

# Patient education materials

- [Augmented Reality for Identification of Temporal Bone Anatomy and Comparison to Conventional Imaging](#)
- [Enhancing skull base tumor management: the combination of 3D printing technology and endoscopic surgical techniques](#)
- [What is the role of non-surgical clinicians in the assessment and management of degenerative cervical myelopathy? - Insights from the RECODE-DCM peri-operative rehabilitation incubator](#)
- [YouTube as a source of information for stroke rehabilitation: a cross-sectional analysis of quality and reliability of videos](#)
- [Can artificial intelligence improve patient educational material readability? A systematic review and narrative synthesis](#)
- [Assessing AI Simplification of Medical Texts: Readability and Content Fidelity](#)
- [Large language models in patient education: a scoping review of applications in medicine](#)
- [Assessing the Clinical Appropriateness and Practical Utility of ChatGPT as an Educational Resource for Patients Considering Minimally Invasive Spine Surgery](#)

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[Patient education materials](#) are [resources](#) designed to help [patients](#) understand their health conditions, treatments, and [procedures](#). They can include written materials, [videos](#), interactive tools, and other resources that are meant to be easily understood by patients with varying levels of health literacy.

Patient education materials can be used in a variety of healthcare settings, such as hospitals, clinics, and doctor's offices. They can also be provided online, through patient portals, or in the form of mobile apps.

The goal of patient education materials is to help patients make informed decisions about their healthcare, improve their health outcomes, and promote better communication between patients and healthcare providers. Effective patient education materials should be clear, concise, and easy to understand, using plain language and avoiding medical jargon.

The development and distribution of patient education materials is an important aspect of patient-centered care, which aims to engage patients in their own healthcare decisions and improve their overall experience with the healthcare system.

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The findings demonstrate promising potential for the application of the ChatGPT in [patient education](#). GPT4 is an accessible tool that can be an immediate solution to enhancing the readability of current [neurosurgical literature](#). Layperson summaries generated by GPT4 would be a valuable addition to [neurosurgical journals](#) and would be likely to improve [comprehension](#) for patients using internet resources like [PubMed](#) <sup>1)</sup>.

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[artificial intelligence](#) (AI) can improve the [readability](#) of patient education materials. AI-powered tools can help identify complex sentences, technical [jargon](#), and medical [terms](#) that may be difficult for

patients to understand. These tools can then suggest simpler alternatives, making the text easier to comprehend. Additionally, AI can analyze the reading level of the material and adjust the language accordingly to match the literacy level of the target audience.

Some examples of AI-powered readability tools include [Hemingway Editor](#), [Grammarly](#), and [Readable](#). These tools can help healthcare professionals and organizations create patient education materials that are easy to read and understand, which can lead to better patient outcomes. Improved patient understanding can result in greater compliance with treatment plans, better management of chronic conditions, and improved patient satisfaction.

However, it is important to note that AI should not be solely relied upon for improving the readability of patient education materials. It is still important for healthcare professionals to review and edit the materials for accuracy and appropriateness. Ultimately, the goal should be to create patient education materials that are both easy to read and understand, as well as medically accurate and informative.

## Internet

To both determine whether the most high-yield [online patient](#) materials for surgical specialties meet the 6th-grade readability level recommended by the [National Institutes of Health](#) (NIH) and [American Medical Association](#) (AMA), and to discover differences in readability across specialties. We hypothesize average readability scores will exceed an 11th-grade level.

The top five most common procedures for each of seven surgical specialties (neurological, orthopedic, plastic, general, thoracic, pediatric, and vascular) were searched using an incognito Google query to minimize location bias. The text from the top five patient-relevant links per procedure, excluding Wikipedia, journal articles, and videos, was extracted and inserted into Readability Studio Software for analysis.

The combined average grade level of materials ( $\pm$  standard deviation) was: 10.47  $\pm$  2.51 Flesh-Kincaid Grade Level (FKGL), 11-12 New Dale-Chall (NDC), 10.09  $\pm$  1.97 Simple Measure of Gobbledygook (SMOG), 12 Fry Graph (FG). Thoracic, neurologic, vascular, plastic, and orthopedic were least readable (grade level 10+ by all metrics).

High [readability](#) of procedure materials for patients is not unique to neurosurgery: all specialties exceeded the recommended 6th grade level by three or more grades. Online [patient education](#) materials related to surgical subspecialties must be written more comprehensible <sup>2)</sup>.

## Systematic reviews

A review aims to examine the accuracy, reliability, comprehensiveness and readability of medical patient education materials (PEMs) simplified by AI models. A [systematic review](#) was conducted searching for articles assessing outcomes of use of AI in simplifying [patient education materials](#) (PEMs). [Inclusion criteria](#) are as follows: publication between January 2019 and June 2023, various modalities of AI, English language, AI use in PEMs and including physicians and/or patients. An inductive thematic approach was utilised to code for unifying topics which were qualitatively analysed. Twenty studies were included, and seven themes were identified (reproducibility, accessibility and ease of use, emotional support and user satisfaction, readability, data security, accuracy and reliability and comprehensiveness). AI effectively simplified PEMs, with reproducibility

rates up to 90.7% in specific domains. User satisfaction exceeded 85% in AI-generated materials. AI models showed promising readability improvements, with [ChatGPT](#) achieving 100% post-simplification readability scores. AI's performance in accuracy and reliability was mixed, with occasional lack of comprehensiveness and inaccuracies, particularly when addressing complex medical topics. AI models accurately simplified basic tasks but lacked soft skills and personalisation. These limitations can be addressed with higher-calibre models combined with prompt engineering. In conclusion, the [literature](#) reveals a scope for AI to enhance patient health literacy through medical PEMs. Further refinement is needed to improve AI's accuracy and reliability, especially when simplifying complex medical information <sup>3)</sup>.

The review highlights the transformative potential of AI in simplifying PEMs and enhancing patient health literacy. However, limitations in the scope, depth, and evaluation criteria constrain its findings. While AI excels in readability and user satisfaction, challenges like accuracy, comprehensiveness, and ethical considerations demand further research and refinement. Addressing these gaps is essential for realizing the full potential of AI in medical education and patient care.

1)

Guerra GA, Grove S, Le J, Hofmann HL, Shah I, Bhagavatula S, Fixman B, Gomez D, Hopkins B, Dallas J, Cacciamani G, Peterson R, Zada G. [Artificial intelligence](#) as a [modality](#) to enhance the [readability](#) of [neurosurgical literature](#) for patients. J Neurosurg. 2024 Nov 8;1-7. doi: 10.3171/2024.6.JNS24617. Epub ahead of print. PMID: 39504543.

2)

Behmer Hansen R, Gold J, Lad M, Gupta R, Ganapa S, Mammis A. Health literacy among neurosurgery and other surgical subspecialties: Readability of online patient materials found with Google. Clin Neurol Neurosurg. 2020 Oct;197:106141. doi: 10.1016/j.clineuro.2020.106141. Epub 2020 Aug 22. PMID: 32861037.

3)

Nasra M, Jaffri R, Pavlin-Premrl D, Kok HK, Khabaza A, Barras C, Slater LA, Yazdabadi A, Moore J, Russell J, Smith P, Chandra RV, Brooks M, Jhamb A, Chong W, Maingard J, Asadi H. Can [artificial intelligence](#) improve [patient educational](#) material readability? A [systematic review](#) and narrative synthesis. Intern Med J. 2024 Dec 25. doi: 10.1111/imj.16607. Epub ahead of print. PMID: 39720869.

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