

Health Information Literacy and Its Impact on Reducing Patient Anxiety in Tertiary Care Settings: A Cross-Sectional Study

**Nourah M. Alorainy¹, Faisal E. Aljwuaied², Ali A. Alshehri³,
Aateka H. Alaali⁴, Wafa I. Alotaibi⁵**

Health Affairs at the Ministry of National Guard

Introduction

Health literacy, which refers to the ability to obtain, process, and understand basic health information and services, is a vital determinant of effective healthcare engagement (Nutbeam, 2000). Low health literacy has been consistently linked to poor health outcomes, including difficulty managing chronic conditions, higher rates of hospital readmissions, and greater healthcare costs (Berkman et al., 2011). In tertiary care settings, where medical information is often dense and complex, patients with limited health literacy are at an increased risk of experiencing heightened anxiety and stress (Rudd, 2010).

Anxiety stemming from low health literacy can exacerbate the psychological burden of illness, further complicating treatment adherence and healthcare utilization (Schillinger et al., 2002). Conversely, interventions to enhance health literacy have demonstrated significant potential in reducing anxiety and improving patient outcomes. For example, simplified communication strategies, teach-back methods, and tailored educational materials have shown to improve patients' understanding of their care plans, leading to increased confidence and reduced stress (Sudore & Schillinger, 2009).

Given the unique challenges posed by tertiary care settings, understanding the relationship between health literacy and patient anxiety is critical for developing targeted interventions that improve patient education and support. This study seeks to examine how health literacy impacts anxiety levels in patients receiving care in a tertiary hospital, with the aim of identifying actionable strategies to improve patient outcomes and satisfaction.

Literature Review

Health literacy has emerged as a critical determinant of health outcomes, with a growing body of research exploring its impact on patient well-being, particularly in complex healthcare environments such as tertiary care. The relationship between health literacy and anxiety is multifaceted, with evidence suggesting that inadequate health literacy exacerbates stress and limits patients' ability to effectively engage with their care plans (Nutbeam, 2000; Berkman et al., 2011).

Health Literacy and Healthcare Outcomes

Studies have consistently linked low health literacy to poor healthcare outcomes, including higher rates of hospital readmissions, increased emergency department visits, and worse chronic disease management (Schillinger et al., 2002). In tertiary care settings, where patients are often faced with complex and technical medical information, these challenges are amplified. Rudd (2010) highlighted that patients with limited health literacy often struggle to navigate the intricacies of tertiary care, leading to heightened psychological distress.

Health Literacy and Anxiety

The psychological implications of low health literacy are well-documented. Patients who struggle to understand their health conditions or the rationale behind their treatment plans frequently report increased levels of anxiety and depression (Berkman et al., 2011). This stress not only impacts their mental well-being but also interferes with their ability to adhere to treatment regimens. Sheridan et al. (2011) emphasized that health literacy interventions targeting patient understanding can significantly reduce anxiety levels, empowering patients to take an active role in their healthcare.

Interventions to Improve Health Literacy

Numerous interventions have been developed to address health literacy deficits, ranging from simplified communication strategies to comprehensive educational programs. Sudore and Schillinger (2009) found that teach-back methods, in which healthcare providers ensure patient understanding through dialogue, were particularly effective in reducing anxiety and improving adherence to treatment. Other studies have demonstrated the efficacy of visual aids and culturally tailored educational materials in improving comprehension among patients with diverse backgrounds (Nutbeam, 2000; Sheridan et al., 2011).

Tertiary Care as a Unique Context

Tertiary hospitals present a unique context for exploring health literacy. These settings are often associated with high patient acuity, advanced medical technologies, and multidisciplinary care teams, all of which can contribute to increased patient anxiety (Rudd, 2010). Despite these challenges, relatively few studies have examined the specific relationship between health literacy and anxiety in tertiary care. Addressing this gap is critical for developing targeted interventions that enhance patient education and support systems in these environments.

Research Gaps

While the link between health literacy and health outcomes is well-established, the specific impact of health literacy on patient anxiety in tertiary care remains underexplored. Existing studies have predominantly focused on primary care or chronic disease management, leaving a gap in understanding how health literacy interventions can be tailored to the complexities of tertiary care. Further research is needed to identify effective strategies for reducing anxiety and improving patient outcomes in this context.

Methodology

Study Design

This study employed a cross-sectional design to investigate the relationship between health literacy and anxiety among patients in a tertiary hospital setting. The study was conducted over six months at a tertiary hospital offering specialized medical care.

Study Population

The study population consisted of adult patients (aged 18 and above) receiving care in various departments, including internal medicine, oncology, and surgery. Inclusion criteria were as follows:

- Patients who provided informed consent.
- Patients capable of reading and understanding the local language.
- Patients who had access to their medical information via electronic health records (EHRs).

Exclusion criteria included patients with cognitive impairments, severe mental health conditions interfering with comprehension, or those in critical care units where participation was not feasible.

Sample Size and Sampling Technique

A total of 300 patients were recruited using convenience sampling. Recruitment occurred at outpatient clinics and inpatient wards, ensuring a diverse representation of patient demographics and medical conditions.

Data Collection Instruments

1. Health Literacy Assessment

Health literacy was assessed using the Short Test of Functional Health Literacy in Adults (S-TOFHLA), a validated instrument that measures patients' ability to read and understand health-related materials. Scores ranged from inadequate (0–16) to adequate (23–36).

