Prevalence and Determinants of General Health Literacy Among Adult Patients Attending the Medicine Outpatient Department of a Tertiary Care Hospital in Eastern India

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Citation: Saha R, Jha S N, Sannigrahi S. Prevalence and Determinants of General Health Literacy Among Adult Patients Attending the Medicine Outpatient Department of a Tertiary Care Hospital in Eastern India. Indian J Comm Health. 2026;38(5):
Page Number 799-805 https://doi.org/10.47203/IJCH.2026.v38i05.010
Article Cycle: Received: 28/05/2026; **Accepted:** 05/08/2026; **Published:** 31.10.2026

Abstract

Background: Health literacy is a key determinant of healthcare engagement, treatment adherence, and health outcomes. Evidence from eastern India remains limited. This study assessed health literacy and its determinants among adults attending a tertiary-care outpatient department in eastern India. **Materials and Methods:** A hospital-based cross-sectional study was conducted among 382 adults attending a medicine outpatient department of a tertiary care centre in West Bengal, India. Participants were selected using systematic random sampling. Data were collected using a pretested questionnaire and the validated HLS19-Q12 instrument. Associations were examined using χ^2 tests and multivariable logistic regression. **Results:** Participants were predominantly male (65.4%) and rural residents (78.3%). In bivariate analyses, limited health literacy was significantly associated with rural residence, lower education, occupation, lower socioeconomic status, healthcare-seeking behaviour, healthcare utilisation frequency, and treatment preference (all $p<0.001$), while age and sex showed no significant association. After adjustment, lower educational attainment (adjusted odds ratio [aOR] 12.49, 95% CI 5.78-27.00), skilled occupational status (aOR 16.19, 95% CI 4.12-63.71), and healthcare utilisation exceeding three visits annually (aOR 8.14, 95% CI 4.24-15.61) remained independent predictors of limited health literacy (all $p<0.001$). **Conclusions:** Limited health literacy is common among adults attending a tertiary-care outpatient setting in eastern India and is strongly associated with educational disadvantage, occupational status, and frequent healthcare utilisation. Targeted health-literacy interventions may improve patient engagement and promote equitable healthcare delivery.

Keywords: Health literacy, multivariable logistic regression, lower education, systematic random sampling

Introduction

Health literacy, defined as the ability to access, understand, appraise, and apply health information for informed healthcare decisions, is increasingly recognized as a key determinant of health outcomes and health equity worldwide.[1] Beyond basic literacy, it encompasses cognitive, communicative, and social skills required to navigate healthcare systems and engage in self-care.[2] The World Health Organization identifies health literacy as essential for achieving patient-centered care and universal health coverage.[1]

Limited health literacy has been consistently associated with poor medication adherence, inadequate utilization of preventive services, suboptimal management of chronic diseases, increased hospitalization, and higher healthcare costs.[3-6] It also adversely affects patient-provider communication and shared decision-making, thereby reducing treatment effectiveness and healthcare engagement.[7] These challenges are particularly relevant in low- and middle-income countries (LMICs), where disparities in education, socioeconomic status, healthcare access, and digital information availability substantially influence individuals' ability to engage with healthcare systems.[8]

India is undergoing rapid epidemiological transition with a rising burden of non-communicable diseases that require sustained patient participation in disease prevention and long-term treatment adherence.[9] However, inequities in literacy, income, and access to credible health information continue to hinder informed healthcare decision-making. Studies from different regions of India and all over the world have reported a high prevalence of limited health literacy, especially among socioeconomically disadvantaged and less educated populations.[10-12]

Health literacy in the OPD setting is particularly actionable because it directly influences patients' understanding of prescriptions, adherence to follow-up advice, and ability to effectively self-manage their health conditions. Assessing health literacy can therefore help identify modifiable gaps and inform targeted patient education strategies. The issue is particularly important in Eastern India, where rural

populations, sociocultural diversity, and constrained healthcare resources may create additional barriers to effective health communication and healthcare navigation. Patients attending tertiary care outpatient departments often represent heterogeneous populations with varying educational and socioeconomic backgrounds.[13,14] Despite growing global attention to health literacy, evidence from Eastern India remains limited, and few studies have used standardized assessment tools. The HLS19-Q12 instrument provides a concise and internationally validated measure of general health literacy.[15] Therefore, the present study was undertaken to assess general health literacy and its associated socio-demographic and healthcare-related factors among adults attending the Medicine Outpatient Department of a tertiary care teaching hospital in Eastern India.

