Obstetric Anal Sphincter Injury:
A Systematic Review of Information Available on the Internet

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Online information concerning obstetric anal sphincter injury is of poor quality.

Short title:

Abstract

Background
The internet is an important source of health information, however, there is no clear governance pertaining to quality.

Objective
We evaluated the accuracy, credibility, reliability, and readability of online information concerning obstetric anal sphincter injury.

Study design
Five popular search engines, aol.com, ask.com, google.com, bing.com, and yahoo.com were searched using the popular keywords including birth trauma, third degree tear, and fourth degree tear. The first thirty webpages were identified for each keyword and were considered eligible if they provided information regarding obstetric anal sphincter injury.

Eligible webpages were assessed by two independent researchers for (1) accuracy (prioritised criteria based upon the Royal College of Obstetricians and Gynaecologists Third and Fourth Degree Tear guideline, range 0-9); (2) credibility (White Paper instrument, range 0-10); (3) reliability (DISCERN instrument, range 0-85); and (4) readability (Flesch-Kincaid instrument, range 0-100). Inter-rater reliability of assessments was evaluated using intra-class co-efficient. We summarised these data in diagrams, tables, and narratively.

Results
Fifty-eight webpages were included. Seventeen webpages had obtained Health-Online the Net certification or Information Standard approval. No webpage performed consistently well over the four domains of assessment. One webpage fulfilled the entire criteria for accuracy: tamesidehospital.nhs.uk. Webpages performed poorly when considering risk factors (23/58),
diagnosis (16/58), and prognosis (12/58). Webpages performed better with regards to
credibility, for example webpages were frequently assessed as being useful (51/58),
highlighted research evidence relevant to the information being presented (44/58), and
provided information regarding author credentials and affiliations (30/58). Over a third
(21/58) were assessed as unreliable. Only two webpages were assessed as being written in
plain English.

Conclusion
Information currently available on the internet concerning obstetric anal sphincter injury often
uses language which is inappropriate for a lay audience and lacks sufficient accuracy,
credibility, and reliability. Healthcare professionals should be aware that online information
pertaining to obstetric anal sphincter injury is poor quality. Providers of online information
should be strongly encouraged to adhere to regulations such as the Health on the Net
Foundation accreditation.

Keywords:
1. Accuracy
2. Credibility
3. Obstetric Anal Sphincter Injury
4. Online Information
5. Quality
6. Systematic Review
**Introduction**

Obstetric anal sphincter injuries (OASI) following vaginal deliveries are severe perineal tears and encompass third-degree tears, injury involving the anal sphincter complex, and fourth-degree tears, injury involving the anal sphincter complex and anal mucosa. (1) The risk of such injuries is estimated to be 5% in nulliparous women and over 7% in higher risk groups. (2) The true prevalence of obstetric anal sphincter injury is unknown, however, it is likely to be higher than estimated, as occult injury is not recognised during clinical examination but is evident on endoanal ultrasound. (3) Short-term management of obstetric anal sphincter injuries requires immediate surgical repair. Repairs are performed by an appropriately trained clinician, preferably in an operating theatre under regional analgesia. (4) Post-operatively analgesia, antibiotic prophylaxis, laxatives, and pelvic floor physiotherapy are recommended. (4) Obstetric anal sphincter injuries are associated with significant morbidity including anal incontinence, urinary incontinence, and sexual dysfunction (5-7). Potential long-term morbidity, difficulties during the convalescence period, and anxieties regarding future births often motivate women, partners, and families to seek online information regarding obstetric anal sphincter injuries.

The internet is perceived as an important source of health information among patients and is increasingly used (8). Young women are more likely to use the internet for this purpose with pregnancy and childbirth accounting for over a fifth of all health-related searches. (9) Patients can access information about their condition, share experiences with others, and utilise support networks anonymously and conveniently. However, the quality of information online can be variable and inaccurate information can be related to adverse outcomes and poor decisions regarding treatment (10).

**Objective**
To date, there is no systematic evaluation of online health information pertaining to obstetric anal sphincter injury. We assessed the accuracy, credibility, reliability, and readability of webpages providing information on the diagnosis and management of obstetric anal sphincter injury.

Methods

Sources

A protocol with explicitly defined objectives, criteria for World Wide Web page selection, and approaches to assessing accuracy, credibility, reliability, and readability was developed. The protocol is registered with the International Prospective Register of Systematic Reviews (PROSPERO), registration number: CRD42017078212. This systematic review was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidance.(11)

Identification of webpages

A comprehensive search strategy was developed. During September 2017, we searched five popular search engines: aol.com, ask.com, bing.com, google.com, and yahoo.com.

