A Quality Assessment of Online Patient Information Regarding Rhinoplasty

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Abstract

There is a large demand for online patient information for patients considering rhinoplasty. While there are many resources available, the quality and content of the information provided are unknown. This study aimed to assess the quality of the most popular information available online, using the "Ensuring Quality Information for Patients" (EQIP) tool to evaluate the content, structure, and readability of patient information on websites. Search terms including nose operation, nose job, nose reshaping, nose tip surgery, rhinoplasty, septorhinoplasty, were identified using Google AdWords and Trends. Unique links from the first 10 pages for each term were identified and evaluated with websites written in English and for general non-medical public use were included. 295 websites met the eligibility criteria with a median overall EQIP score of 17. Only 33% contained balanced information on the risks and benefits. Bleeding and infection risk was only mentioned in 29% and 27% of websites, respectively. Two percent described complication rates of the procedures and only 20% of articles explained further surgery may be required to achieve patient cosmetic or functional satisfaction. Information regarding rhinoplasty available online is currently of poor quality. The lack of effective risk counselling, possible outcome management, and complications may likely lead to unrealistic expectations of rhinoplasty. It is crucial the risks of surgery are communicated to the patient to ensure they can make an informed decision. Improved education through online resources would likely help to promote more realistic patient expectations.

Keywords
- rhinoplasty
- online information
- patient expectations

In 2019, a total of 821,890 rhinoplasties were performed globally with a 13.1% increase in 2018 according to the International Society of Aesthetic Plastic Surgery.[1] With as much as 95% of patients contemplating plastic surgery seeking online information prior to attending a consultation, a need for online quality health information exists.[2] Currently, a wealth of readily accessible online resources is available to inform prospective patients on rhinoplasty and its variants such as septorhinoplasty and non-surgical alternatives.

The value and emphasis patients place on online health information can vary and be influenced by their attitudes toward this medium and to some extent the aesthetic design of websites.[3,4] While online information can aid patients in their understanding of doctors' recommendations and

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advice,[5] the lack of regulation means online information can misinform patients, introduce distress, and increase the tendency toward self-diagnosis or self-treatment, leading to unnecessary treatments.[3]

Despite increasing amounts of online information, few studies have evaluated the quality of their content.[5–7] One of the commonly validated assessment tools is the "Ensuring Quality Information for Patients" (EQIP) scale which assesses all aspects of written health information, including its readability, quality, and design.[8] Published literature using the EQIP tool in other medical specialties has identified that the quality of online health information, including cosmetic surgery such as breast augmentation and liposuction, is generally regarded as inadequate.[6,7,9–11]

This study aims to evaluate the overall quality of information available to patients considering rhinoplasty using the modified EQIP tool.[12]

Methods

On July 05, 2020, five search terms were used to identify eligible websites via the most used search engine, Google.[13–15] The Google search engine was used as previous studies have shown high levesl of duplicates when multiple search engines are used.[16–18] Google Trends and AdWords were used to identify commonly searched phrases related to rhinoplasty.[19,20] Google AdWords links inputted terms with popular-related keyword suggestions while Google Trends provides a comparison with similar and related search patterns. With this, we developed a comprehensive dataset using the following search terms: nose operation, nose job, nose reshaping, nose tip surgery, rhinoplasty, and septorhinoplasty.

All websites providing written health information in English, intended for the general public use and included one of the required search terms, were eligible for inclusion. Websites or articles intended for professionals or specific population subsets were excluded alongside video content, marketing content, or any websites with no educational content.

Web Scraping

A PHP: Hypertext preprocessor (PHP) web scraping tool was developed to identify all unique websites within the first 10 pages of results on Google. The tool makes Hypertext Transfer Protocol (HTTP) requests from a server in Texas, United States, to the search engine to mimic normal queries and no preferences are made to limit searches by geography. All duplicate links within the first 10 pages were removed.

Data Entry

The evaluation included 36 modified EQIP items, all assessed through "Yes," "No," or "N/A" questions, each scoring one point. Country of origin and type of source were also recorded. The collated websites were classified into the following groups:

- Academic Centre
- Charity/Non-Governmental Organization
- Hospital
- Industry
- Practitioner
- Professional Society
- Encyclopedia
- Government/Health Department
- News Service
- Patient Group

Additionally, specific postoperative information was individually assessed, including four sets of precautions, three sets of results, and four sets of complications selected by two ENT surgeons who perform rhinoplasty.