Materials and Methods

A hospital-based descriptive analytical study with a cross-sectional design was conducted among adults attending the Medicine Outpatient Department (OPD) of a tertiary care hospital in West Bengal, India, over a period of six months. The study population comprised patients aged ≥18 years attending the Medicine OPD during the study period. Individuals able to understand the study language and willing to provide written informed consent were included. Critically ill patients, individuals with cognitive impairment affecting communication, and healthcare professionals were excluded to minimize response and professional knowledge bias.

The sample size was estimated using the standard formula for single population proportion:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

where n represents the required sample size, Z the standard normal deviate at 95% confidence level (1.96), P the prevalence of limited health literacy, and d the absolute precision. Based on a previous Indian study conducted among adults attending a tertiary care hospital in Bangalore, the prevalence of limited health literacy was considered to be 65.5%.[10] Assuming a 5% margin of error and 95% confidence interval, the minimum calculated sample size was 347. After adding a 10% non-response rate, the final sample size was estimated to be 382 participants.

Participants were selected using systematic random sampling. Data collection was conducted on three alternate days per week over 12 weeks, resulting in 36 data collection days. To reduce day-specific selection bias, data collection days were rotated in consecutive weeks. Approximately 10-11 participants were recruited daily. On each data collection day, all eligible patients present in the OPD queue at 10:00 AM were enlisted to form the sampling frame. The sampling interval (k) was calculated using the formula:

$$k = \frac{N}{n}$$

where N denotes the total number of eligible patients in the sampling frame and n the required number of participants for that day. The first participant was selected randomly from the first k individuals using a lottery method, and subsequently every kth eligible patient was enrolled until the required sample size was achieved. In case of refusal or ineligibility, the next eligible participant was included.

Data were collected using a predesigned, pretested, semi-structured interviewer-administered questionnaire comprising socio-demographic characteristics, healthcare-related variables, and the HLS19-Q12 instrument for assessment of general health literacy. Variables included age, sex, residence, educational status, occupation, family size, monthly family income, socioeconomic status according to the modified BG Prasad scale, healthcare-seeking behavior, frequency of healthcare utilization, preferred method of treatment, presence of chronic illness within the family, and health insurance coverage. The HLS19-Q12 instrument, developed under the WHO Action Network on Measuring Population and Organizational Health Literacy (M-POHL), is a validated short-form tool for measuring general health literacy across multiple domains.[15] Necessary permissions for its use were obtained from the concerned authority. If required, translation and back-translation procedures were undertaken to ensure linguistic validity and semantic equivalence. The questionnaire was pilot-tested among participants outside the study sample to assess clarity, comprehensibility, and operational feasibility. The HLS19-Q12 score is calculated as the percentage of items answered as "easy" or "very easy" among all valid responses, provided that at least 80% of the items have valid responses; otherwise, the score is considered missing. Scores range from 0-100, with higher scores indicating better general health literacy. Based on predefined cut-off values, health literacy was categorized as excellent, sufficient, problematic, or inadequate. "Excellent" and "sufficient" levels indicated predominantly "easy/very easy" responses, whereas "inadequate" health literacy reflected predominantly "difficult/very difficult" responses.

Eligible participants were approached in the OPD waiting area, and the purpose and procedures of the study were explained in detail. Written informed consent was then obtained. Face-to-face interviews were subsequently conducted in a private setting using the interviewer-administered questionnaire, with each interview lasting approximately 15-20 minutes. Investigators involved in data collection received prior training regarding study objectives, ethical considerations, interview techniques, and administration of the HLS19-Q12 instrument to ensure uniformity and minimize interviewer bias.

The primary outcome measure was the level of general health literacy categorized as inadequate, problematic, or adequate according to the HLS19-Q12 scoring criteria.[15] Secondary outcomes included associations between health literacy and

socio-demographic characteristics as well as healthcare-seeking behavior profiles.

