Consulting Dr. Google™: Quality of Online Resources About Tympanostomy Tube Placement

Vandra C. Harris, MD [1]; Anne R. Links, MS, MHS [1]; Paul Hong, MD [3]; Jonathan Walsh, MD[1]; Desi P. Schoo, MD [1]; David E. Tunkel, MD [1]; Charles M. Stewart, MD PhD [1]; Emily F. Boss, MD, MPH [1,2]

[1] Department of Otolaryngology-Head and Neck Surgery, Johns Hopkins Medical Institutions, Baltimore, Maryland
[2]Department of Health Policy and Management, Johns Hopkins Medical Institutions, Baltimore, Maryland.
[3] Division of Otolaryngology-Head and Neck Surgery, Department of Surgery, Dalhousie University, Halifax, Nova Scotia, Canada.

Background

- Tympanostomy tube (TT) placement is the most common surgical procedure in young children.[1]
- TT placement is often performed in otherwise healthy children who will be undergoing their first surgical procedure. Even if considered a minor procedure, parents may experience a great deal of decisional conflict.[2]
- Active participation by parents in decision-making and the use of decision aids may reduce decisional conflict over surgery in children. The internet is a readily available and often used source for patients to find health-related information.
- However, the family-centeredness and utility of online information used for decision-making and understanding is unknown.
- This study aimed to evaluate the online resources and educational materials available for the most commonly performed otolaryngologic surgery in children, TT placement. [1]

Methods

- We performed an online search using Google ™ search engine on August 25, 2016. The following search terms were used: “ear tubes”,” tympanostomy tubes” and “PE tubes”. The ten websites that were found in the results for each search term were analyzed.
- The text was evaluated for readability using the Flesch Reading Ease test (FRE), and Flesch-Kincaid Grade Level (FKGL), via the online readability calculator found at https://readability-score.com. [3-4]
- Understandability and actionability were evaluated with the Patient Education Materials Evaluation Tool (PEMAT). Materials with scores of 70% or more are deemed to be adequately understood and actionable.[5] PEMAT scoring was performed by three individuals (two physicians, and one non-clinical researcher.
- The Center for Medicaid and Medicare Services informed consent guidelines were used to determine key factors central to shared decision-making. The six factors deemed essential to be conveyed to patients and their families to facilitate well-informed decision-making are description of procedure, indications, short-term risks, long-term risks, benefits of the procedure, and alternatives.[6] Each site was scored on a six-point scale: one point was given for each factor that was included. Websites were reviewed independently by two physician reviewers.
- Websites were evaluated for adherence to the published AAO-HNSF Clinical Practice Guideline: Tympanostomy Tubes in Children.[1] Each site was reviewed to determine inclusion of information regarding CPG. The following four guideline points which the American Academy of Otolaryngology-Head and Neck Surgery (AAOHNS) CPG state should be addressed in perioperative education were used: 1) duration of tube function, 2) follow-up schedule, 3) detection of complications, and 4) water precautions. [1] Each site was scored on a four-point scale: one point was given if there was correct information for each of the above-mentioned guidelines. CPG compliance was assessed by two physician coders.
- Fleiss κ interrater reliability analysis was performed using Stata software to determine level of agreement amongst raters.

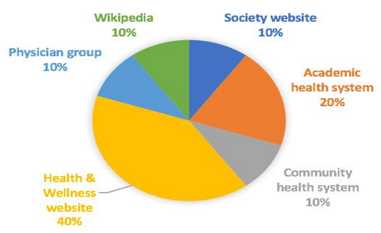

Figure 1. Website Demographics.

Results

- Figure 2 shows readability scores, reading grade level, understandability and actionability scores for each website.
- Shared decision-making centrality scores ranged from 4 to 6 with a mean and median of 5 (SD =0.5). Nine out of ten websites sufficiently describe the procedure and its risks, however only three mentioned anesthesia risks. Only two sites listed alternatives to surgery.
- Most sites had information that complied with the assessed components of AAOHNS CPG for TT placement. Adherence scores ranged from 1 to 4 with a mean of 3.4 (SD = 1) and median of 4. See Table 2 for representative text illustrating the variability in CPG adherence.
- Fleiss κ analysis showed slight inter-rater agreement for PEMAT understandability scoring (κ = 0.20; p= 0.02).

Pattern of “Reading Ease” Scores

“Reading Ease” Score	Description of Style	Typical Magazine	Syllables per 100 Words	Average Sentence Length in Words
0 to 30	Very difficult	Scientific	192 or more	29 or more
30 to 50	Difficult	Academic	167	25
50 to 60	Fairly difficult	Quality	155	21
60 to 70	Standard	Digests	147	17
70 to 80	Fairly easy	Slick-fiction	139	14
80 to 90	Easy	Pulp-fiction	131	11
90 to 100	Very easy	Comics	123 or less	8 or less

Figure 2. Flesch reading ease score interpretation

Website	FRE*score	FKGL†	Understandability£	Actionability
www.entnet.org	45.9	12	80%	47%
www.mayoclinic.org	53.3	9	85%	73%
http://kidshealth.org	55.5	10	80%	47%
www.webmd.com	70.6	6	83%	80%
www.medicinenet.com	53.6	9	92%	73%
http://www.emedicinehealth.com	44.5	12	86%	33%
www.earcentergreensboro.com	50.4	10	77%	53%
www.wikipedia.org	40.4	12	73%	0%
www.childrenshospital.vanderbilt.org	61.8	9	88%	40%
www.emedicine.medscape.com	28.8	15	75%	0%