Precautions included advice regarding: (1) Avoidance of strenuous activity or exercise, (2) Sneezing with their mouth open, (3) Rinsing their nose with salt water, and (4) Resting at home for a minimum of 1 week after operation. Results included comments on: (1) Final results may take up to a year, (2) Failure of procedure to improve shape or worsen cosmesis, and (3) Further surgeries may be required to achieve desired cosmetic results. Complications included stating that the procedure may result in: (1) A blocked nose, (2) Bleeding, (3) Infection, and (4) Perforation of the septum. Complication rates were also recorded where available.[21,22]

With supervision and training by E.S., three assessors (G.D.S., K.S.F., S.R.) independently assessed the websites between July 7, 2020 and August 16, 2020. After the initial round of data entry, each website was double checked within the next 4 weeks by another assessor S.A.G.

Modified EQIP Tool

The original EQIP tool consists of 20 items and is designed as a checklist to ensure quality of written work, design, and coherence of health information.[23] The modified EQIP tool expands to a criteria of 36 items, based on guidance of British Medical Association (BMA) and International Patient Decision Aids Standards (IPDAS) on providing optimal information for patients.[24,25] This has been utilized in a variety of specialties previously, including cosmetic surgery.[10,11] The modified EQIP tool eliminates the subjective nature of "partly yes" from the original EQIP, which has been shown to lower reliability.[6,8,12] The final EQIP score is calculated as the sum of all fulfilled items, with a maximum of 36.

The Modified EQIP contains three domains:

- Content (items 1–18), which assesses the adequacy of information and includes content on the medical problem itself (items 1–3, 11, 14) and the management and complications (items 4–11).
- Identification (items 19–24), which assesses whether a website displays its production details such as date of issue, authorship/contributions, and bibliography (items 19–24).
- Structure (items 25–36), which evaluates the design of the website, including its layout and how well information is conveyed to its audience.

"Yes/No" binary questions were used in 31 items, with five allowing the answer of "N/A" where appropriate. Similar to

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existing studies, a cut-off of 75th percentile was set to discriminate between high-scoring websites (HSW) and low-scoring websites (LSW).[17]

This study has further adapted the modified EQIP to be more specific to rhinoplasty procedures including a focus on the complications unique to rhinoplasties, the etiology of the information, and whether there was balanced information considering the potential adverse outcomes.

Statistical Analysis

Dataset consists of continuous and categorical variables and are reported as the mean, median, and their respective interquartile range. Kruskal–Wallis and Fisher's $\chi 2$ tests were used to analyze where appropriate. All p-values were two-tailed and considered significant when $p < 0.05$. rbiostatistics.com (α version)[26] was used to perform the statistical analysis.

Patient and Public Involvement

Patients and public were not involved in the conception, design, data collection, or in the production of this manuscript

Results

Gathering of Websites and Website Demographics

The search terms and list of websites were obtained from "Google AdWords Keyword Planner" and "Google Trends" on July 05, 2020. The five search terms returned a total of 434 websites, with 41 duplicates within each search term excluded. A further 98 were removed based on exclusion criteria, resulting in a final database of 295 websites. Workflow of dataset creation is shown in ►**Fig. 1**

Overall Performance

The median EQIP score was 17 for all websites searched. The median scores for content, identification, and structure domains were 8, 2, and 7, respectively. The 75th percentile EQIP score was 20. The 91 websites that scored equal or greater than 20 were regarded as high-scoring websites. The 204 websites that had EQIP scores less than 20 were regarded as low-scoring websites. The individual performance of each item, odds ratio (OR), 95% confidence interval (95% CI), and p-values are shown in ►**Appendix 1** with a histogram of the EQIP scores for the searched websites seen in ►**Fig. 2**.

