improving clinical medicine and public health (7); the role of primary caregivers, such as mothers, cannot be over emphasized.

A mother's health literacy is an important element in her ability to engage in health promotion and prevention activities for herself and her children (8). Adequate understanding of health information helps a mother to make quick informed decisions which lead to improved health care outcomes for herself and her family. Mothers with lower levels of health literacy often lack a clearer understanding of issues on nutrition, malnutrition and other health related conditions in their children, and are therefore unable to meet the nutritional and other health needs of these children (8).

Many countries in Sub-Saharan Africa (SSA) made little progress in attaining the Millennium Development Goal 4 (MDG4), which was to reduce under-five mortality rate (U5MR) by two-thirds between 1990 and 2015 (9). Currently, Ghana is one of the SSA countries that have made progress in reducing the prevalence of infant and under-five deaths. In order to continue and sustain the progress and to attain the set target of the Sustainable Development Goal 3 (SDG 3), the country needs to invest in improving the health literacy levels of its population, especially mothers, who are considered by WHO as key supporters of young children (2).

Despite the growing importance of health literacy for maternal and child health, assessing and improving health literacy levels of mothers has received little research attention, particularly in low-and-middle-income countries. In Ghana, studies on maternal health literacy are limited. The few studies in this area have focused either on pregnant women (10) or on specific aspect of maternal health literacy (11). For instance, Lori et al. (10) examined antenatal health literacy among pregnant women in the Ashanti Region and observed that the women had low levels of health literacy. This was demonstrated by their inability to correctly interpret and operationalize health education they received during antenatal care. Saaka (11) also assessed the relationship between maternal, nutritional knowledge in childcare practices and growth of children living in impoverished rural communities in the northern part of Ghana, and concluded that an increase in maternal childcare knowledge might contribute to an improvement in children's nutritional status. Generally, not much has been done to comprehensively assess health literacy levels of mothers in Ghana, especially mothers of children under the age of five years.

As an attempt to fill the above research gap, the present study aimed at determining the level of health literacy among mothers of children under the age of five years in the Ejisu-Juaben and Kwabre-East Districts in the Ashanti Region of Ghana. Unlike the previous studies, this study considered the full multidimensional concept of health literacy. The findings have implications for the design and implementation of health literacy programs to empower mothers in the studied communities.

Materials and Methods

Study Design and setting

A community-based cross-sectional study was conducted from January 1 to March 30, 2021 to determine the level of health literacy among mothers with children under the age of five years in the two randomly selected districts, Ejisu-Juaben and Kwabre-East, out of the 45 districts in the Ashanti Region of Ghana. The Ashanti Region is the second most populated region in Ghana, with a population of 5,432,485 (12). It has a population density of 192.4 per sq. km. The Region has 43 districts and 132 sub-districts (<https://www.statsghana.gov.gh/>).

Study population and sample size determination

The study population consisted of mothers of children under the age of five years living in the studied districts. However, only mothers who were 18 years and above, without any apparent mental ill-health, had lived in the two districts for at least six months prior to the study, and were willing to participate in the study were included. Mothers were excluded if they were less than 18 years old, and had children who were five years or older.

A sample size of 1,558 was chosen for the study. This was arrived at by doubling the sample size of an earlier study (13) which is similar to the

current study. Our aim was to choose a sample size large enough to ensure generalizability of the study findings.

Study instrument

Health literacy of the mothers was assessed using the Health Literacy Questionnaire (HLQ) (14). The HLQ is one of the most widely used health literacy measures in the world. The instrument is based on WHO's definition of health literacy and incorporates the three levels of health literacy described in Nutbeam's theoretical model: functional health literacy, interactive health literacy, and critical health literacy (15). It was developed by Osborne et al. in Australia using a validity driven approach (16). The tool consists of nine scales with 44 items. Each scale measures a distinct element of health literacy construct. The scales are: 1- Feeling understood and supported by healthcare providers (4 items), 2- Having sufficient information to manage my health (4 items), 3- Actively managing my health (5 items), 4- Social support for health (5 items), 5- Appraisal of health information (5 items), 6- Ability to actively engage with healthcare providers (5 items), 7- Navigating the healthcare system (6 items), 8- Ability to find good health information (5 items), 9- Understanding health information well enough to know what to do (5 items)

The first five scales are scored on a 4-point Likert-type response (Strongly Disagree, Disagree, Agree and Strongly Agree), while scales 6-9 are scored on a 5-point response (Cannot Do, Very Difficult, Quite Difficult, Easy, and Very Easy) (17).

