

Patient Dependence on Unregulated Printable Online Educational Materials Prior to Tympanoplasty

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ABSTRACT

Patient education is a critical component of successful surgical outcomes, yet individuals preparing for tympanoplasty often rely on printable online educational materials (POEMs) that are inconsistent in quality, frequently written above recommended readability levels, and lacking in actionable guidance. This review evaluates the role of unregulated POEMs in patient preparation for tympanoplasty, highlighting deficiencies in readability, actionability, and completeness. Across otolaryngology-related materials, most are written at or above a tenth-grade reading level, far exceeding the sixth- to eighth-grade level recommended by national guidelines. Critical information, including anesthesia risks, alternative management strategies, and clear stepwise instructions, is frequently omitted. Such limitations can leave patients with misunderstandings, incomplete knowledge, and unrealistic expectations, ultimately affecting surgical preparedness, informed consent, and recovery. Addressing these shortcomings through stricter regulation of online materials and stronger physician-patient communication is essential to improving patient comprehension and outcomes in tympanoplasty.

Keywords: Otolaryngology, Printable Online Educational Materials, Tympanoplasty, Online Education, ENT.

INTRODUCTION

Surgery, often considered the backbone of medical intervention, represents not only a technical procedure but also an exchange of trust between the patient and the physician [1]. For surgical outcomes to be successful, both parties have a shared understanding of the goals, risks, and benefits. When patients fail to fully comprehend and understand the information provided, the likelihood of complications, delayed recovery, and dissatisfaction with care increases [2]. Such issues can strain the delicate physician-patient relationship. Unfortunately, failure to convey information in a way that is truly understandable to the patient leads to search for and use of unregulated information from non-medical personnel.

Before any surgery, patients are debriefed on pre-operation instructions, how the surgery will be performed, and how to speed up recovery post-operation. While a seasoned practitioner may be able to relay this

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information well, it is estimated that only about 25% of the information that a doctor tells a patient is able to be relayed back to the physician in a recall-based survey. This indicates that there is a problem with both communication and comprehension [3]. Another study evaluates that about 50% of patients felt as if they understood the information given by the physician which later dropped to 10% right before surgery [4]. This has been a problem for most patient-physician based interactions and often goes unnoticed in the medical community. While this does not affect the physician's ability to perform the surgery, it is imperative that the patient has a right to know and understand what procedures are being performed on them. Although communication between a healthcare provider and a patient is an issue in itself, this paper aims to evaluate patients receiving information from places other than your typical doctor's visit.

Printable Online Educational Materials (POEMs) are health-related educational resources made available through the internet, often in the form of pamphlets, fact sheets, or downloadable PDFs. These materials cover a wide spectrum of medical phenomena and procedures, ranging from common operations such as cholecystectomy and appendectomy to chronic conditions like diabetes mellitus, cardiovascular disease, anxiety, and depression. POEMs are intended to provide patients and their families with accessible, easy-to-read information outside of the clinical encounter to help improve health literacy. However, the quality and reliability of POEMs vary considerably. While some are carefully developed by established medical institutions and physicians, many others are unregulated. In such cases, content is uploaded by individuals with no formal medical background, yet presented in a way that appears credible. This creates a significant challenge, as patients may not possess the skills or context necessary to distinguish between evidence-based resources and inaccurate, misleading information produced by uneducated internet users.

This concern becomes particularly relevant in the context of surgical procedures, where patient comprehension directly affects expectations, decision-making, and recovery outcomes. For instance, in the field of otolaryngology, tympanoplasty is a procedure frequently researched by patients online. Many individuals scheduled for tympanoplasty turn to POEMs as their primary or source of knowledge before their surgery. Rather than relying solely on physician guidance, they enter the clinical setting with preconceived notions, either accurate or incorrect, based on what they encountered online. This paper specifically evaluates the unregulated use of POEMs prior to tympanoplasties.

METHODS

A literature-based review was conducted to evaluate the readability, quality, and actionability of printable online educational materials (POEMs) used by patients prior to tympanoplasty. Sources were identified through searches of PubMed, Google Scholar, and reference lists of relevant articles, focusing on studies published between 2015 and 2025. Search terms included combinations of "tympanoplasty," "otolaryngology," "patient education," "printable materials," "readability," "actionability," and "online educational resources."

Included studies met the following criteria: (1) evaluated patient-facing educational materials related to otolaryngologic procedures, specifically tympanoplasty or analogous surgeries; (2) assessed readability using validated tools such as the Flesch-Kincaid Grade Level or Simple Measure of Gobbledygook (SMOG); and/or (3) measured understandability and actionability using instruments like the Patient Education Materials Assessment Tool (PEMAT) or DISCERN. Materials created by professional healthcare organizations, hospitals, or independent online platforms were included to capture variability in regulation and quality.