Country of Origin and Source of Information

The websites originated from 21 different countries, with the United States (U.S.) ($n = 178$; 51%) producing the most websites followed by the United Kingdom ($n = 56$; 26%). The median total EQIP scores for the United States and United Kingdom are 17 and 19, respectively. South Africa has one entry and holds the highest median EQIP score of 27. The country with the lowest median EQIP score (9) was Norway, also with only one entry. The United States had the highest number of HSWs with 46 (51%) followed by the United Kingdom ($n = 24$; 26%). Practitioners were the most common source of information ($n = 129$; 44%), followed by hospitals ($n = 105$; 36%) and industry ($n = 33$; 11%). Their respective median EQIP scores are 16, 18, and 18, respectively. A

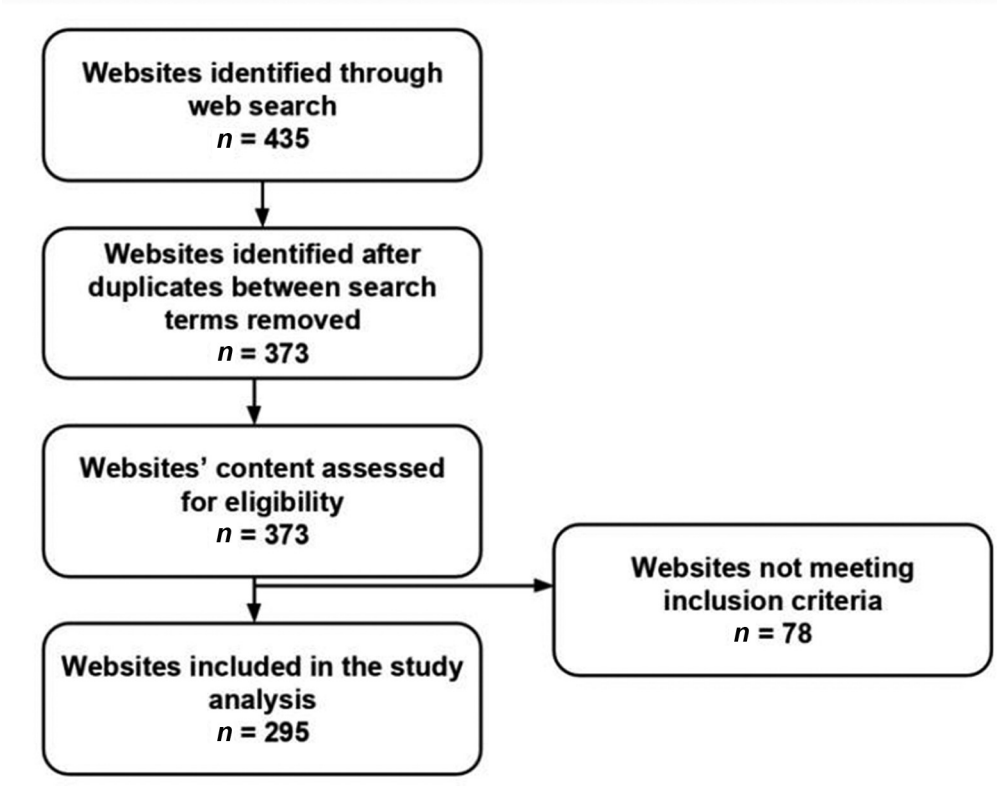

Fig. 1 Flowchart of websites included and excluded in search strategy.