The HLQ has undergone validity testing in several counties and has been shown to have strong psychometric properties (18,19). In most settings, Cronbach's alpha has been greater than 0.8 for most scales (16,19). Also, composite reliability above 0.8 has been reported in various settings (19), thus demonstrating the suitability

of the tool for research and development purposes. The tool has been reproduced in many languages and cultures, including English, Danish, German, Slovakian, Serbian, Nepalese, Portuguese, Norwegian, Dutch, French, and Akan-Twi (Ghana) (16). In the current study, the Akan-Twi version of the tool was used. In addition to the HLQ were nine items on the demographic data of the respondents.

Sampling and data collection procedure

A two-stage sampling method was used in selecting the mothers to participate in the study. First, three sub-municipals were randomly selected from the Ejisu-Juaben District and one from the Kwabre-East District, since Ejisu-Juaben has more sub-municipals, as well as being more populous than Kwabre-East. Second, we used consecutive sampling to select 308 eligible mothers from each of the four randomly selected sub-municipals. Consecutive sampling method is a sampling technique in which every subject meeting the criteria of inclusion is selected until the required sample size is achieved (20). This method allowed us to conveniently select eligible participants consecutively into the study until a desired sample size was attained. The questionnaire was pilot tested in one community in the study area. Necessary modifications were made before the actual data collection.

The administration of the questionnaire was done face-to-face, using a structured interview approach in the studied communities. Thirteen research assistants were trained to assist in the data collection, which lasted approximately three months (from January 1 to March 30, 2021). Informed consent (oral) was obtained from each participant before administering the questionnaire.

Data Analysis

The collected data was entered into Epi Info 7.0 and analyzed using Statistical Package

for Social Sciences (SPSS) software version 20 (IBM® Corporation, Armonk, NY, USA). A scoring system was generated and respondents were given a score on each item answered. Items in scales 1-5 of the HLQ were scored 1, 2, 3, and 4 representing 'Strongly Disagree', 'Disagree', 'Agree' and 'Strongly Agree' respectively. Scales 6-9 items were scored 1, 2, 3, 4 and 5 representing 'Cannot Do', 'Very Difficult', 'Quite Difficult', 'Easy', and 'Very Easy' respectively. Sample mean scores for the nine scales were presented in the form of a table. A mean score above average (i.e., >2 for scales 1-5 and >2.5 for scales 6-9) indicated sufficient health literacy. A paired-simple t-test was used to examine the significant levels of the differences in the mean health literacy scores of the mothers in the two districts. Finally, a multiple logistic regression analysis was used to examine the relationships between the demographic variables of the respondents and health literacy as a dichotomized variable. Scores for items in scales 1-5 of the HLQ were recoded as follows: 1 and 2 (Strongly Disagree and Disagree) = 0, and 3 and 4 (Agree and Strongly Agree) = 1. For scales 6-9, scores 1, 2 and 3 (Cannot Do, Very Difficult and Quite Difficult) were recoded as 0, while 4 and 5 (Easy and Very Easy) were recoded as 1. The demographic variables were also dichotomized. Educational status was coded as 'Below high school' = 0 and 'High school and above' = 1; employment status as 'Unemployed' = 0 and 'Employed' = 1; and country (nationality) as 'non-Ghanaian' = 0 and 'Ghanaian' = 1. The rest of the variables with dichotomous responses were coded as 'Yes' = 1 and 'No' = 0. The regression model was fitted with health literacy as the outcome variable and the demographic variables being the explanatory variables. A p value of 0.05 was used to indicate statistical significance.