Collected data were checked daily for completeness and consistency before entry into Microsoft Excel spreadsheets. Statistical analysis was performed using IBM SPSS Statistics version 16. Continuous variables were summarized using mean with standard deviation or median with interquartile range, as appropriate, while categorical variables were expressed as frequencies and percentages. Chi-square test or Fisher's exact test was applied to assess associations between health literacy categories and independent variables. Variables found significant in bivariate analysis were subsequently entered into a multivariable logistic regression model to identify independent predictors of limited health literacy after adjustment for potential confounders. Complete or quasi-complete separation was assessed during logistic regression modelling. Separation was evaluated by examining the model convergence, the estimated regression coefficients and standard errors, and the presence of extremely large or unstable odds ratios and confidence intervals. No evidence of complete or quasi-complete separation was identified in the final logistic regression models; therefore, standard maximum-likelihood logistic regression was retained for the analysis. Adjusted odds ratios with 95% confidence intervals were reported, and a p-value <0.05 was considered statistically significant.

Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants before enrollment. Participation was voluntary, and confidentiality and anonymity were strictly maintained throughout the study. No personal identifiers were recorded, and all collected information was used solely for research purposes.

Results

Among the 382 participants, 50.3% were aged 41-60 years, 31.7% were aged 18-40 years, and 18.1% were aged >60 years. Most participants were male (65.4%) and resided in rural areas (78.3%).

Regarding education, 31.7% were illiterate/just literate, 27.0% had secondary or higher secondary education, 20.9% had primary or middle school education, and 20.4% were graduates or above. Unskilled workers constituted the largest occupational group (30.1%), followed by homemakers (26.7%), service holders (14.4%), skilled workers (11.5%), businesspersons (8.9%), and students (8.4%).

Socioeconomically, 32.5% belonged to SES Class IV, 27.0% to Class V, 20.7% to Class I & II, and 19.9% to Class III. Government healthcare facilities were the predominant source of care (79.6%), whereas 12.3% preferred private healthcare and 8.1% consulted quacks. Nearly half of the participants (44.8%) reported seeking healthcare 4-6 times annually, while 28.8% reported 1-3 visits and 26.4% reported >6 visits per year.

Most participants preferred allopathic treatment (87.2%). Chronic illness within the family was reported by 39.0% of participants, and 30.6% had health insurance coverage.

Bivariate analysis (Chi-square test) showed no significant association of health literacy with age (p=0.944) or sex (p=0.176). However, inadequate/problematic health literacy was significantly more common among rural participants than urban participants (67.6% vs 42.2%; χ^2=17.8, p<0.001).

Educational status was strongly associated with health literacy (χ^2=86.0, p<0.001), with inadequate/problematic health literacy predominating among participants educated up to higher secondary level (72.5%-75.7%), whereas graduates or above more commonly demonstrated sufficient/excellent health literacy (83.3%). Occupation also showed a significant association (χ^2=73.9, p<0.001); inadequate/problematic health literacy was highest among skilled workers (90.9%), while service holders predominantly exhibited sufficient/excellent health literacy (85.5%).

Participants from lower socioeconomic classes (III-V) had a higher prevalence of inadequate/problematic health literacy (66.1%-69.7%) than those from SES Class I-II (χ^2=19.9, p<0.001). Similarly, healthcare-seeking behaviour was significantly associated with health literacy (χ^2=51.2, p<0.001), with poorer health literacy observed among those utilising government facilities (66.4%) and quacks (87.1%), whereas private healthcare users predominantly had sufficient/excellent health literacy (83.0%).