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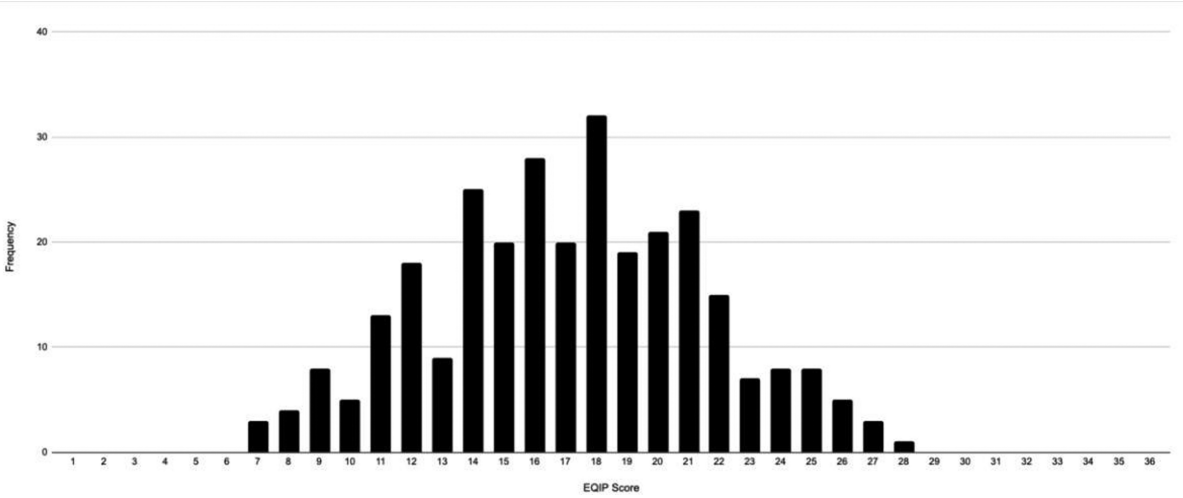

Fig. 2 Histogram showing EQIP scores for all websites collected from the study search. EQIP, Ensuring Quality Information for Patients.

breakdown of highest scoring websites by source can be seen in ►**Table 1**.

Additional Postoperative Information

A total of 223 websites provided additional information regarding the procedure, with 185 (63%) mentioning some form of postoperative precaution, 147 (50%) discussing the expectations of future results, and 121 (41%) referring to postoperative complications. Only seven (2%) websites described complication rates. Most commonly mentioned precautions were resting at home for at least 1 week ($n = 151$; 51%), followed by avoiding strenuous activity/exercise ($n = 123$; 42%). Most mentioned postoperative results were that the final outcome may take up to 1 year ($n = 106$; 36%). Most mentioned complication was bleeding ($n = 97$; 29%). A breakdown of scores by additional postoperative information is shown in ►**Table 2**.

Discussion

This is the first study to evaluate the quality of online patient information for rhinoplasty surgery. With a median EQIP score of 17, the data suggests current online patient information for rhinoplasty is of poor quality. This is in line with other studies that have demonstrated poor online patient information in a range of medical specialities.[7,27] Within surgical procedures breast augmentation 10, liposuction 11, and gallstone disease[12] show equally poor-quality levels with median EQIP scores of 15, 16, and 15, respectively.

ENT United Kingdom and European Academy of Facial Plastic Surgery, two well-known medical societies that produce widely distributed information on rhinoplasty received EQIP scores of 21. While both received good content scores the provenance of their information was not clearly referenced. Forty-seven other websites recorded higher scores than these professional bodies.

The General Medical Council in the United Kingdom has guidelines on decision making and consent, which suggest high quality medical information should be provided to patients for the informed decisions to be made.[28] The method of patient information delivery is important with studies showing only 14% recall of spoken medical information compared with pictorial information[29] and suggesting oral information should always be supplemented with written or visual information to help improve patient understanding.[30]

The study has highlighted three main areas where online patient information for rhinoplasty is inadequate:

A. Counselling on rhinoplasty surgery, which includes:
   i. The risks and complications of surgery.
   ii. The expectations and outcomes of surgery.

Table 1 Top 5 high-scoring websites by type of source

Source of information	High-scoring websites (*n*, %)	Median overall EQIP	Median content	Median identification	Median structure	Articles (*n*, %)
Hospital	41 (45%)	18.0	9.0	2.0	8.0	105 (36%)
Practitioner	23 (25%)	16.0	7.0	2.0	7.0	129 (44%)
Industry	11 (12%)	18.0	8.0	2.0	8.0	33 (11%)
Professional society	6 (7%)	18.0	8.0	2.0	8.0	13 (4%)
Encyclopedia	4 (4%)	21.0	9.5	3.5	8.5	5 (2%)

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Table 2 Website performance by additional postoperative information