Results

Characteristics of the respondents

A total of 1,234 questionnaires were collected for analysis: 635 (51.46%) from Ejisu-Juaben District and 599 (48.54%) from Kwabre-East District. The response rate was 79.2%. The highest educational attainment of the majority of the respondents was

primary school or less (60.45%), while university postgraduate represented the lowest (0.08%). With employment status, home duties recorded the highest (16.86%) while part-time student recorded the lowest (0.08%) (Table1).

Table 1: Demographic characteristics of the study respondents (N=1,234)

Variable	Responses	Frequency	Percentage
District	Ejisu-Juaben	635	51.46
	Kwabre-East	599	48.54
Living alone	No	927	75.12
	Yes	307	24.88
Speak English at home	No	1,103	89.38
	Yes	131	10.62
Educational Status	University Postgraduate	1	0.08
	University Undergraduate	29	2.35
	High School Completed	289	23.42
	High School Not Completed	149	12.07
	Primary School or less	746	60.45
	No formal education	20	1.62
Country	Burkina Faso	3	0.24
	Ivory Coast	9	0.73
	Nigeria	1	0.08
	Togo	2	0.16
	Ghana	1,219	98.78
Employment Status	Full time Student	5	0.41
	Home Duties	208	16.86
	Others (farming, trading etc.)	285	23.1
	Part-time Student	1	0.08
	Permanently unable to Work	25	2.03
	Retirement	37	3
	Working full-time	275	22.29
	Working part-time	398	32.25
Do you have a healthcare card	Yes	1,138	92.22
	No	95	7.7
	Missing	1	0.08
Do you have Private Health Insurance	Yes	1,017	82.41
	No	217	17.59

Health literacy levels

The mean scores for each HLQ scale, inclusive of their standard deviations (SD) are presented in Table 2. The mothers scored above average (mean score = 2.61, range 2.55-2.68) on all of the HLQ scales 1-5. They scored highest on scale 3 'Actively managing my health' (mean score = 2.68) and lowest on Scale 1 'Feeling understood and supported by healthcare providers' (mean score = 2.55). Comparatively, the mothers scored higher on some of the individual items under the various scales. For instance, three items: 'I have at least one healthcare provider who knows me well', 'I feel I have good information about health recorded', and 'There are things that I do regularly to make myself healthier' under the HLQ scales 1, 2 and 3 respectively recorded mean scores above 2.8, with over 70% of the respondents

agreeing to the statements. None of the items had a score below average (i.e., below 2.0).

The mothers again scored above average (mean score = 3.39, range 3.33-3.44) on HLQ scales 6-9. The highest score recorded was scale 6 'Ability to actively engage with healthcare providers' (mean score = 3.44), while scale 7 'Navigating the healthcare system' had the lowest score (mean score = 3.33). With the individual items, three items, one under scale 8 ('Make sure that healthcare providers understand you') and two under scale 9 ('Accurately follow the instructions from healthcare providers' and 'Understand what healthcare providers are asking you to do'), scored the highest mean scores (all recording a mean score of 3.9). Again, none of the HLQ scale 6-9 items had a score below average (i.e., below 2.5).

Table 2. Health Literacy Levels of the respondents (N = 1,234)

HLQ Subscale	Range	Mean	SD
Feeling understood and supported by healthcare providers	1-4	2.55	0.68
Having sufficient information to manage my health	1-4	2.60	0.60
Actively managing my health	1-4	2.68	0.58
Social support for health	1-4	2.64	0.80
Appraisal of health information	1-4	2.56	0.64
Ability to actively engage with healthcare providers	1-5	3.44	0.88
Navigating the healthcare system	1-5	3.33	0.90
Ability to find good health information	1-5	3.43	0.86
Understanding health information well enough to know what to do	1-5	3.36	0.96

We compared the health literacy scores of the mothers in the two districts. However, we observed no statistically significant difference ($p > 0.05$) in the mean health literacy scores between the two districts (Table 3).