2. Anxiety Assessment

Anxiety levels were measured using the Generalized Anxiety Disorder-7 (GAD-7) scale, a validated tool for assessing anxiety severity. Scores were categorized as minimal (0–4), mild (5–9), moderate (10–14), and severe (15–21).

3. Patient Demographics and Clinical Characteristics

A structured questionnaire collected information on patients' age, gender, educational level, income, and medical diagnosis. Data on length of hospital stay and department of care were also recorded.

Data Collection Procedure

Data collection was conducted by trained research assistants who approached patients in outpatient

waiting areas and inpatient wards. After obtaining informed consent, participants completed the S-TOFHLA and GAD-7 assessments under the guidance of the research team. The structured questionnaire was administered during the same session.

Ethical Considerations

The study was approved by the institutional ethics committee. All participants provided written informed consent, and confidentiality was maintained by anonymizing data during analysis. Participants were informed of their right to withdraw at any stage of the study.

Data Analysis

Quantitative data were analyzed using SPSS. Descriptive statistics summarized demographic and clinical characteristics. Pearson's correlation analysis assessed the relationship between health literacy and anxiety levels. Multivariate linear regression was conducted to adjust for potential confounders such as age, gender, and education level.

Results Dissemination

Findings were presented at hospital staff meetings and disseminated through a peer-reviewed journal to inform healthcare providers about the significance of health literacy in managing patient anxiety.

Findings

Participant Characteristics

A total of 300 participants were included in the study. The mean age of participants was 46.2 years (SD = 12.8), with 58% identifying as female. Most participants (68%) had completed secondary education, and 45% reported a monthly income below the national average. Table 1 summarizes the demographic characteristics of the participants.

Table 1. Demographic and Clinical Characteristics of Participants

Characteristic	Frequency (n = 300)	Percentage (%)
Age (years)		
18–30	65	21.7
31–50	140	46.7
>50	95	31.6
Gender		
Male	126	42.0
Female	174	58.0
Education Level		

Characteristic	Frequency (n = 300)	Percentage (%)
Primary	34	11.3
Secondary	204	68.0
Tertiary	62	20.7
Income Level		
Below National Average	135	45.0
Above National Average	165	55.0

Health Literacy Levels

Health literacy scores, as measured by the S-TOFHLA, revealed that 32% of participants had inadequate health literacy, while 21% had marginal health literacy, and 47% had adequate health literacy. Table 2 displays the distribution of health literacy levels.

Table 2. Health Literacy Levels (S-TOFHLA Scores)

Health Literacy Level	Frequency (n = 300)	Percentage (%)
Inadequate (0–16)	96	32.0
Marginal (17–22)	63	21.0
Adequate (23–36)	141	47.0

Anxiety Levels

GAD-7 scores indicated that 42% of participants experienced mild anxiety, 26% had moderate anxiety, and 12% had severe anxiety. Table 3 shows the distribution of anxiety levels among participants.

Table 3. Anxiety Levels (GAD-7 Scores)

Anxiety Level	Frequency (n = 300)	Percentage (%)
Minimal (0–4)	60	20.0
Mild (5–9)	126	42.0
Moderate (10–14)	78	26.0
Severe (15–21)	36	12.0

Correlation Between Health Literacy and Anxiety

Pearson’s correlation analysis revealed a significant negative correlation between health literacy and anxiety levels ($r = -0.42$, $p < 0.001$), indicating that higher health literacy was associated with lower anxiety. Figure 1 illustrates the correlation between health literacy and anxiety scores.

Multivariate Regression Analysis

Multivariate regression analysis adjusted for age, gender, and education level. Health literacy remained a significant predictor of anxiety ($\beta = -0.37$, $p < 0.001$). Lower health literacy was associated with higher anxiety levels after controlling for confounders. Table 4 summarizes the results of the regression analysis.

Table 4. Multivariate Regression Analysis: Predictors of Anxiety

Predictor	β Coefficient	Standard Error	p-Value
Age	-0.08	0.05	0.098
Gender (Female)	0.12	0.08	0.152
Education Level	-0.24	0.07	0.003**
Health Literacy	-0.37	0.05	<0.001**

Significance level: $p < 0.05$

References

1. Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine*, 155(2), 97–107. <https://doi.org/10.7326/0003-4819-155-2-201107190-00005>
2. Nutbeam, D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3), 259–267. <https://doi.org/10.1093/heapro/15.3.259>
3. Rudd, R. E. (2010). Improving Americans' health literacy. *New England Journal of Medicine*, 363(24), 2283–2285. <https://doi.org/10.1056/NEJMp1008755>
4. Schillinger, D., Grumbach, K., Piette, J., Wang, F., Osmond, D., Daher, C., Palacios, J., Sullivan, G. D., & Bindman, A. B. (2002). Association of health literacy with diabetes outcomes. *JAMA*, 288(4), 475–482. <https://doi.org/10.1001/jama.288.4.475>
5. Sheridan, S. L., Halpern, D. J., Viera, A. J., Berkman, N. D., Donahue, K. E., & Crotty, K. (2011). Interventions for individuals with low health literacy: A systematic review. *Journal of Health Communication*, 16(sup3), 30–54. <https://doi.org/10.1080/10810730.2011.604391>
6. Sudore, R. L., & Schillinger, D. (2009). Interventions to improve care for patients with limited health literacy. *Journal of Clinical Outcomes Management*, 16(1), 20–29.