Data extracted from selected studies included: readability level, actionability score, understandability score, completeness of content (e.g., inclusion of anesthesia risks, alternative treatment options, and stepwise instructions), and accuracy of information. Median and mean values for readability, understandability, and actionability were summarized, and results were synthesized qualitatively to highlight recurring deficiencies in patient educational materials.

This review did not involve human subjects or primary data collection, and thus ethical approval was not required.

RESULTS

For the average patient to understand medical based information, it is recommended that the information is portrayed no more than the level that a sixth grader would understand. To establish the issues with POEMs, many sources indicate that the readability of these pamphlets are either exceeding the level of the average consumer to properly understand the material, or have information on there that are incorrect (hence the label, unregulated POEMs). Many POEMs exceed the recommended sixth grade level, often seeing some reaching the eighth grade level [5]. Others mention that with the caliber of everyday POEMs require patients reading them to have at least 10 years of proper schooling to understand the information, which is a standard that should not be held to everyone seeking basic healthcare [6]. Other POEMs were found to have an average

rate of 1.9 per 100 words that had incorrect statements, with many reaching harmful cognitive biases [7]. These should warrant the attention of the medical community, with increasing efforts to recognize these as harmful to our patients as well as the need to correct these issues.

Similarly, the misuse of unregulated POEMs can be attributed to specific surgical procedures like tympanoplasties. Patients accordingly elect a significant portion of their time, often hours, for online education prior to their tympanoplasty surgery. This information includes written information, surgical diagrams, videos, and social media [8]. Another source evaluates the educational content of YouTube videos for tympanoplasty surgeries using the IVORY grading scale, measuring how well educational videos adhere to teaching standards. Despite YouTube's place as an educational platform, this study evaluates it lacking the proper educational quality that is needed for our patients [9]. It is clear that there is a place for educational content before patients attend their tympanoplasty, however these sources indicate that stricter guidelines must be in place to improve patient understanding.

A review of common literature revealed that patient educational materials (POEMs) related to otologic procedures, including tympanoplasty, frequently exceed recommended readability standards and often demonstrate poor quality and low actionability. Several investigations into otolaryngology-related POEMs highlight trends that likely generalize to this patient population receiving tympanoplasties.

For tympanoplasties, the median readability was reported at the 10th grade level, substantially higher than the National Institutes of Health (NIH) recommendation of 7th-8th grade. Although understandability was acceptable (average PEMAT score $\approx$ 82%), actionability was low, with a median score of 47% (mean 44.6%). Furthermore, only 30% of websites discussed anesthesia risks, and most failed to present alternative options or risk-benefit comparisons, raising concerns about the adequacy of informed consent [10].

Beyond readability and quality, accessibility and equity remain underrecognized issues in patient education. Many POEMs are written exclusively in English and lack culturally diverse content, limiting their use in patients that do not have English as their first language or for those who have differing health literacy backgrounds. This creates a disproportionate burden on vulnerable populations, superimposed on the fact that there may be people who have barriers to care. Without efforts to standardize the readability and accuracy, POEMs risk widening existing disparities in surgical outcomes and health knowledge. Addressing these shortcomings through multilingual, culturally sensitive, and evidence based materials would help with not only improving understanding of material, but also allowing for patient engagement throughout different cultures.

Similar findings have been observed in other otolaryngologic contexts. In patient materials related to nasal septoplasty, 42% were rated as "poor" or "very poor" in quality using the DISCERN instrument [11]. Hospital-generated otolaryngology PEMs also demonstrated readability ranging from the 8th to 12th grade level, again surpassing NIH recommendations [12]. A study of otitis media materials similarly found that although DISCERN scores were acceptable, most exceeded the 8th grade readability limit [13].

Collectively, these findings demonstrate that POEMs frequently used by patients for surgical decision-making are written at a level too advanced for the general population. Such deficiencies may hinder comprehension, impair shared decision-making, and potentially compromise surgical preparedness in patients undergoing tympanoplasty.

Although specific graphical analysis is not available for just tympanoplasties, several otolaryngology procedures share similar experiences with POEMs containing a level of understanding far beyond what the average patient can comprehend. These results can be generalized to tympanoplasties, and are depicted in figure 1 [10-13].