In the multiple logistic regression analysis, three variables had significant association with the mothers' health literacy: age, educational level and speaking English at home. We observed that respondents who were aged 25 years and above were less likely (AOR=0.42, 95% CI: 0.35-1.87), to have sufficient health

literacy compared with those below 25 years. Also, the mothers with higher levels of education were 5.6 times more likely (AOR=2.3, 95% CI: 0.95-4.87), compared to those with lower levels of education, to have sufficient health literacy. Further, respondents who indicated that they spoke English at home had higher odds of doing better (AOR=1.58, 95% CI: 1.23-2.25) on the HLQ scales, compared with those not speaking English at home. The other explanatory variables had no significant association with the mothers' health literacy scores ($p > 0.05$).

Table 3: Health literacy levels of the respondents by district

HLQ Subscale	Range	Mean		P Value
		Ejisu-Juaben (N=635)	Kwabere-East (N=599)	
Feeling understood and supported by healthcare providers	1-4	2.65	2.35	0.18
Having sufficient information to manage my health	1-4	2.67	2.33	0.26
Actively managing my health	1-4	2.48	2.78	0.38
Social support for health	1-4	2.54	2.74	0.48
Appraisal of health information	1-4	2.56	2.26	0.64
Ability to actively engage with healthcare providers	1-5	3.24	3.84	0.08
Navigating the healthcare system	1-5	3.57	3.24	0.09
Ability to find good health information	1-5	3.82	3.44	0.26
Understanding health information well enough to know what to do	1-5	3.26	3.37	0.62

Table 4: Multiple logistic regression analysis of factors associated with health literacy (N = 1,234)

Variable	COR (95%CI)	AOR (95%CI)
Age:		
Below 25 years	Ref	Ref
25 years and above	0.67 (0.18-1.99)	0.42 (0.35-1.87) *
District:		
Ejisu-Juaben	Ref	Ref
Kwabere-East	1.83 (0.6-2.01)	1.52 (0.53-1.92)
Living alone:		
No	Ref	Ref
Yes	1.84 (0.58-1.39)	1.72 (1.43-2.02)
Speak English at home:		
No	Ref	Ref
Yes	1.62 (1.34-2.33)	1.58 (1.23-2.25) *
Educational Status:		
Below high school	Ref	Ref
Above high school	6.86 (2.75-8.96)	5.62 (2.33-7.55) *
Nationality:		
non-Ghanaian	Ref	Ref
Ghanaian	1.74 (1.23-2.46)	1.53 (1.28-2.84)
Employment Status:		
Unemployed	Ref	Ref
Employed	1.09 (0.31-2.45)	1.06 (0.85-2.12)
Having a healthcare card:		
No	Ref	Ref
Yes	2.09 (1.31-3.45)	1.96 (0.85-3.12)
Having a private health insurance:		
No	Ref	Ref
Yes	3.09 (2.31-4.45)	2.96 (1.85-4.12)

*Statistically significant (p<0.05)

COR = crude odds ratio, AOR= adjusted odds ratio, CI = confidence interval

Discussion

Clients' attitude is a function of prompt, appropriate action towards treatment seeking in situation of ill health. Yet, there is a dearth of knowledge on health literacy levels among primary caregivers, such as mothers of children under five years of age, in Ghana. In this study, we assessed 1,234 mothers' health literacy levels using the HLQ. The results showed that health literacy levels of the respondents were well above average. The mothers did not score below average on all of the 44 items composing the HLQ. This performance of the mothers is contrary to the findings of two studies (10, 16) conducted in Ghana. For instance, Lori et al. observed that the study respondents struggled to interpret and apply health information even after engaging with health professionals (10). In Amoah and Phillips' study, only 34% of the respondents had sufficient health literacy, while 28.1% and 37.9% had inadequate and problematic health literacy respectively (13). However, our findings concur with studies conducted in Korea (21), the United States of America (22) and the United Kingdom (23) where the study respondents (women) were reported to have sufficient levels of health literacy.

