



# A Quality Assessment of Online Patient Information Regarding Tonsillitis Using the EQIP Tool

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## Abstract

**Background:** Tonsillitis is a common pediatric condition. The decision to seek medical attention and consent to treatment is usually made by parents or guardians. With increased accessibility of the internet, online medical information plays an increasingly significant role in the decision-making process. Little is known regarding the quality of online patient information on tonsillitis, as this has not been previously studied.

**Objective:** The aim of our study was to identify the quality of information regarding tonsillitis on websites intended for the public.

**Materials and Methods:** We conducted a systematic review of online information on tonsillitis using the following search terms: "Tonsillectomy", "Tonsillitis", "Adenotonsillectomy" and "Tonsil". The first three pages of returned websites were captured and each website was examined using the validated Ensuring Quality Information for Patients (EQIP) tool (score 0-36).

**Results:** A total of 92 websites met the inclusion criteria for analysis. The overall median EQIP score was 19 with an interquartile range of 17 to 22 and a maximum of 32. More than half of all websites originated from the USA (61%) and hospitals were the most common source of information (29%). Most websites failed to describe the quantitative benefits or address the medical intervention costs and insurance issues. Half of the websites included both tonsillectomy and antibiotics as treatments for tonsillitis. Only 68% included complications of tonsillitis or tonsillectomy.

**Conclusion:** The assessment of the quality of online patient information websites regarding tonsillitis by the EQIP tool indicates that most websites were of poor credibility, with minimal information regarding treatment choices and complications. To improve awareness of tonsillitis, there is a need for more informative and patient-centered websites that are compatible with the international quality standard for patient information.

**Keywords:** Tonsillitis; Tonsillectomy; Adenotonsillectomy; Tonsil, Patient information; EQIP tool

## Introduction

Recurrent sore throat is a common disease affecting up to 100 per 1000 populations annually across primary care settings [1]. While the majority of sore throat presentations are simple viral diseases, tonsillitis represents an important diagnosis not to be missed. The inflammation of tonsils and associated lymphatic tissues is typically managed with symptom relief and is self-resolving, however, it can lead to short term complications, such as quinsy, and long-term complications, such as rheumatic fever [2]. Tonsillitis can be caused by both viruses and bacteria and scoring systems, such as CENTOR and Fever PAIN, can help differentiate the etiology and whether antibiotics are indicated [3]. In those with recurrent tonsillitis, the management approach is often escalated to tonsillectomy to prevent further episodes [3]. This is effective at providing short term benefits including reduced school absences and sick days for children as it generally affects younger populations [4].

Tonsillectomy is a surgical procedure that involves the complete removal of the palatine tonsils, with or without adenoidectomy [5]. The patient journey typically begins with a referral from a general practitioner to an Ear, Nose and Throat (ENT) specialist. The primary indications for tonsillitis are recurrent sore throat or obstructive sleep apnea [6]. Indications for tonsillectomy are

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outlined by the Scottish Intercollegiate Guidelines Network (SIGN) criteria [7] (Table 1).

Tonsillectomy, like all other surgical procedures, is not without risks. Bleeding is one of the most common complications which affect nearly 3% of children following tonsillectomy [5]. The procedure can also cause significant postoperative pain, leading to reduced oral intake and dehydration. Given the severity of morbidities associated with tonsillectomy, and the option for medical management using antibiotics, it is paramount to ensure patients can make an informed decision.

In the digital age, patients have access to a variety of sources of health information; clinicians are no longer patients' and parents' only source of information. As identified by the Oxford Internet Survey 2013 report, respondents who use the Internet to access health information have risen from 37% to 69% within a decade [8]. The major concern faced by users when accessing online health information is the heterogeneity in the quality of information among different sources [9]. Systematic reviews have consistently revealed a significant proportion of sources are of poor quality, which can affect patients' ability to provide truly informed consent [10,11]. The Department of Health and Human Services' Office of Disease Prevention and Health Promotion in the US carried out a national assessment of popular online health resources, including WebMD and Medscape and found that only 58% met 3 or more of their reliability criteria of 6 items [12]. Similarly, it is also challenging to ensure the latest information is presented as a study examining online information on lower back pain showed only 31% were up to date with the most recent National Institution of Clinical Excellence (NICE) guidelines [13]. This general lack of high-quality health information poses a significant barrier to making informed decisions.