Postoperative information included on searched websites	Articles (*n*, %)	High-scoring websites (*n*, %)
Any postoperative precaution	185 (63%)	79 (87%)
Any explanation of future results	147 (50%)	66 (73%)
Any postoperative complication	121 (41%)	67 (74%)
Described complication rates	8 (3%)	6 (7%)
Precaution: avoid blowing nose 48 h postop	57 (19%)	37 (41%)
Precaution: avoid hot baths or showers	32 (11%)	26 (29%)
Precaution: avoid strenuous activity/exercise	123 (42%)	58 (64%)
Precaution: sneeze with mouth open	17 (6%)	15 (16%)
Precaution: rinsing nose with saltwater postop	21 (7%)	15 (16%)
Precaution: rest at home for 1 wk minimum	151 (51%)	64 (70%)
Results: final results may take up to a year	106 (36%)	47 (52%)
Results: failure to improve shape/worse cosmesis	58 (20%)	35 (38%)
Results: need for further surgery to achieve desired result	59 (20%)	40 (44%)
Complication: blocked nose	77 (26%)	44 (48%)
Complication: bleeding	87 (29%)	53 (58%)
Complication: infection	69 (23%)	47 (52%)
Complication: perforation of septum	20 (7%)	11 (12%)

B. The transparency and provenance of displayed information.

A. Counselling on Rhinoplasty Surgery

1. The risks and complications of surgery

Effective shared-decision making is considered to be the pinnacle of patient-centered care but is dependent on patient's access to clinically accurate decision aids with up-to-date and relevant clinical evidence.[31]

Of our article cohort, few contained balanced information on the risks and benefits of the rhinoplasty ($n = 33\%$) with only 2% of all articles and 7% of high scoring websites (HSWs) describing complication rates of the procedure. Where complications were discussed, the most frequently mentioned complication was bleeding (29 vs. 58% in HSWs) followed by blocked nose (26 vs. 48% in HSWs). Rarely was the risk of a septal perforation discussed (7%) with a few discussions on how to handle complications if they arise.

The literature suggests bleeding and infection rates are 0.2 to 2%[34,35] and 0.2%, respectively[32] with Layliev et al showing age over 40 years to be a significant independent risk factor in increasing complication rate; 1.3 versus 0.5% in under 40-year olds ($p = 0.01$).[33] Very few websites included any kind of statistics referring to the benefits (4%) or complications (5%) that patients may experience postoperatively

2. The expectations and outcomes of surgery

A substantial number of rhinoplasty patients undergo revision surgery (5.3%) or have to revisit the hospital for further evaluation (6.5%).[34] The possibility of a second surgery is not reflected in the articles we reviewed as only 20% of the cohort of articles reviewed discussed the possibility of further surgery being required to achieve the patient's desired cosmetic or functional result, or to correct a complication.

Analysis of 2,326 online customer reviews post rhinoplasty by Khansa et al found overall satisfaction post-surgery of 87.6% in females versus 56.1% in males ($p < 0.001$).[35] In those who were dissatisfied, shape of the nose was the most common complaint with difficulty in breathing (male: female: 20.9 vs. 30.2%), excessive scarring (M:F 17.8 vs. 34.9%), looking like a different person (M:F 7.0 vs. 19.4%), and lack of expected improvement in quality of life (M:F 29.5 vs. 23.3%).[35] In the field of otolaryngology in the United Kingdom, within the private sector rhinological surgery (including rhinoplasty) has some of the highest rates of disatisfaction.[36]

The lack of risk counselling, possible outcome management, and complications can unfairly mislead patients toward incorrect expectations of rhinoplasty. This can result in dissatisfaction in their surgery, reduced trust, and reduced confidence in the health care system as well as in possible future litigation. Unrealistic expectations of surgical outcomes have been well documented in other aesthetic surgical procedures.[10,11,27,31] It is crucial the risks of surgery are communicated to the patient to ensure they can make an informed decision on whether a rhinoplasty is in their best interests.[2] Improved patient education through online resources may help to promote more realistic outcome expectations.

B. The transparency and provenance of displayed information

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A lack of evidence-based information was a common feature in the articles reviewed. Only 3% of the articles contained a bibliography of sources to support the assertions in the respective literature. The 105 hospital-sourced articles had the greatest proportion of highest scoring articles (45%) while medical practitioner websites written by individual surgeons performed poorly despite being most common source of articles ($n = 129$) with only 25% scoring highly.