Higher frequency of healthcare utilisation within the family was associated with poorer health literacy (χ^2=24.5, p<0.001). Preference for alternative systems of medicine was also significantly associated with inadequate/problematic health literacy (100%; Fisher's exact p<0.001). No significant associations were observed for chronic illness within the family (p=0.164) or health insurance status (p=0.054). [Table 1]

Table 1: Bivariate analysis showing the association between socio-demographic and clinical profile of the study participants and General Health Literacy status. N= 382

Variables	Sub-variables	Inadequate/ Problematic	Sufficient/ Excellent	Test of Significance
Age in years	18 - 40	75 (62)	46 (38)	X^2=0.115, df=2, p=0.944
	41 – 60	118 (61.5)	74 (38.5)	
	> 60	25 (36.2)	44 (63.8)	
Gender	Male	149 (59.6)	101 (40.4)	X^2=1.83, df=1, p=0.176
	Female	88 (66.7)	44 (33.3)	
Residence	Rural	202 (67.6)	97 (32.4)	X^2=17.8, df=1, p <0.001*
	Urban	35 (42.2)	48 (57.8)	
Education	Illiterate/ Just literate	88 (72.7)	33 (27.3)	X^2=86.0, df=3, p
	Primary or Middle	58 (72.5)	22 (27.5)	

	school			<0.001*
	Secondary or Higher Secondary	78 (75.7)	25 (24.3)	
	Graduate or above	13 (16.7)	65 (83.3)	
Education	Business	22 (64.7)	12 (35.3)	X^2=73.9, df=5, p <0.001*
	Students	23 (71.9)	9 (28.1)	
	Skilled Workers	40 (90.9)	4 (9.1)	
	Unskilled workers	82 (71.3)	33 (28.7)	
	Service	8 (14.5)	47 (85.5)	
	Homemaker	62 (60.8)	40 (39.2)	
Socio-economic Status	SES Class I & II	32 (40.5)	47 (59.5)	X^2=19.9, df=3, p <0.001*
	SES Class III	53 (69.7)	23 (30.3)	
	SES Class IV	82 (66.1)	42 (33.9)	
	SES Class V	70 (68)	33 (32)	
Health care seeking Behaviour	Government	202 (66.4)	102 (33.6)	X^2=51.2, df=2, p <0.001*
	Private	8 (17)	39 (83)	
	Quack	27 (87.1)	4 (12.9)	
Frequency of need for health care seeking per year within the family	01-Mar	47 (42.7)	63 (57.3)	X^2=24.5, df=2, p <0.001*
	01-Jun	120 (70.2)	51 (29.8)	
	>6	70 (69.3)	31 (30.7)	
Preferred method of treatment predominantly	Allopathy	188 (56.5)	145 (43.5)	Fisher exact test p <0.001*
	Others (Homeopathy / Ayurveda)	49 (100)	0 (0)	
Chronic illness within the family	Yes	86 (57.7)	63 (42.3)	X^2=1.94, df=1, p = 0.164
	No	151 (64.8)	82 (35.2)	
Health Insurance	Yes	81 (69.2)	36 (30.8)	X^2= 3.70, df=1, p = 0.054
	No	156 (58.9)	109 (41.1)	

(*) indicating p < 0.05 or statistically significant, # percentages represent row percentages

Multivariable binary logistic regression was performed to identify independent predictors of inadequate/problematic health literacy. Variables significant in bivariate analysis were dichotomised prior to modelling: rural residence, lower educational attainment (up to higher secondary), skilled occupation categories, lower socioeconomic status (SES III-V), healthcare-seeking from quacks, healthcare utilisation >3 times annually, and preference for alternative systems of medicine were coded as "1", while their respective reference categories were coded as "0". The model estimated the odds of inadequate/problematic health literacy. [Table 2]

Table 2: Coding for Multivariate Binary Logistic Regression

Variables	1	0
General Health Literacy	Inadequate/ Problematic Literacy	Sufficient/ Excellent
Residence	Rural	Urban
Education	Illiterate/ Just literte, Primary or Middle school Secondary or Higher Secondary	Graduate or above
Socio-economic Status	SES Class III, IV & V	SES Class I & II
Health care seeking Behaviour	Quack	Qualified doctors (Government & Private)
Frequency of need for health care seeking per year within the family	>3	>3
Preferred method of treatment predominantly	Others (Homeopathy/ Ayurveda)	Allopathy

The regression model demonstrated acceptable fit (deviance=320; AIC=336) with good explanatory power (McFadden R^2=0.368; Cox-Snell R^2=0.387; Nagelkerke R^2=0.526). No evidence of multicollinearity was observed (all VIFs <1.5). Using a cut-off probability of 0.5, the model correctly classified 85.7% of participants with inadequate/problematic health literacy and 74.5% with sufficient/excellent health literacy.