Table 1. Readability and PEMAT Scoring. Readability scores ranged from 28.8 to 70.6 with a mean of 50.4 (SD = 11.6) and a median of 51.85. Reading Grade levels ranged from 6th to 15th grade with a mean of 10th grade (SD = 2.5) and a median of 10th grade. Nine out of ten websites had readability scores above the NIH recommended seventh-eighth grade level.[7] All websites were understandable with understandability scores ranging from 73 to 92% with a median of 81.5 and a mean of 81.9 (SD = 6). Actionability scores were more variable and generally low. Scores ranged from 0 to 80% with a median of 47 and mean of 44.6 (SD = 28). Most sites did not provide tangible tools and visual aids to help the reader take action.

Clinical Practice Guideline	Representative text
Duration of tube function	“Short- term tubes … typically stay in place for six to eighteen months…. Long-term tubes are larger and have flanges that secure them in place for a longer period of time.”[32] “These ventilating tubes remain in place for six months to several years.” [33] “Tympanostomy tubes generally remain in the eardrum for six months to two years, with T-tubes lasting up to four years.” [34]
Follow-up schedule*	“An initial follow-up appointment will be scheduled within the first two to four weeks after the procedure. Other follow-up appointments…will be scheduled at four- to six-month intervals”. [35] “Follow-up visits…. Are very important. The doctor checks to see whether the tubes are working and whether the child’s hearing has improved.” [36] Your doctor may recommend a follow-up examination 7-14 days after the procedure. Further appointments are typically scheduled every 3-6 months…”. [37]
Detection of complications‡	“Medical attention may be necessary… If the child has experienced several ear infections…The child has persistent ear drainage after using the drops as ordered. The child has increasing ear pain without ear drainage…. If any significant change of hearing is noted”. [37] “If the drainage persists or if there is fever greater than 102F, an office visit may be necessary…”. [38] Otorrhea…- This is treated initially with antibiotic ear drops; occasionally, children experience persistent ear tube drainage that necessitates prompt removal of the tube”. [39]
Water precautions ◊	“Your surgeon might recommend earplugs for regular bathing or swimming.” [40] “…usually you don’t have to worry about protecting the ears with an earplug unless your child is dunking their head deeply (over a couple of feet below the surface) or the water is not thought to be clean.” [41] “Current guidelines do not recommend routine water precautions”. [32]

Table 2. Clinical Practice Guideline Variation.

Discussion

- The median readability grade level was well above the 7th-8th grade level recommended by the NIH health literacy guidelines for health materials. [7] This may indicate that patients with low socioeconomic status and with low literacy are at a disadvantage for successful shared decision-making when using internet resources. Inadequate health literacy further widens health disparities experienced by those of low socioeconomic status.[8]
- Most websites were understandable with an average understandability score of 81.9% and a of range 73-92%. Seven of the ten websites had low actionability scores with a median of 47% and a mean of 44.6%. PEMAT can be a useful guide to help authors of patient education material determine if the information provided is understandable and if patients will be able to act on what they learn. However, the PEMAT does not assess quality of materials because it is does not evaluate accuracy of information. [5] Another limitation is differing interpretation of items being evaluated amongst raters. Raters may have different perspectives when material is subjective.
- Regarding shared decision-making eight out of ten websites failed to list alternative treatment options or discuss the risk/benefits of surgery versus observation. Only six out of ten sites addressed anesthesia risks, which many clinicians and families deem perhaps the most significant worry with TT. While these websites are not explicitly called decision aids, 28% of people use the internet to help make medical decisions. Easily accessible, comprehensive decision aids specifically designed for TT placement may help with SDM.
- Clinical Practice Guideline compatibility was generally high with a mean of 3.4 and a range of 1 to 4. All ten websites explained the variable duration of tube function. While recommendations for follow-up intervals were not seen in these sites, no such recommendation exist in the CPG either. All sites mentioned the detection of TT otorrhea. Information concerning water precautions was most variable with three websites suggesting that ear plugs may need to be used and two websites providing no mention of water precautions. These findings are not indicative of physician compliance but may provide a starting point to evaluate CPG adherence in clinical practice and standardization of practice.

Conclusion

- Patient-centered care and shared decision-making are important components for elective procedures. Patient/family education can be a key component to successful decision making in TT placement.
- Commonly used internet resources about TT placement vary in quality pertaining to health literacy, principles of shared decision-making, and consistency with practice guidelines.
- Overall, easily accessed online educational materials for TT placement are understandable but are written at inappropriately high reading levels and have low actionability.
- Shared decision-making centrality and adherence to CPG were good for the websites evaluated.
- Clinicians should recognize that the available online educational materials may be inadequate for successful shared decision-making and reduced decisional conflict, and should be prepared to supplement this with in-person counseling and well-constructed decision-aids.

Contact

Vandra Harris, MD
Johns Hopkins School of Medicine – Department of Otolaryngology/Head & Neck Surgery
Email: vharri18@jhmi.edu
Phone: 410-955-1080

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