Search term selection

Google.com keyword planner and semrush.com were used to define, select, and evaluate the most relevant keywords related to obstetric anal sphincter injury. A long list of terms and phrases were evaluated within google.com keyword planner, terms yielding fewer than 100 monthly searches were excluded. We used the following search terms: (1) perineal trauma (1000 searches per month), (2) perineal tear (100,000 searches per month), (3) perineal laceration (10,000 searches per month), (4) obstetric trauma (1000 searches per month), (5) third degree tear (10,000 searchers per month), (6) fourth degree tear (1000 searches per
We reviewed webpages identified by search terms on the first three pages per search engine. The search was limited as the vast majority of internet users do not seek information from webpages listed past the first three pages returned by a search engine. Location services were disabled to reduce geographical bias.

We organised the webpages and two researchers (VG and VP) screened the webpages for eligibility based on predetermined eligibility criteria. Webpages were considered eligible if they provided information about obstetric anal sphincter injury such as the classification of tears, associated risk factors, preventative methods, diagnosis, treatment by surgical repair, prognosis, post-operative management, follow up, and mode of delivery in future pregnancies. Websites were excluded for the following reasons: language other than in English; citations of scholarly articles; advertisements for products, hospitals, and clinicians; personal experience or blogs; videos resources; password protected sites; and material aimed at medical professionals. Discrepancies were resolved by a third reviewer (SKD).

Eligible webpages were saved in an electronic form and duplicates removed. Two independent researchers (VG and VP) extracted webpage characteristics and assessed accuracy, credibility, reliability, and readability.

**Webpages characteristics**

Two researchers (VG and VP) independently extracted website characteristics using a piloted data extraction Microsoft Excel sheet. Webpage characteristics extracted included country of origin, listed authors, disease specific, patient focused, presence of a patient forum, privacy statement, source of funding, and external editorial approvals. Discrepancies were resolved by a third reviewer (SKD).
Quality assessment

Webpages were assessed for accuracy, credibility, reliability, and readability. Researchers were trained to evaluate:

1. **Accuracy** prioritised criteria based upon the Royal College of Obstetricians and Gynaecologists (RCOG) *Third and Fourth Degree Tear* guideline, range 0-9;
2. **Credibility** White Paper instrument, range 0-10;
3. **Reliability** DISCERN instrument, range 0-85;
4. **Readability** Flesch-Kincaid instrument, range 0-100.

Two researchers (VG and VP) independently assessed each webpage.

Accuracy of information presented on webpages was assessed by a prioritised nine-item criterion (Appendix A). This was formulated and guided by evidence-based recommendations from the Royal College of Obstetricians and Gynaecologists guideline, *Third and Fourth Degree Tears 2015*. Recommendations pertaining to classification, risks, preventative strategies, diagnosis, surgical treatment, and further management of obstetric anal sphincter injury were extracted from the guideline. With regards to surgical repair, details of standardised repair technique were omitted. Each criterion was scored the following: zero for not mentioned or incorrectly mentioned, one for partially mentioned and two for correctly mentioned; total scores ranged from zero to 18.

The White Paper instrument was developed for healthcare users to critically appraise the credibility of online information using the following criteria. Credibility was assessed using 10-point criteria: (1) source; (2) context; (3) currency; (4) utility; (5) editorial review process; (6) hierarchy of evidence; (7) statement of original source; (8) disclaimer, which included ownership, sponsorship, funding, and advertising; (9) omissions; and (10) feedback. Each criterion was scored zero if absent and one if present, total scores ranged from zero to 10. Webpages were considered credible if they achieved scores $\geq 7$. 

(1) accuracy
(2) credibility
(3) reliability
(4) readability
The DISCERN instrument developed by the National Health Service Executive Research and Development Programme consists of 16 questions and is used to assess reliability of written information regarding treatment choices.(14) Questions one to eight assess the reliability and dependability of information, questions nine to 13 and 15 specifically assess information on treatment options. For this study, question 14 was excluded as no treatment is not a recommended management strategy in the event of an obstetric anal sphincter injury. Question 16 is an overall global rating. These questions are scored on a Likert scale anchored between one (low quality) to five (high quality). Total scores ranged from 15 to 75 and were arbitrary grouped: very poor (15–26), poor (27–38), moderate (39–50), good (51–62), and excellent (63–75) (17,18).