After adjustment, lower educational attainment emerged as a strong independent predictor of inadequate/problematic health literacy (adjusted OR 12.49, 95% CI 5.78-27.00; p<0.001). Similarly, participants belonging to skilled occupational categories had significantly higher odds of inadequate/problematic health literacy compared with the reference occupational group (aOR 16.19, 95% CI 4.12-63.71; p<0.001). Participants reporting healthcare utilisation >3 times annually also had higher odds of inadequate/problematic health literacy (aOR 8.14, 95% CI 4.24-15.61; p<0.001). [Table 3]

Table 3: Binary Logistic Regression Analysis for Predictors of Health Literacy. N= 382

Predictor (Comparison)	Estimate	SE	Z value	p value	AOR (95% CI)
Residence (Rural vs Urban [Ref])	0.2963	0.361	0.82	0.411	1.35 (0.66–2.73)
Education (Illiterate/ Just literate /Primary–Higher	2.5251	0.393	6.42	<0.001	12.49

Secondary vs Graduate or above [Ref])					(5.78–27.00)
Occupation (Skilled workers vs Unskilled/Homemaker [Ref])*	2.7845	0.699	3.98	<0.001	16.19 (4.11–63.71)
Socio-economic status (Class III–V vs Class I–II [Ref])	0.2541	0.41	0.62	0.536	1.29 (0.57–2.88)
Health-care seeking behaviour (Quack vs Qualified doctors [Ref])	-0.0809	0.607	-0.13	0.894	0.92 (0.28–3.03)
Frequency of healthcare need/year (>3 vs ≤3 [Ref])	2.0967	0.332	6.31	<0.001	8.14 (4.24–15.61)

*1 = {Inadequate Literacy} & 0 = {Sufficient Literacy}

In contrast, residence, socioeconomic status, and healthcare-seeking behaviour were not independently associated with health literacy after adjustment. Although preference for alternative systems of medicine showed a significant association in bivariate analysis, it did not retain significance in the adjusted model, likely due to sparse data and quasi-complete separation.

Discussion

This study demonstrates a substantial burden of limited health literacy, with nearly two-thirds of participants exhibiting inadequate or problematic health literacy. Comparable prevalence estimates have been reported from Southern Italy (61.6%), Lebanon (65.8%), and among adult outpatient attendees in Bangalore (65.5%).[10-12] The consistency of these findings across diverse sociocultural settings suggests that limited health literacy remains a pervasive public health challenge. In low- and middle-income countries, this burden is likely compounded by educational disadvantage, restricted access to comprehensible health information, socioeconomic inequities, and dependence on resource-constrained public healthcare systems.[10-12]

Age and sex were not significantly associated with health literacy in the present study. Similar observations were reported in Southern Italy, where health literacy levels did not differ significantly across age groups.[11] In contrast, studies from Delhi and Bangalore identified age and gender as important determinants of health literacy.[10-16] Such inconsistencies may reflect contextual differences in educational attainment, sociocultural norms, health-system characteristics, and access to health information across study populations.

Rural residence was associated with poorer health literacy in unadjusted analyses, with rural participants significantly more likely to exhibit inadequate or problematic health literacy than their urban counterparts. This finding is plausible given the structural barriers often encountered in rural settings, including limited educational opportunities, reduced availability of healthcare services, lower exposure to health promotion initiatives, and restricted access to reliable health information. The digital divide, particularly in relation to internet-based and social media health resources, may further exacerbate disparities in health literacy between rural and urban populations.

Educational attainment emerged as one of the strongest determinants of health literacy. Both bivariate and multivariable analyses demonstrated a robust association between lower educational status and inadequate/problematic health literacy. Participants educated up to higher secondary level had markedly greater odds of poor health literacy compared with graduates and above. Similar findings have been reported from Lebanon,[12] while studies from Delhi and Bangalore also identified education as a key determinant of health literacy.[10-16] Education enhances reading comprehension, communication skills, critical appraisal of information, and confidence in navigating healthcare systems. Consequently, individuals with higher educational attainment are better equipped to understand prescriptions, interpret health information accurately, engage with healthcare providers, and participate in informed decision-making.