Concerning HLQ scales 1-5, Scale 1: 'Feeling understood and supported by healthcare providers' had the lowest mean score (2.55). The majority of the participants disagreed with the various sub-questions under this scale. This indicates that mothers within the study area do not understand and are not supported by healthcare providers. This could be associated with the fact that patients might not understand what healthcare professionals tell them and might feel reluctant to further ask for an explanation due to poor relationship that might exist between healthcare professionals and patients or community members. It has

been indicated that there is most often tension between community members and healthcare professionals which at times leads to unfavorable relationship between these two groups (24). Poor attitude of healthcare providers pushes mothers away from seeking care, actively and confidently asking questions related to their health (10).

It was refreshing to know that the respondents made time, putting in efforts and setting goals for health living. This knowledge can be capitalized on in further strengthening the interactions between the community members and healthcare professionals to promote the health of the respondents in the community. On the respondents' understanding of health information, mean scores for following instructions were higher than reading, which reflects the highest educational attainment of majority of the respondents (primary school or less). This places a higher burden on the healthcare professionals to ensure that the right and full complement of information is made available to their clients.

The majority of the respondents indicated that they received social support or help from people around them (family and friends) in matters related to healthcare seeking. This shows that there is strong social support system in the study area. In other words, mothers in the study area could rely on family and friends as far as their healthcare is concerned. This could be associated with the fact that Ghanaian community thrives on communalism. The family system, both the nuclear and extended family system, works well in Ghana (25).

We observed that health literacy had a significant relationship with educational level. The mothers with higher levels of education were 5.6 times more likely to have sufficient

health literacy. This is consistent with studies conducted in Iran (26), Brazil (27) and Taiwan (21). A possible explanation for these findings could be that women with higher levels of education are more exposed to different sources of information and have better information access and comprehension skills (26), thus their ability to perform better on health literacy assessment. It is, therefore, vital for policy makers to invest in female education as a long-term strategy to improve mothers' health literacy.

Finally, we identified age as a determinant of health literacy. The mothers who were younger (below 25 years) were more likely to have sufficient health literacy compared with the older ones. This observation is in line with the literature that younger people tend to have better health literacy (28). Available evidence shows that age is related to cognitive impairment. Thus, older people find it difficult to understand or judge more complicated aspects related to health (28).

Study limitations: It is acknowledged that these findings represent the health literacy profiles of mothers of under 5-year-old children in two districts of the Ashanti Region of Ghana, and thus may have limited generalizability. To this end, large-scale studies that will have samples drawn across the country are recommended to assess health literacy levels of mothers in Ghana. It must be emphasized, however, that the studied districts are peri-urban with heterogeneous population of people from four other countries and across Ghana. Thus, our findings could be used as proxy of what pertains in Ghana.

Conclusion

Improving people's health literacy is one of the most fundamental, economic and effective ways of improving the health level of the entire population. This study concludes that mothers

of children under five years in the Ejisu-Juaben and Kwabre-East Districts in the Ashanti Region of Ghana have above average level of health literacy. Mothers are able to engage, understand and follow instructions given by health providers. However, the results are not an indication of an outstanding performance. Thus, the country's healthcare professionals and policy makers still need to do a lot to ensure that mothers in the country attain the level of health literacy they need to improve their health, as well as that of their children.

Acknowledgement: We acknowledge the 13 research assistants who assisted us in collecting data for this study

Conflicts of interest: The authors declare that there is no conflict of interest regarding the publication of this paper.

Ethical consideration: Permission was obtained from the District Health Directorate of the Ejisu-Juaben and the Kwabre-East to carry out the research. The study protocol was submitted to the Committee on Human Research and Publication Ethics (CHRPE), the institutional Review Board of the School of Medical Sciences, Kwame Nkrumah University of Science and Technology (SMS-KNUST) for review and approval.