Medical practitioners use websites to promote themselves and their services[10,11,37] with an increasing trend establishing a social media presence to attract potential custom.[38] In a competitive marketplace, it is possible that the clear signposting of risks including complication rates of their individual services may deter potential clients[10] and push them toward surgeons who do not declare such information. This is supported by our findings where qualitative benefits of the surgery were explained in nine out of 10 websites, but complications rates explained in less than one. It is known that there is a higher incidence of publications with positive conclusions from surgeons with financial conflicts of interest versus those with no financial interests.[39]

Furthermore, patients have limited access to the opinions and experiences of other previous rhinoplasty patients with only 2% of articles analyzing featured descriptions detailing the real experience of those who have undergone the procedure. Having both positive and negative experiences from patients or access to Q&A sessions with previous patients would enable concerns and questions to be raised with those who have been through the experience.

Unbiased, referenced, and up-to-date information needs to be provided in all patient-accessible information. Such information can address patient concerns,[40] can allow effective informed decision making leading to better outcomes. Patients want this type of accessible information[41] and by improving shared decision making we can ensure patient expectations are maintained in rhinoplasty.

Limitations

The selection of search terms was based on the use of "Google AdWords Keyword Planner" and "Google Trends" which may not include all the results that patients may use to acquire information on their surgeries.

As only the first 10 results of each google search was included in this study our results are limited to a snapshot in time with website content and popularity adapting constantly. This piece did not analyze material from posts or articles only available on social media. The exclusion of websites written in different languages will mean some material that a proportion of United Kingdom patients can read and access will not be summarized in this study.

While this piece assesses the quality of some of the material available on the internet, further work is needed to summarize the quality of information provided on social media, in video content as well as in physical paper leaflets provided to patients. We appreciate that websites cannot include all the information a patient may want or need to fully inform them on a procedure, and that clinicians will have different ways of delivering information which may not include their website. However, as they are used for marketing purposes it should be a good practice that honest, transparent, and up-to-date information would be provided to patients irrespective of the agenda or purpose of that website. We have entered an era where a patient will often search the internet for more information on their procedure or doctor.

Conclusion

Our study has identified that online resources relating to rhinoplasty are of poor quality. The majority of websites do not adequately inform patients of the risks, complications, and potential outcomes of rhinoplasty and may contribute to patient dissatisfaction and distress by setting unrealistic expectations. Like current literature on other cosmetically enhancing procedures, our study highlights the need for health care professionals, particularly those of the private sector, to deliver higher quality and unbiased information for patients to make informed decisions.

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Conflict of Interest
None declared.

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Appendix 1 Statistical analysis of the websites searched based on each item of the EQIP score