Thus, the primary objective of this study is to critically evaluate the quality of health information provided for tonsillitis and its management using tonsillectomy or antibiotics using the standardized Ensuring Quality Information for Patients (EQIP) tool.

## Materials and Methods

### Eligibility criteria, information sources and data selection

Data of websites providing information on tonsillectomy were collected through the use of Google, the most used search engine worldwide [14,15]. Other search engines were not used as previous studies showed a high level of duplicates when multiple engines were used [16,17].

The key search terms used were "Tonsillectomy", "Tonsillitis", "Adenotonsillectomy" and "Tonsil". Similar to established literature evaluating the quality of health information online, the first three pages of returned websites were captured as most people do not research past the first three pages [11,18]. Websites that contain information not intended to address the general public or websites that direct readers to scientific journals intended for professionals were all excluded. In addition, websites not written in English, containing only video content or purely for product advertisement are excluded. Duplicate websites between search terms will be removed at the screening stage. The remaining websites will be collated for analysis.

### Website query

Search engines such as Google utilize the geographical origin of each query to provide users with the most relevant results. This mechanism introduces significant differences in results returned

between users of different locations. In order to improve the representation of websites, the four search terms will be queried from the locations of the top four contributors of English health websites as identified in previous studies: Australia, Canada, United States and the United Kingdom [11,19].

### Data entry

All websites identified were each independently assessed by 3 people, who were fluent in English, using the 36 item EQIP checklist (Table 2). Additional website demographics such as country of origin and type of website were recorded. Websites may be classified as follows: academic centre, encyclopedia, government/health department, hospital, industry, news service, patient group, practitioner, professional society, charity/non-governmental organization, general practitioner, and others. Discrepancies are identified and a collective decision is made to maintain uniform standards of assessment.

### Expanded EQIP tool

The expanded EQIP tool was used in this study to provide more comprehensive analysis of patient information available online [10,11,19]. All EQIP items were recorded as 'Yes' or 'No' or 'N/A' (some items may not be relevant for specific website categories) which is an improvement over the original EQIP tool which allowed ambiguous "Partly Yes" responses. The 36 items were divided into 3 specific categories: Content data (1-18), Identification data (19-24), and Structure data (25-36).

### Additional items

Additionally, pre-operative and post-operative information, advice and recommendations were recorded. Other information related to symptoms, complications, and mortality was also stored and analyzed.

### Statistical analysis

Recorded data underwent both descriptive and statistical analysis by using freely accessible analytical tools from rBiosstatistics.com (R version 3.3.2 and R Studio version 1.0.44). Continuous variables, reported as median and IQR, were compared with Mann-Whitney and Kruskal-Wallis tests where appropriate. Categorical variables, reported as numbers and proportions through percentages, were compared with Fisher's exact tests or  $\chi^2$  tests where appropriate. All P values were considered to be statistically significant when  $P < 0.05$ . The EQIP score was dichotomized in order to distinguish between high-scoring and low-scoring websites, a cut-off point at the 75<sup>th</sup> percentile was set to identify commonalities and differences between high and low-quality websites as was performed in previous studies [10,11,19].

## Results

### Websites query

A total of 480 websites were identified. After the removal of intra-search term duplicates and those that do not meet inclusion criteria, 92 websites remained for analysis. The PRISMA workflow for the identification of websites eligible for analysis is shown in Figure 1.