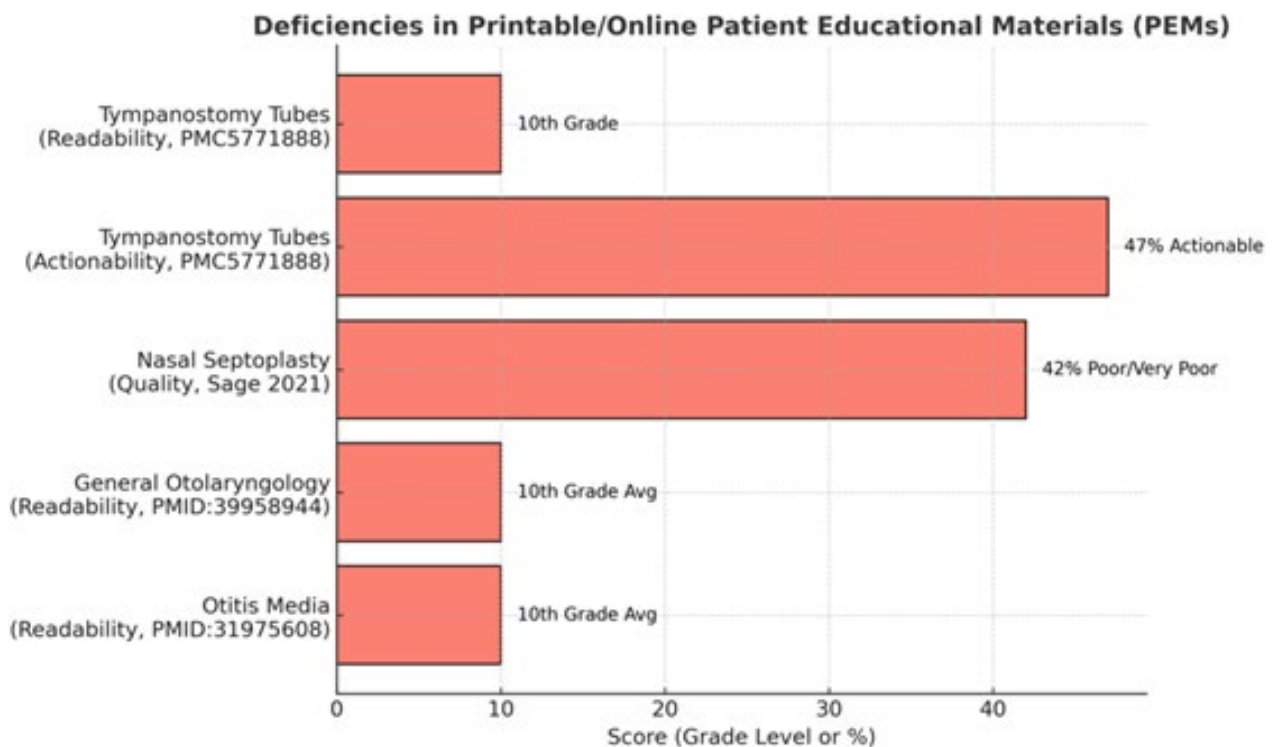


Figure 1. Deficiencies in Printable and Online Patient Educational Materials (PEMs) in Otolaryngology.

Readability, actionability, and quality scores from published studies of POEMs related to otolaryngologic procedures demonstrate consistent deficits. Harris et al., 2018 [10], Grose et al., 2021 [11], Warriar et al., 2025 [12], Shetty et al., 2020 [13].

Image Credit: Waseem Syed (Original Author).

DISCUSSION

This review highlights the issue with patient education for individuals undergoing tympanoplasty; the heavy reliance on printable and online educational materials (POEMs) that are frequently written above recommended readability levels, lacking in actionable information, and variable in overall quality. Although POEMs are designed to go hand in hand with physician counseling, the findings presented here demonstrate that many fail to meet basic standards for health literacy. When patients turn to these materials in preparation for surgery, they may be left with misunderstandings, incomplete knowledge, or misplaced expectations, all of which can negatively impact surgical preparedness, satisfaction, and outcomes.

One of the most pressing concerns is readability. National guidelines recommend that patient-facing documents be written at or below a sixth to eighth grade reading level to ensure accessibility across diverse populations. Yet, the reviewed studies consistently found that otolaryngology-related POEMs, including those for tympanoplasty, were written at approximately the tenth-grade level or higher. This

mismatch means that a substantial proportion of patients may struggle to fully comprehend the content. For surgical procedures such as tympanoplasty, where informed consent and adherence to perioperative instructions are essential, comprehension gaps place patients at risk for increased anxiety, poor adherence, and potential postoperative complications. These findings align with prior investigations in other surgical fields, which similarly demonstrated that POEMs often surpass recommended readability levels, thereby reinforcing the broader concern that surgical patient education materials frequently fail to meet basic health literacy standards.