The Flesch-Reading Ease Score and Flesch-Kincaid Grade level, were used to assess the readability of webpages. The Flesch-Reading Ease score was calculated using a validated formula using an online readability calculator (https://readable.io). Flesch-Reading Ease scores ranged from zero to 100, with higher scores indicating easier reading.(15) It has been recommended health information should achieve a Flesch-Reading Ease score below 70. Flesch-Kincaid Grade level are based on the United States grade levels and range from one to 12 and were calculated using an online readability calculator (https://readable.io). It has been recommended health information should not exceed a level above seventh grade.(19)

**Data analysis**

Scores obtained for accuracy, credibility, reliability, and readability from each researcher were averaged and presented as means, standard deviation (SD), and percentages. Inter-rater reliability of assessments was tested for agreement using intra-class co-efficient. Scores less than 0.2 indicated poor agreement, 0.6 to 0.8 indicated good, and greater than 0.8 indicated very good agreement.(20)
Results

Our search strategy identified 1,198 webpages. After excluding 768 duplicate records, 430 webpages were screened. Fifty-eight webpages met the study’s inclusion criteria.

Webpage characteristics

Twenty-seven webpages (47%) were published in the United Kingdom (Appendix B). Most webpages (54/58; 93%) stated a privacy statement, 20 webpages (34%) attributed authorship, and 27 webpages (46%) were government funded. Fifteen webpages (25%) had obtained Health-On line the Net certification or Information Standard approval.

Accuracy

The intra-class coefficient between researcher VG and VP was 0.98 (95% CI 0.96 – 0.99). A single webpage (1%) fulfilled the entire criteria for accuracy: tamesidehospital.nhs.uk. The definition of obstetric anal sphincter injury was among the criteria communicated most frequently and accurately by webpages (53 webpages, 91%). Webpages performed poorly when considering preventative strategies (23 webpages; 39%), risk factors (23 webpages; 39%), diagnosis (16 webpages; 27%), and prognosis (12 webpages; 20%). Webpages frequently reported information regarding surgical treatment (43 webpages; 74%) and post-operative management (44 webpages; 75%), and future childbirth (25 webpages; 43%)

Credibility

Twenty-nine webpages (50%) were assessed as credible. A third of webpages (17 webpages, 30%) were accredited by The Information Standard or Health-On line the Net. All webpages provided information regarding the source of information. Fifty-one webpages (87%) were frequently assessed as being useful and fit for purpose and 44 webpages (75%) presented evidence for the information provided. Webpages performed well with regards to content (53 webpages; 91%) and data of publication and intentions to update (42 webpages;
72%). Over half of webpages (30 webpages, 52%) were assessed as containing information regarding author credentials including affiliations. Thirty webpages (51%) provided an opportunity for users to provide feedback. Funding and sponsorship was infrequently reported (16 webpages; 27%).

Reliability
The intra-class coefficient between researchers VG and VP was 0.94 (95% CI 0.89-0.96).

No webpage consistently performed well across assessment domains. Twenty-one webpages (36%) were assessed as poor or very poor. Forty-nine webpages (84%) explained the operative technique for obstetric anal sphincter injury repair. Forty-three webpages (74%) described the benefits of operative repair and 38 webpages (65%) described the risks. Forty-three webpages (74%) described aspects of quality of life. Fifty-five webpages (94%) were assessed as providing no information regarding long-term morbidity associated with no treatment.

Readability
When considering the Flesch-Reading Ease Score for included webpage, no webpage met the recommended Flesch-Reading Ease Score below 70. When considering the Flesch-Kincaid Grade level for included webpages, two webpages mayoclinic.org and babycentre.co.uk met the recommended seventh grade reading level.

Comment

Main findings
A minority of webpages had obtained Health-Online the Net certification or Information Standard approval. No webpage performed consistently well over the four domains of assessment. One webpage provided accurate information. Most webpages provided no
information regarding risk factors, diagnosis, and prognosis. Webpages performed better with regards to credibility, for example webpages were frequently assessed as being useful, highlighted research evidence relevant to the information being presented, and provided information regarding author credentials and affiliations. Over a third were assessed as unreliable, however, many webpages did describe the benefits of operative repair, discussed quality of life, and provided information with regards to future health. Only two webpages were assessed as being written in plain English.

Strengths and weaknesses

To our knowledge, this is the first study to examine the accuracy, credibility, reliability, and readability of online information concerning obstetric anal sphincter injury. We used a comprehensive search strategy to identify webpages relevant to obstetric anal sphincter injury. Validated instruments were used to assess credibility, reliability, and readability. Webpage assessment was undertaken by two researchers independently, with evidence of good inter-rater agreement.

