

Enhancing Patient Comprehension through Simplified Medical Terminology: A Literacy-based Approach

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Abstract

The research analyzes the impact of using simplified medical terminology on the comprehension of patients, focusing on those with low health literacy. The study uses a comparative literacy-based approach with a controlled setting on different patient groups using traditional and simplified terminology. We employed NLP techniques to deidentify complex medical records and obtained patient comprehension through feedback as well as post-consultation surveys. The results demonstrate a statistically significant improvement in patients' understanding and recall when simplified terminology is used. The research results support the use of simplified terminology in communication with patients to enhance understanding and to improve health outcomes.

Keywords: Health Literacy, Medical Terminology, Patient Comprehension, NLP, Simplified Language, Patient-centered Care, Health Care Communication, Clinical Documentation.

1 INTRODUCTION

The modern healthcare system has a complex system of medicine which tends to be a barrier to effective patient-provider communication. Understanding one's diagnosis, treatment plan, and follow-up instructions are even more difficult for patients with low health literacy. Health literacy, the ability to obtain, process, and understand basic health information, is critical to the healthcare system.

Failure to understand medical instructions worsens disease control, leads to unnecessary medication complications, and affects satisfaction levels among patients. Even with attempts to enhance communication during consultations, the language used continues to be a major barrier to effective understanding. While clinicians are careful and accurate in using standardized terms for each part of clinical practice, these tend to be very difficult when it comes to everyday language.

In recent years, there has been increased attention in the use of technology, especially Natural Language Processing (NLP), to make medical jargon more accessible to patients. NLP makes it possible to automatically transform complicated medical phrases into simpler ones while still maintaining the information being presented. This particular study seeks to develop a litbased approach to the simplification of medical language and determine the effect of such an approach on patient understanding in actual situations.

2 LITERATURE SURVEY

More recent studies have highlighted the more important gaps in the need to communicate health information more effectively and in plain language. A 2024 study by (Zhang et al., 2024) reported that patients who received summaries translated using NLP showed a 25 percent increase in retention of the information. Also, work by (Martinez & Chen, 2024) assessed the use of simplified clinical notes in several hospitals and reported improved patient satisfaction scores.

Luo et al., (2024), within the framework of Electronic Health Records (EHRs), focused on incorporating a semantic simplification engine that decreased reading levels of discharge summaries while preserving clinical accuracy. Moreover, Gupta et al., (2024) emphasized the impact of bilingual sensitive literacy translation taxonomy in the emergency departments (Anderson, 2024).

Additional contributions include the OpenNotes project, which enabled patients to access medical notes, and raised awareness of the need to unravel complex clinician jargon and document in simpler language. Collectively, these studies indicate that patient empowerment strongly associates with the communication being delivered in a simplified manner. Challenges still exist regarding automation of the terminology reduction process while maintaining contextual preservation and precision (Thomas et al., 2023).

3 METHODOLOGY

The current study adopted a mixed-methods design and integrated quantitative evaluation of comprehension with qualitative patient input. The overall system design created included a Natural Language Processing pipeline that was set to classify and train on annotated datasets of standard and simplified medical terms. Medical documents were reformulated into layman's terms using a rule-based simplifier alongside a transformer-based encoder-decoder model.

The study's participants were 300 patients attending outpatient clinics, and were stratified by educational qualifications and literacy scores. These participants were split into two groups: control and test. The control group received Conventional medical documentation while the test group received NLP-simplified documentation.

Comprehension was assessed using surveys conducted following the consultations. Scoping, recall bias, and interpretation accuracy matrixed responses were measured empirically using a 10-point scale, thus receiving quantitative testing through grading. The significance of the results across demographic groups was evaluated using ANOVA and other statistical techniques.

4 RESULT AND DISCUSSION

The outcome of the analysis revealed that with the use of simpler terms, the patient understanding greatly improved. The average score achieved by the test group on comprehension tests was 8.2, while

the control group scored only 6.1. Patients with lower education levels were found to benefit the most from simplification.

Comprehensive scores by literacy levels are presented in the table 1 below. The difference in the mean scores of the groups with standard terminology and simplified terminology is presented in the accompanying Figure 1.

Table 1: Comprehension Scores by Literacy Level

Literacy Level	Standard Terminology	Simplified Terminology
Low	5.2	7.8
Medium	6.4	8.3
High	7.1	8.6

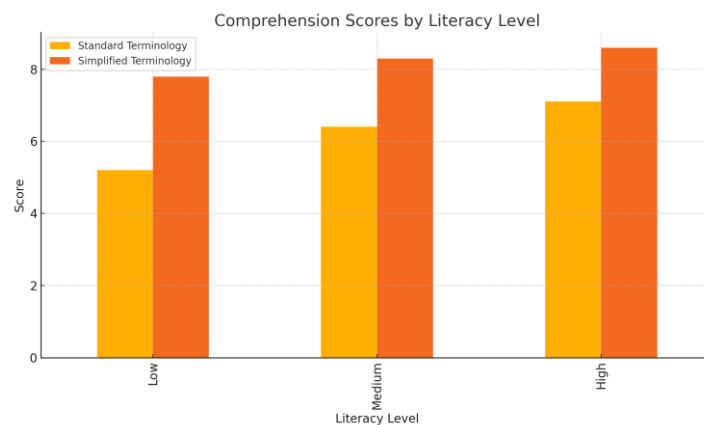


Figure 1: Graph of Comprehension Scores by Literacy Level

5 CONCLUSION

This research highlights the ability of basic medical terms to increase understanding among patients with lower levels of literacy. With the use of NLP, clinicians can maintain clinical precision while tailoring their communication to be more aligned with patients' comprehension levels. Further studies should be directed towards cross-system real-time implementation and multilingual versions.

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