Funding statement: No funding was obtained for this study

Authors' contributions: Emmanuel Kwasi Afriyie and Emmanuel Kumah conceptualized the study and led the project and writing. All authors contributed to the development of the coding scheme. Collins Kokuro and Charles Owusu-Aduomi Botchwey conducted the coding and analyses and drafted the methods. Agatha Afful Boateng, and Peter Agyei-Baffour reviewed the codes and results. All authors contributed to the writing and revision and approved the final version of the manuscript

References

1. Sørensen K, Nørgaard O, Maindal HT. Need for more research in patients' health literacy. *Ugesk Laeg* 2014;176(1), 40-43.
2. World Health Organization. The mandate for health literacy. Geneva: World Health Organization, 2016.
3. Beauchamp A, Buchbinder R, Dodson S, Batterham RW, Elsworth GR, McPhee C, Osborne RH. Distribution of health literacy strengths and weaknesses across socio-demographic groups: a cross-sectional survey using the Health Literacy Questionnaire (HLQ)". *BMC Public Health* 2015;15. <https://doi.org/10.1186/s12889-015-2056-z> PMID:26194350 PMCID:PMC4508810
4. Scott T, Gazmararian J, Williams M, Baker D. Health literacy and preventive health care use among Medicare enrollees in a managed care organization. *Med Care*. 2002 <https://doi.org/10.1097/00005650-200205000-00005> PMID:11961474
5. Nutbeam D. The evolving concept of health literacy. *Soc Sci Med* 2008; 67(12), 2072-2078. <https://doi.org/10.1016/j.socscimed.2008.09.050> <https://doi.org/10.1016/j.socscimed.2008.09.050> PMID:18952344
6. Ishikawa H, Yano E. Patient health literacy and participation in the health-care process. *Health Expect* 2008;11(2),113-122. <https://doi.org/10.1111/j.1369-7625.2008.00497.x> PMID:18494956 PMCID:PMC5060442
7. Maindal HT, Kayser L, Norgaard O, B A, Elsworth GR., Osborne R.H. Cultural adaptation and validation of the Health Literacy Questionnaire (HLQ): robust nine-dimension Danish language confirmatory factor model. *Springer Plus* 2016; 5:1232. <https://doi.org/10.1186/s40064-016-2887-9> PMID:27536516 PMCID:PMC4971008
8. Asgary R, Liu M, Naderi R, Grigoryan Z, Malachovsky M. Malnutrition ton prevalence and nutrition barriers in children under 5 years: A mixed methods study in Madagascar. *Int Health* 2015 ;7(6):426-32. [DOI: 10.1093/in health/ihv016] [PMID] <https://doi.org/10.1093/inthealth/ihv016> PMID:25788580
9. The Global Economy. Economic indicators for over 200 countries Secondary Economic indicators for over 200 countries, 2019. Available from: www.globaleconomy.com
10. Lori JR, Munro ML, Chuey MR. Use of a facilitated discussion model for antenatal care to improve communication. *Int J Nurs Studies* 2015;15: 00098-X.
11. Saaka, M. Relationship between mothers' nutritional knowledge in childcare practices and the growth of children living in impoverished rural communities. *J Health, Population Nutri* 2014;32(2), 237-248.
12. Ghana Statistical Service. 2021 population and housing census. Ghana Statistical Service: Accra, 2019. Accessed March 11, 2022
13. Amoah, PA, and Phillips, DR. Socio-demographic and behavioral correlates of health literacy: a gender perspective in Ghana. *Women Heal* 2020;60:123. <https://doi.org/10.1080/03630242.2019.1613471> PMID:31092133
14. Nolte S, Osborne RH, Dwinger S, Elsworth GR, Conrad ML, et al. German translation, cultural adaptation, and validation of the Health Literacy Questionnaire (HLQ). *PLoS One* 2017;12(2): 1-12. <https://doi.org/10.1371/journal.pone.0172340> PMID:28234987 PMCID:PMC5325258
15. Nutbeam D. Health promotion glossary. *Health Prom Int* 1998;13(4), 349-364 <https://doi.org/10.1093/heapro/13.4.349>
16. Osborne, R.H., Batterham, R.W., Elsworth, G.R., Hawkins, M., & Buchbinder, R. The grounded psychometric development and initial validation of the Health Literacy Questionnaire (HLQ). *BMC Public Health* 2013;13:658. <https://doi.org/10.1186/1471-2458-13-658> PMID:23855504 PMCID:PMC3718659
17. Buchbinder R, Batterham R, Elsworth G, Dionne CE, Irvin E, Osborne RH. A validity-driven approach to the understanding of the personal and societal burden of low back pain: development of a conceptual and measurement model. *Arthritis Res. Ther.* 2011, 13, R152. <https://doi.org/10.1186/ar3468> PMID:21933393 PMCID:PMC3308082
18. Debussche X, Lenclume V, Balcou-Debussche M, Alakian D, Sokolowsky C, Ballet D, Elsworth GR, Osborne RH, Huiart L. Characterisation of health literacy strengths and weaknesses among people at metabolic and cardiovascular risk: Validity testing of the Health Literacy Questionnaire. *SAGE Open Med* 2018. <https://doi.org/10.1177/2050312118801250> PMID:30319778 PMCID:PMC6154264
19. Elsworth GR, Beauchamp A, Osborne RH. Measuring health literacy in community agencies: A Bayesian study of the factor structure and measurment invariance of the health literacy questionnaire (HLQ). *BMC Health Serv Rese* 2016; 16, 508 <https://doi.org/10.1186/s12913-016-1754-2> PMID:27659559 PMCID:PMC5034518
20. Mathieson K. Making Sense of Biostatistics: Types of Nonprobability Sampling. *J Clin Res Best Prac* 2014; 10(10).
21. Lee SYD, et al. Health literacy, health status, and healthcare utilization of Taiwanese adults: results from a national survey. *BMC Public Health* 2010;10(1), 1-8. <https://doi.org/10.1186/1471-2458-10-614> PMID:20950479 PMCID:PMC2967535
22. Beier ME, Ackerman. PL. Determinants of health knowledge: an investigation of age, gender, abilities, personality, and interests. *J Pers Soc Psycho* 2003; 84 (2):439-48. <https://doi.org/10.1037/0022-3514.84.2.439>
23. von Wagner C, K Knight K, Steptoe A, Wardle J. Functional health literacy and healthpromoting behaviour in a national sample of British adults. *J Epi Community Health* 2007;61 (12):1086-90. <https://doi.org/10.1136/jech.2006.053967> PMID:18000132 PMCID:PMC2465677
24. Quansah EB. Ghana Health Service Must Be Serious with CHPS Compound Implementation. *Feature Article* 2014:12-