Occupation was another independent predictor of health literacy. Skilled and unskilled workers were significantly more likely to have inadequate/problematic health literacy, whereas service holders demonstrated substantially higher levels of sufficient or excellent health literacy. These occupational differences may reflect broader disparities in educational opportunities, economic security, workplace exposure to health information, and interaction with formal healthcare systems. Occupations involving greater engagement with written communication, digital technologies, and institutional environments may facilitate the acquisition and application of health-related knowledge, thereby contributing to higher health literacy.

Lower socioeconomic status was associated with

inadequate/problematic health literacy in unadjusted analyses; however, this association did not persist after adjustment for potential confounders. Similar observations have been reported in Lebanon,[12] where socioeconomic disadvantage was linked to poorer health literacy. Individuals from lower socioeconomic strata often face barriers to healthcare access, educational opportunities, preventive services, and reliable health information. Nevertheless, the attenuation of this association in the adjusted model suggests that the influence of socioeconomic status may operate largely through educational attainment and occupational position. Previous evidence supports this interpretation. Rao AP et al. demonstrated the close relationship between general literacy and health literacy,[17] while Cuthino et al. reported higher health literacy among individuals from health science backgrounds.[18] Similarly, Jayarajan et al. observed particularly low health literacy among those with lower educational attainment.[19]

Healthcare-seeking behaviour was significantly associated with health literacy in bivariate analyses. Poor health literacy was more common among individuals seeking care from government facilities or unqualified practitioners, whereas users of private healthcare services were more likely to demonstrate sufficient or excellent health literacy. Individuals with limited health literacy may have difficulty identifying trustworthy health information, evaluating treatment options, and navigating healthcare systems, which may increase reliance on inappropriate or informal sources of care. However, these associations lost significance after adjustment, suggesting that underlying educational and socioeconomic factors may largely shape healthcare-seeking patterns. Likewise, although participants preferring alternative systems of medicine exhibited poorer health literacy in unadjusted analyses, this relationship did not remain significant in the multivariable model.

A notable finding was the independent association between frequent healthcare utilisation and inadequate/problematic health literacy. Participants reporting healthcare utilisation exceeding three visits annually had significantly higher odds of poor health literacy, even after adjustment. This observation is consistent with findings from Lebanon,[12] where limited health literacy was associated with greater healthcare utilisation, including increased emergency department visits and hospital admissions. Poor health literacy may impair disease understanding, treatment adherence, self-management capacity, and timely healthcare-seeking, thereby contributing to greater healthcare utilisation. Similar associations have also been reported in a Catalan study,[20] which demonstrated a significant relationship between limited health literacy and increased healthcare visits.

Neither chronic illness within the family nor health insurance status was significantly associated with health literacy. The absence of an association between chronic illness and health literacy is consistent with findings from Southern Italy,[11] where no significant differences were observed between individuals with and without chronic disease. The presence of chronic illness alone may be insufficient to improve health literacy unless accompanied by effective counselling, repeated health education, and clear communication from healthcare professionals. This finding underscores that exposure to healthcare services does not necessarily translate into improved health literacy without targeted educational support.

The study has several limitations. First, its cross-sectional design precludes establishing temporal or causal relationships between health literacy and the factors studied. Second, the single-center, hospital-based sample may limit the generalizability of the findings to community-level and other healthcare settings. Third, the use of self-reported health literacy data may be subject to social desirability and reporting biases.

Conclusion

Health literacy was inadequate or problematic among a substantial proportion of participants, particularly those with lower educational attainment, skilled/unskilled occupations, and higher healthcare utilisation. Although rural residence, socioeconomic disadvantage, and healthcare-seeking patterns were associated with poorer health literacy in unadjusted analyses, these relationships were attenuated after adjustment, highlighting the dominant influence of educational and occupational factors. The findings suggest that health literacy reflects broader social determinants of health and remains a critical barrier to effective healthcare engagement. Context-specific, literacy-sensitive public health strategies targeting vulnerable populations are urgently needed to promote informed decision-making, equitable healthcare access, and improved health outcomes.

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