Several study limitations exist. We limited our search to webpages written in English, it is challenging to draw any firm conclusions regarding webpages written in other languages. We limited our search to the first three pages of search results, potentially missing webpages eligible for inclusion. We cannot comment on the impact of the included webpages on the knowledge acquired or health-related decision influenced. We did not perform an assessment of webpage design or the impact of factors including presentation and ease of navigation on patient experience and education.

Comparison with existing literature

Our findings are consistent with previous studies (16) (18) (21). The quality of online health information is poor across a range of obstetric and gynaecological topics (21) (16) (18).

Readability of webpages and their ability to convey information to patients was a concern
among studies. Both, Tirlapur et al and Hirsch et al, concluded webpages were poorly written and unsuitable for public audiences (21) (16). Information on webpages was often incomplete and contained inaccuracies. Similar, to findings from our study, Fioretti et al found information lacked long-term prognosis and long-term complications related to caesarean section. Although, Fioretti et al assessed webpages written in Portuguese, it is significant as poor quality information is not limited to a country or language (18). Our study did not perform a sub-analysis determining the quality of online information according to organisations. However, Tirlapur et al concluded that specialist sites produced higher quality information than non-specialist sites (21). Therefore, patients should be directed to dedicated websites for further online information.

Websites that spread misinformation will always exist. We need to equip women with critical questions to assess the quality of information and arm themselves against poor and biased information. At present, there are no tools available for patients to utilise and identify high quality information to support health-related decisions.

As clinicians, we must be aware of the limitations of online literature and the language used to convey information. Due to shorter consultation times, patients may refer to online resources for further information and peer-peer support (23). However, as demonstrated by this study and previously reported by others, online information uses language that exceeds basic literacy levels of adults (16). Thereby, online information can fail in its very purpose to inform and educate patients regarding their condition and treatment options. To effectively utilise the internet as a health resource, clinicians should refer patients to webpages that communicate information which can be understood clearly by a lay audience.

The internet can influence and impacts our patients’ decisions, beliefs and attitudes towards their health. In clinical practice, medical advice is given by qualified professionals however, online information may be produced by individuals and groups that do not have such
credentials. Online content can lack an evidence base, failing to reflect current practice and opinion. Patients do not have the skills to critically appraise health literature to detect unreliable, inaccurate and biased information. Such information can leave patients vulnerable and may be used to inform health decisions potentially causing harm.\textsuperscript{(24,25)} Most concerning, is that a large proportion of patients will fail to discuss the knowledge acquired from the internet as they feel confident about the credibility of the source.\textsuperscript{(26)} Such information may be used to inform health decisions and potentially cause harm.\textsuperscript{(24,25)} For this reason, it is imperative that health professionals encourage discussion regarding internet findings to provide clarification or rationales for management plans that may differ from those read online. Failing to do so may result in poor adherence to treatments and a breakdown in the doctor-patient relationship.

The governance of online health information has inherent difficulties. Currently, online information is not subject to mandatory requirements or standards including a peer review process. However, codes of conduct have been developed such as the HONcode and Information Standard. Although, accreditation is voluntary they aim to guide internet users by highlighting reliable, relevant and trustworthy sources of health and medical information. This study evaluated written information however, the method of delivering online health information is changing. Increasingly, videos are being used to deliver information and although, we are familiar with appraising online written information using validated instruments. There are few studies that have appraised the quality or effectiveness of information delivered using modalities such as video, and there are currently no validated tools for such purposes. Further research is required to develop validated instruments to assess the quality of online information delivered by video and its effectiveness to inform patients.

At present the information provided on the internet does not effectively inform women about obstetric anal sphincter injury. Key aspects including long-term morbidity and prognosis are
often absent in current health literature. Health care professionals should clearly
communicate risks and benefits as well as areas of uncertainty regarding diagnostic or
therapeutic options. Women who have sought online information should be encouraged to
discuss the accuracy of information. During which, patients should be made aware of the
dangers of inaccurate online information and the potential adverse outcomes. Health
professionals can advise patients of organisations and websites that provide high quality
online information. This allows for a shared decision making during discussions that will
inform women regarding future health and lifestyle choices.

It is in the interest of professional bodies and clinicians to contribute to the development of
webpages. This ensures that the content published is credible, reliable and accurate.
Furthermore, producers of online health information should be encouraged to adhere to
regulations such as the HONcode and Information Standard. Patient-centred interventions
are required to enhance online literacy and allowing patients to identify high quality health
information (27).

Conclusion and implications

Information currently available on the internet concerning obstetric anal sphincter injury often
uses language which is inappropriate for a lay audience and lacks sufficient accuracy,
credibility, and reliability. Healthcare professionals should be aware that online information
pertaining to obstetric anal sphincter injury is poor quality. Providers of online information
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