- 10 Available from: <https://ghanaweb.com/GhanaHomePage/features/Ghana-Health-Service-Must-Be-Serious-With-Chps-Compound-Implementation-338564>
25. Chesser AK, Keene Woods N, Smothers K, Rogers N. Health Literacy and Older Adults. *Gerontology Geriatric Med* 2016;12. <https://doi.org/10.1177/2333721416630492> PMID:28138488 PMCID:PMC5119904
26. Hakkak, H, et al. Health literacy level and related factors among pregnant women referring to bojnord health centers in 2017. *Int J Pharm Res.* 2019;11(1), 152-158 <https://doi.org/10.31838/ijpr/2019.11.01.015>
27. Phommachanh,S, et al. Maternal health literacy on mother and child health care: A community cluster survey in two southern provinces in Laos. *PLoS One* 2021; 16(3), e0244181 <https://doi.org/10.1371/journal.pone.0244181> PMID:33780460 PMCID:PMC8007003
28. Rouquette A, Nadot T, Labitrie P, Van den Broucke S, Mancini J, Rigal, L et al. Validity and Measurement Invariance across Sex, Age, and Education Level of the French Short Versions of the European Health Literacy Survey Questionnaire. *PLoS One* 2018; 13(12):e0208091. <https://doi.org/10.1371/journal.pone.0208091> PMID:30521552 PMCID:PMC6283623