### EQIP performance and demographics

The overall median EQIP score was 19 with an Interquartile

**Table 1:** SIGN Tonsillectomy eligible criteria.

1	Seven or more clinically significant episodes in the preceding year
2	Five or more episodes in each preceding two years
3	Three or more episodes in each of the preceding three years

**Table 2:** Breakdown of results of the modified Ensuring Quality Information for Patients tool (n= number).

Item	Yes (n, %)	No (n, %)	N/A (n, %)
1. EQIP: Content Data [Initial definition of which subjects will be covered]	82 (89%)	10 (11%)	0 (0%)
2. EQIP: Content Data [Coverage of the previously defined subjects (NA if the answer is “no” for item 1)]	81 (88%)	4 (4%)	7 (8%)
3. EQIP: Content Data [Description of the medical problem/treatment/procedure]	82 (89%)	10 (11%)	0 (0%)
4. EQIP: Content Data [Definition of the purpose of the interventions]	79 (86%)	13 (14%)	0 (0%)
5. EQIP: Content Data [Description of treatment alternatives (conservative management)]	52 (57%)	40 (43%)	0 (0%)
6. EQIP: Content Data [Description of the sequence of the interventions and surgical procedure]	50 (54%)	42 (46%)	0 (0%)
7. EQIP: Content Data [Description of the qualitative benefits for the patient]	44 (48%)	48 (52%)	0 (0%)
8. EQIP: Content Data [Description of the quantitative benefits to the patient]	2 (2%)	90 (98%)	0 (0%)
9. EQIP: Content Data [Description of the qualitative risks and complications]	63 (68%)	29 (32%)	0 (0%)
10. EQIP: Content Data [Description of the quantitative risks and complications]	13 (14%)	79 (86%)	0 (0%)
11. EQIP: Content Data [Addressing quality-of-life issues]	38 (41%)	54 (59%)	0 (0%)
12. EQIP: Content Data [Description of how complications are handled]	39 (42%)	53 (58%)	0 (0%)
13. EQIP: Content Data [Description of the precautions that the patient may take]	51 (55%)	41 (45%)	0 (0%)
14. EQIP: Content Data [Mention of alert signs that the patient may detect]	44 (48%)	48 (52%)	0 (0%)
15. EQIP: Content Data [Addressing medical intervention costs and insurance issues]	2 (2%)	81 (88%)	9 (10%)
16. EQIP: Content Data [Specific contact details for hospital services (NA if not hospitals)]	23 (25%)	13 (14%)	56 (61%)
17. EQIP: Content Data [Specific details of other sources of reliable information/support]	30 (33%)	62 (67%)	0 (0%)
18. EQIP: Content Data [Coverage of all relevant issues for the topic (summary item for all content criteria)]	20 (22%)	72 (78%)	0 (0%)
19. EQIP: Identification [Date of issue or revision]	58 (63%)	34 (37%)	0 (0%)
20. EQIP: Identification [Logo of the issuing body]	92 (100%)	0 (0%)	0 (0%)
21. EQIP: Identification [Names of the persons or entities that produced the document]	83 (90%)	9 (10%)	0 (0%)
22. EQIP: Identification [Names of the persons or entities that financed the document]	39 (42%)	53 (58%)	0 (0%)
23. EQIP: Identification [Short bibliography of the evidence-based data used in the document]	27 (29%)	65 (71%)	0 (0%)
24. EQIP: Identification [Statement about whether and how patients were involved/consulted in the document's production]	2 (2%)	84 (91%)	6 (7%)
25. EQIP: Structure data [Use of everyday language and explanation of complex words or jargon]	91 (99%)	1 (1%)	0 (0%)
26. EQIP: Structure data [Use of generic names for all medications or products (NA if no medications described)]	40 (44%)	23 (26%)	27 (30%)
27. EQIP: Structure data [Use of short sentences (<15 words on average)]	71 (77%)	21 (23%)	0 (0%)
28. EQIP: Structure data [Personal address to the reader]	66 (72%)	26 (28%)	0 (0%)
29. EQIP: Structure data [Respectful tone]	91 (99%)	1 (1%)	0 (0%)
30. EQIP: Structure data [Clear information (no ambiguities or contradictions)]	89 (97%)	3 (3%)	0 (0%)
31. EQIP: Structure data [Balanced information on risks and benefits]	38 (41%)	54 (59%)	0 (0%)
32. EQIP: Structure data [Presentation of information in a logical order]	84 (91%)	8 (9%)	0 (0%)
33. EQIP: Structure data [Satisfactory design and layout (excluding figures or graphs; see next item)]	89 (97%)	3 (3%)	0 (0%)
34. EQIP: Structure data [Clear and relevant figures or graphs (NA if absent)]	17 (18%)	4 (4%)	71 (77%)
35. EQIP: Structure data [Inclusion of a named space for the reader's notes or questions]	13 (14%)	78 (85%)	1 (1%)
36. EQIP: Structure data [Inclusion of a printed consent form contrary to recommendations (NA if not from hospitals)]	0 (0%)	32 (35%)	60 (65%)