Equally important is the lack of actionability and completeness in POEMs. Even when materials are understandable, they often fail to provide clear, stepwise instructions that patients can implement, as reflected in low actionability scores. Moreover, critical elements of surgical decision-making, such as anesthesia risks, alternative management strategies, and explicit risk-benefit comparisons, are frequently omitted. Similar trends have been reported in studies evaluating patient education resources in rhinology and head and neck surgery, where omission of perioperative instructions and limited discussion of risks were also noted. The present findings therefore align with and expand upon this body of literature by demonstrating that tympanoplasty-related POEMs are not an exception but part of a systemic issue across otolaryngology.

Beyond the idea of surgical preparedness, the limitations of existing POEMs show broader issues of health equity. Patients that have a lower educational background, limited English proficiency, or have reduced access to physician based services are disadvantaged by materials that fail to meet readability and actionability standards [14]. This widens the current disparities in surgical outcomes and also undermines efforts to promote shared decision-making and patient autonomy. These gaps need to be addressed and requires a multipronged approach including the development of standardized evidence based templates for online educational material, incorporating easy to read language with visual aids, and rigorous evaluation [15]. These measures not only improve patient comprehension and engagement, but also allow for equitable access for safe and effective surgical care.

Taken together, this review supports the conclusion that while POEMs are readily available, their current quality limits their effectiveness as educational tools. The findings are consistent with broader health literacy research showing that patients provided with materials above their reading level or lacking in actionable steps are less likely to retain information and adhere to medical recommendations. By confirming these trends in tympanoplasty-specific POEMs, this study expands upon existing literature and underscores the urgent need for standardized, patient-centered educational materials that balance readability, completeness, and actionability.

LIMITATIONS

A key limitation in this review is the variability in the methodologies used to assess readability, actionability, and quality across the many different studies that was analyzed in this review. Many of these have automated readability formulas that measure sentence length and word complexity but do not account for cultural context, visual aids, or patient preferences that may influence comprehension. Most of these studies focus on solely English-based materials, limiting the amount of generalization that we can make to those with limited English proficiency or for those who rely on translated materials. Another limitation is the emphasis on material that was available online, but disregarding material that may be misleading or incorrect that is already printed available in clinics. These may differ in readability and quality but are less frequently analyzed. Patient perspectives and real-world outcomes, such as whether using POEMs actually impacts preparedness, adherence, and satisfaction remain underexplored.

RECOMMENDATIONS

Given these limitations, several recommendations are given. Providers should be aware of the readability and

completeness of the educational resources they provide to their patients, supplementing POEMs with direct counseling tailored to individual patient needs. Multidisciplinary collaboration between otolaryngologists, health literacy experts, and patient advocates would be able to improve the development of these materials that are easily accessible. Institutions may also be able to adopt standardized tools such as PEMAT (Patient Education Materials Assessment Tool), during the creation of the content. Furthermore, translation into multiple languages for those who may not share English as their first language is a necessary recommendation.

FUTURE DIRECTIONS

Future research needs to prioritize patient centered outcomes to better understand how POEMs influence surgical preparedness, informed consent, and recovery post-operatively in tympanoplasty. Studies that assess the effectiveness of such interventions like rewriting educational materials to meet global health literacy standards, integrating multimedia formats, or using interactive digital platforms may be warranted. Comparative studies between standard POEMs and enhanced educational tools could clarify the best standards for patient education in otolaryngology. Ultimately, addressing these gaps not only improve the quality of tympanoplasty-related POEMs but also strengthen patient engagement, satisfaction, and surgical outcomes across the realm of head and neck.

CONCLUSION

Tympanoplasty is generally successful, but good outcomes depend on more than just surgical skill. Patients need to understand the procedure, follow pre- and post-operative instructions, and feel confident in their care. Many rely on unregulated Printable Online Educational Materials (POEMs), which can be confusing, incomplete, or inaccurate, leading to misunderstandings and anxiety. Improving patient education with clear, evidence-based resources and strong physician-patient communication can help patients make informed decisions, follow instructions more closely, and have better overall experiences and outcomes. Furthermore, regulation of POEMs with stricter guidelines will allow patients to seek correct information online at their own leisure, without having to worry about misinformation. These next steps are beyond the scope of this paper and warrant further research to implement proper information on internet websites.

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CONFLICT OF INTEREST

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