Item	Yes (*n*, %)	No (*n*, %)	N/A (*n*, %)	OR	%95 CI	*p*-Value
1. Initial definition of which subjects will be covered.	223 (76%)	72 (24%)	0 (0%)	14.91	4.65–76.29	<**0.001**
2. Coverage of the previously defined subjects (NA if the answer is "no" for item 1).	218 (74%)	26 (9%)	51 (17%)	16.60	5.19–84.80	<**0.001**
3. Description of the medical problem/treatment/procedure.	271 (92%)	24 (8%)	0 (0%)	–	–	<**0.001**
4. Definition of the purpose of the interventions.	273 (93%)	22 (7%)	0 (0%)	10.28	1.60–430.99	**0.003**
5. Description of treatment alternatives (conservative management).	53 (18%)	242 (82%)	0 (0%)	6.41	3.25–13.02	<**0.001**
6. Description of the sequence of the interventions and surgical procedure.	211 (72%)	84 (28%)	0 (0%)	8.72	3.60–25.61	<**0.001**
7. Description of the qualitative benefits for the patient.	265 (90%)	30 (10%)	0 (0%)	14.84	2.38–614.15	<**0.001**
8. Description of the quantitative benefits to the patient.	16 (5%)	279 (95%)	0 (0%)	4.05	1.28–14.04	**0.010**
9. Description of the qualitative risks and complications.	160 (54%)	135 (46%)	0 (0%)	9.92	4.98–21.32	<**0.001**
10. Description of the quantitative risks and complications.	11 (4%)	284 (96%)	0 (0%)	10.99	2.21–106.71	<**0.001**
11. Addressing quality-of-life issues.	217 (74%)	78 (26%)	0 (0%)	6.37	2.76–17.21	<**0.001**
12. Description of how complications are handled.	57 (19%)	238 (81%)	0 (0%)	8.55	4.33–17.51	<**0.001**
13. Description of the precautions that the patient may take.	148 (50%)	147 (50%)	0 (0%)	11.38	5.79–23.94	<**0.001**
14. Mention of alert signs that the patient may detect.	46 (16%)	249 (84%)	0 (0%)	7.30	3.51–15.88	<**0.001**
15. Addressing medical intervention costs and insurance issues.	110 (37%)	185 (63%)	0 (0%)	2.92	1.70–5.04	<**0.001**
16. Specific contact details for hospital services (NA if not hospitals).	105 (36%)	31 (11%)	159 (54%)	1.57	0.91–2.69	NS
17. Specific details of other sources of reliable information/support.	20 (7%)	275 (93%)	0 (0%)	10.57	3.27–44.83	<**0.001**
18. Coverage of all relevant issues for the topic (summary item for all content criteria).	27 (9%)	267 (91%)	1 (0%)	37.76	9.02–337.37	<**0.001**
19. Date of issue or revision.	31 (11%)	264 (89%)	0 (0%)	5.78	2.46–14.46	<**0.001**
20. Logo of the issuing body.	223 (76%)	72 (24%)	0 (0%)	6.74	2.77–19.86	<**0.001**
21. Names of the persons or entities that produced the document.	116 (39%)	179 (61%)	0 (0%)	2.54	1.49–4.37	<**0.001**
22. Names of the persons or entities that financed the document.	96 (33%)	198 (67%)	1 (0%)	2.92	1.69–5.09	<**0.001**
23. Short bibliography of the evidence-based data used in the document.	10 (3%)	285 (97%)	0 (0%)	9.65	1.87–95.21	**0.002**
24. Statement about whether and how patients were involved/consulted in the document's production.	6 (2%)	289 (98%)	0 (0%)	1.12	0.10–8.00	NS
25. Use of everyday language and explanation of complex words or jargon.	275 (93%)	20 (7%)	0 (0%)	4.29	0.99–38.95	**0.043**
26. Use of generic names for all medications or products (NA if no medications described).	87 (29%)	10 (3%)	198 (67%)	6.92	3.85–12.63	<**0.001**
27. Use of short sentences (<15 words on average).	285 (97%)	10 (3%)	0 (0%)	1.04	0.23–6.39	NS

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Appendix 1 (*Continued*)

Item	Yes (*n*, %)	No (*n*, %)	N/A (*n*, %)	OR	%95 CI	*p*-Value
28. Personal address to the reader.	244 (83%)	51 (17%)	0 (0%)	13.99	3.52–121.73	<**0.001**
29. Respectful tone.	289 (98%)	6 (2%)	0 (0%)	–	–	NS
30. Clear information (no ambiguities or contradictions).	273 (93%)	22 (7%)	0 (0%)	10.28	1.60–430.99	**0.003**
31. Balanced information on risks and benefits.	98 (33%)	197 (67%)	0 (0%)	8.38	4.66–15.37	<**0.001**
32. Presentation of information in a logical order.	251 (85%)	44 (15%)	0 (0%)	23.90	3.92–977.49	<**0.001**
33. Satisfactory design and layout (excluding figures or graphs; see next item).	219 (74%)	76 (26%)	0 (0%)	16.25	5.08–83.05	<**0.001**
34. Clear and relevant figures or graphs (NA if absent).	75 (25%)	29 (10%)	191 (65%)	1.26	0.69–2.28	NS
35. Inclusion of a named space for the reader's notes or questions.	40 (14%)	255 (86%)	0 (0%)	2.58	1.24–5.40	**0.009**
36. Inclusion of a printed consent form contrary to recommendations (NA if not from hospitals).	2 (1%)	158 (54%)	135 (46%)	2.25	0.03–177.66	NS

Abbreviation: NS, not statistically significant.
Note: All *p*-values <0.05 are deemed statistically significant and noted in bold.

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