Range (IQR) of 17-22 and a maximum of 32. General EQIP data property is shown in Table 3 and the distribution of EQIP score is shown in Figure 2. The 75<sup>th</sup> percentile of total EQIP score is 22 or above, achieved by 25 websites. These websites were considered high scoring.

The country of origin and source of information is shown in Table 4, 5 respectively. More than half of all websites originated from the USA (61%; n=56), with a median EQIP score of 18. Only one website from New Zealand was included, which had the highest EQIP score of 32. UK-based websites had the second-highest median EQIP of 21.5 and the widest IQR of 8 across its 14 websites. The distribution of EQIP scores by country of origin is shown in Figure 2. Hospitals

were the most common source of information (29%; n=27), followed by patient groups (24%; n=22). Their median EQIP scores were 18 and 19.5 respectively (Table 3). A breakdown of each EQIP domain is shown in Table 2.

**EQIP: Content data**

The median score obtained for content data was 9/18 (50%) and the maximum score obtained was 16/18 (89%). All high-scoring websites provided an initial definition of the subject (Item 1), a description of the medical problem (Item 3) and a description of the sequence of intervention and surgical procedures (Item 6).

Most websites failed to describe the quantitative benefits (Item 8)

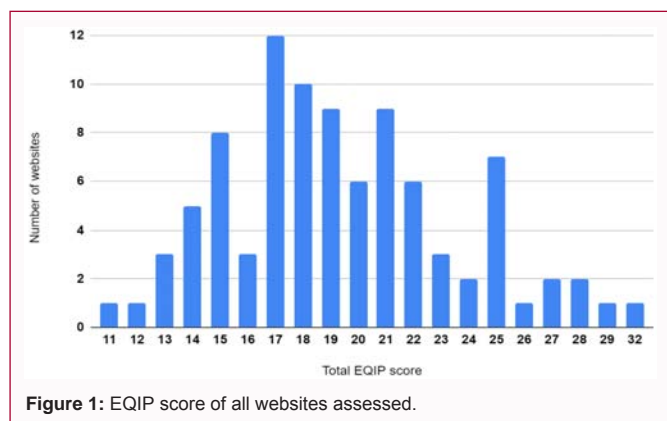


Figure 1: EQIP score of all websites assessed.

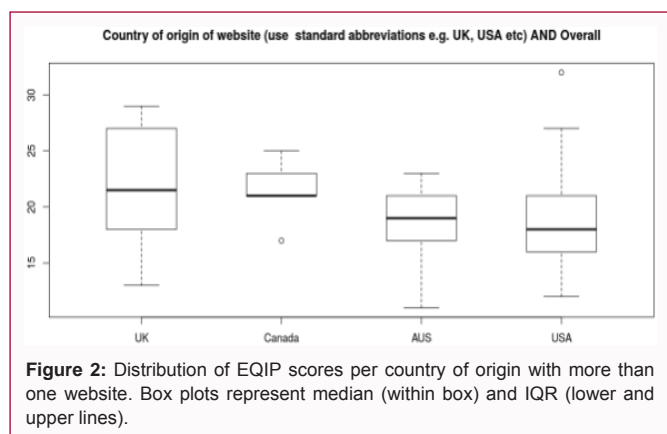


Figure 2: Distribution of EQIP scores per country of origin with more than one website. Box plots represent median (within box) and IQR (lower and upper lines).

or address the medical intervention costs and insurance issues (Item 15); both Items 8 and 15 were described in 2% of websites. The two websites that included these two items were also the two highest-scoring websites.

**EQIP: Identification**

In terms of the identification domain, the median score obtained was 3/6 (50%), and the maximum score obtained was 6/6 (100%; Table 3). All websites included the logo of the issuing body (100%) but only 2% included a statement about whether and how patients were involved/consulted in the document's production.

**EQIP: Structure**

The median score obtained for the structure domain was 8/12 (66%), and the maximum score obtained was 11/12 (92%; Table 3). All high-scoring websites satisfied Item 25 (Use of everyday language and explanation of complex words or jargon), 29 (Respectful tone), 30 (clear information), 32 (Presentation of information in a logical order), 33 (Satisfactory design and layout) and 34 (Clear and relevant figures or graphs).

**Top EQIP scoring websites**

EQIP cut-off for the 99<sup>th</sup> percentile was 29, which only includes two websites (Table 6). The highest-scored website was produced by Kids Health from New Zealand, which scored 15 in the content domain, 6 in identification and 11 in structure. Plymouth Hospital from the UK, which also displayed thorough patient information, scored 29.

**Additional information**

Pre-operative advice for tonsillectomy was included in 32 websites (35%), while post-operative advice was included in 45 websites (49%).

Table 3: EQIP data properties.

	Content	Identification	Structure	Overall EQIP
<b>Median:</b>	9	3	8	19
<b>Minimum:</b>	4	1	3	11
<b>Maximum:</b>	16	6	11	32
<b>Quartile 1:</b>	6	3	7	17
<b>Quartile 3:</b>	11	4	8	22
<b>IQR:</b>	5	1	1	5
<b>75<sup>th</sup> Percentile</b>	11	4	8	22
<b>99<sup>th</sup> Percentile</b>	15	5	10	29

Table 4: Descriptive analysis of websites included in the study grouped by country of origin (n= number).

IQR	Country	n	Median EQIP	Articles n (%)
4	Australia	17	19	17 (18%)
0	Canada	5	8	5 (5%)
0	NZ	1	32	1 (1%)
8	UK	14	21.5	14 (15%)
4.5	USA	55	18	55 (60%)

Table 5: Descriptive analysis of websites included in the study grouped by source of information (n= number).

Source of information	n	Articles n (%)	Median EQIP
Academic centre (academic institutions)	2	2 (2%)	17.5
Encyclopedia	7	7 (8%)	19
Government/Health Department	8	8 (9%)	20
Hospital (any organization that provides hospital care)	27	27 (29%)	18
Industry (for-profit organization within the medical industry, including clinics)	16	16 (17%)	19
News Service (both primary and secondary news articles that are not written for professionals)	4	4 (4%)	20
Nonprofit academic medical center	1	1 (1%)	16
Patient group (primarily serve patients, such as Patient.info)	22	22 (24%)	19.5
Practitioner (or-profit WebPages of an individual medical practitioner)	3	3 (3%)	15
Professional society (non-profit groups of healthcare professionals)	2	2 (2%)	18

Table 6: Websites scoring above 99<sup>th</sup> percentile or above.

Organization	Content	Identification	Structure	Overall
Plymouth Hospital	16	4	9	29
Kids Health	15	6	11	32

Only 28 websites (30%; median EQIP=21) contain both pre-operative and post-operative advice whereas 43 websites omitted this advice. Complications of tonsillitis or tonsillectomy were included in 63 (68%; median EQIP=17) websites. Half of the websites included both tonsillectomy and antibiotics as treatment for tonsillitis (n=46; 50%), 42 websites included tonsillectomy only (46%) and 4 websites mentioned antibiotics only (4%).

**Discussion**

With increased accessibility and availability of information on the internet, online medical information plays an increasingly significant role in patients' decision-making process. To the best of our knowledge, this is the first study evaluating online patient information for tonsillitis with a reproducible and validated tool,



i.e. EQIP. This study revealed that the quality of patient information regarding tonsillitis was only at a moderate level, with a median EQIP score of 19 (IQR 17-22, max 32). None of the analyzed websites met all 36 criteria of the EQIP tool.

Although EQIP was not initially developed to assess tonsillitis patient information, it has been used across multiple disciplines, including evaluation of other surgical conditions or treatments, namely, rhinoplasty (median EQIP 17, IQR14-20, max 28) [10], cosmetic injectable fillers (median EQIP 20, IQR 16-22, max 28) [11], appendicitis (median EQIP 20; IQR 18-22, max 29) [19], gallstone (median EQIP 15, IQR 13-18, max 28) [16], living liver transplantation (median EQIP 16, IQR 13-20, max 28) [17] and bariatric surgery (median EQIP score 17, IQR 15-19, max 28) [20]. The median score, IQR and maximum score in tonsillectomy websites are relatively high when compared to other studies. This could suggest that the quality of information for tonsillitis on the Internet is generally better. This may be due to higher levels of parental anxiety involved as parents are shown to heavily rely on online health information compared to conditions that primarily affect adults [21,22]. Hence, increases the need for better quality health information which drives the production of these resources. However, a median EQIP score of 19 of all analyzed websites is still far from the maximum possible EQIP score of 36 and, similar to existing literature, the overall quality of online health information remains poor.

Tonsillitis is a common pediatric condition that primarily affects younger individuals aged 5 to 15 [23]. The decision to seek medical attention and consent to treatment is usually made or aided by parents or guardians. A recent study published in 2020 revealed that around half of Internet users decide to see a doctor based on the health information they obtained online [24]. Along with moving away from paternalistic care, the success of the patient-led healthcare approach will be heavily influenced by our ability to educate patients so that they can be more involved in their own care [25,26]. Although trained clinicians are responsible for giving accurate and tailored healthcare information, online information still plays a significant role in patients' decision making and has been shown to affect their compliance with medical advice. Therefore, clear and quality patient information is necessary.

Overall, websites tend to score low in the Content domain, with a median score of 9/18 (50%; IQR 6-11). Complications of tonsillitis or tonsillectomy were only included in 63 websites (68%). When assessing the content, information on the medical problem/treatment and purpose of the intervention was usually available. Nonetheless, only 41% of the websites provided balanced information on the risks and benefits of the treatment and only 48% mentioned alert signs that the patient may detect. Albeit rare, post-tonsillectomy bleed can result in airway obstruction and hypovolemic shock, which can be lethal. Blood transfusion and the return to the operation theatre for cauterization may be necessary for hemostasis, and therefore, it is important to include related alert signs on the websites [27]. While this is likely to be conveyed during the consenting process or postoperative period, it is nonetheless important to ensure patient access to accurate and comprehensive information at all times.

The first and second highest EQIP scores were achieved by websites from New Zealand and the United Kingdom respectively. They both had the highest two scores in the content domain (15 and 16 respectively). The United Kingdom also had the highest IQR of 8, which suggests that the results were diluted by a significant

number of poor-quality websites. These sources are from a mixture of government, hospital and for-profit organizations which did not show differences in patterns of information quality. The IQR ranges for the USA (4.5), Australia (4) and Canada (0) were similar and much smaller (Table 4 and Figure 2).

## Limitations

This methodology has several limitations. Only websites created in the English language from Australia, Canada, the UK, the USA, and New Zealand were evaluated. Although most people speak English as their first or second language in developed countries [28], the conclusion drawn based on these websites may not represent patient information websites from other countries or in other languages. Another limitation is the selection of keywords *via* Google Trends as the absolute numbers of queries are not made available to the public. This means that the most common search terms, and the subsequent popularity of these returned websites, were inferred from the individual keywords' popularity relative to each other. Additionally, despite EQIP not being developed specifically to assess tonsillitis it has been effectively used to assess other ENT conditions or treatments such as rhinoplasty and cosmetic injectable fillers and therefore, was deemed to be appropriate to be used in this study. Finally, the study only evaluated the result at the time the electronic search was carried out: Search engine results will change over time and so does the content of websites, allowing this study to only represent a snapshot in time.

## Conclusion

In conclusion, the internet has become the main source of information in the modern era. One of the commonest childhood surgical ailments, tonsillitis, has yet to be studied. Our data showed that the general quality of health information on tonsillitis was poor. Online medical information can affect patients' decision-making process and help educate patients regarding the condition, which can eventually affect the patient's long-term outcome. Many studies have highlighted the low quality of online medical information, it is important for healthcare information providers to use the information gathered in these studies and create websites including all the essential information.

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