

An assessment of the quality of information available on the Internet about the IUD and the potential impact on contraceptive choices

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Abstract

This study analyzed data gathered from a survey of online information on the intrauterine device (IUD) to determine the content and quality of information available to consumers and providers, as evidenced by the presence or absence of a series of attributes measuring the accuracy and objectiveness of information provided. While information on the IUD is consistently available on websites providing information about birth control options, there is a great deal of misinformation about the IUD on the Internet. A substantial percentage of sites, designed for both healthcare providers and consumers, state that the IUD increases risk of pelvic inflammatory disease, ectopic pregnancy and infertility. This misinformation can effectively limit access to the IUD, so it is vital to monitor the quality of information available to consumers online and encourage clinicians to take an active role in correcting misperceptions among their patients. © 2003 Elsevier Inc. All rights reserved.

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1. Introduction

The intrauterine device (IUD) is a safe, effective and convenient form of reversible birth control, but less than 1% of women choose it in the United States, compared to 12% worldwide [1]. One might expect to see greater use given the fact that the IUD can serve as a safe, highly effective, alternative to female surgical sterilization, currently the most common form of birth control in the United States [2]. One possible explanation for this discrepancy is the quality of information available about the IUD to consumers and healthcare professionals, specifically on the Internet. Women in particular rely on the Internet for health information [3]. However, recent studies have reported that online health information is often inaccurate and biased [4–6]. This study was designed to determine the content and quality of online information on the IUD in order to assess the quality of information available to consumers and providers about the IUD and whether the information may influence birth control choices.

2. Methods

2.1. Identifying search terms and search engines

A thorough search of the Internet was conducted to identify websites with information on the IUD. The search was conducted following a two-tiered approach. As a first step, a general search was conducted using the terms *birth control* and *contraception* in order to determine whether information on the IUD is available in discussions about birth control options. This is referred to as the Contraception Study. A second more specific search was then conducted using the terms *IUD*, *intrauterine device*, *intrauterine contraception*, *intrauterine system*, *Mirena* and *ParaGard* to identify sites with specific information on the IUD and to determine the quality of that information. This is referred to as the IUD-specific Study.

The search was conducted using 11 search engines: Altavista, AskJeeves, Excite, Google, HotBot, InfoSpace, Inktomi, LookSmart, Lycos, Overture and Yahoo. InfoSpace was not on the original list of search engines, but it is automatically included within Metacrawler, the power search tool that was employed to conduct a power search using AskJeeves, Excite, Google, Inktomi, LookSmart and Overture. Power searching is popular and efficient because

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it allows a “surfer” to use several search engines simultaneously.

The search engines were chosen based on widespread use as determined by online rating systems such as Juniper Media Metrix Ratings and Nielson/NetRatings. These systems conduct surveys of home and work “surfers” and measure popularity in several ways, including: (a) the number of times a sample of home and work “surfers” use a search engine; and (b) the average amount of time a sample of “surfers” spend searching with a particular engine.

In addition to prominence in ratings, the search engines chosen represent the two basic methods for searching the web. One type, exemplified by Yahoo, searches within a human-compiled database of listings. The other method searches the Internet by using a “crawler” that examines all available online information for a particular search term. Google is a very popular crawler-based search engine with a strong reputation for its ability to direct surfers to reliable and high-quality sites.

During the power search and individual searches, each engine was requested to return up to 20 sites (this includes requiring each of the seven search engines included in the Metacrawler power search to return up to 20 sites each).

2.2. *Conducting the search*

The original search, conducted September 9–12, 2002, identified 99 websites in the Contraception Study and 524 websites in the IUD-specific Study. The Contraception Study yielded significantly fewer sites because only two search terms were used, in contrast to the IUD-specific Study search, which used six search terms.

Between September 12th and 24th, 2002, each of the original websites was carefully reviewed to determine study eligibility. A site was included in the study if it offered a consumer or provider information or guidance in learning about or choosing a method of birth control. Sites were excluded from the study for the following reasons: duplicate sites, if the language was not English, if the site content was not relevant to the study (e.g., the site only provided historical information on contraception or its focus was policy or religious debate on the topic), if the site merely provided a list of links and no content, and if it could not be accessed. In the end, 28 Contraception Study sites and 115 IUD-specific Study sites were included in the study. The review of all study sites was conducted during September, October and November 2002.

2.3. *Website review*

Two questionnaires—a short one for the Contraception Study and a longer one for the IUD-specific Study—were created to collect information about each website. The Contraception Study questionnaire primarily was designed to

ascertain whether sites that had information about birth control in general included specific data on the IUD. It also included questions about whether that information was up-to-date and accurate (Table 2).

The IUD-specific Study questionnaire was comprised of a list of attributes to help understand the type and quality of online information available to consumers and providers on the IUD (Table 3). The attributes were intended to reveal if a site objectively presented specific information about IUD characteristics, including benefits and disadvantages, or if it made erroneous claims about the IUD. The questionnaire also included questions to help ascertain the overall accuracy and credibility of a site; these attributes are defined below.

Once the study sites were identified, a small pilot study of the IUD-specific Study questionnaire was conducted. The questionnaire worked well, allowing site attributes to be easily identified, and the majority of pertinent questions had been included. Only minor modifications were made. Subsequently, the review of all sites in both the Contraception and IUD-specific studies was conducted. A Yes/No response was recorded for each question to signify the presence or absence of specific information. For example, a website had to explicitly state that the IUD was safe for it to be credited with that attribute.

2.3.1. *Up-to-date*

An up-to-date site correctly mentioned that the Copper T-380A and the levonorgestrel intrauterine system (the Mirena) were on the market as of September 2002. If the progesterone-T was mentioned, the site indicated that this IUD was no longer marketed in the United States as of September 2002.

2.3.2. *Accurate representation of standard product information*

These sites included the following elements of standard product information as described in peer-reviewed scientific literature: IUD failure rates, mechanisms of action and the clinical insertion process.

2.3.3. *Clearly false information*

These sites made claims that conflict with information supported by peer-reviewed scientific literature or World Health Organization guidelines [7]. Examples of false information include misrepresentation of how the IUD functions to prevent pregnancy, erroneous statistics on the IUD's effectiveness and misleading information such as the recommendation that women should not breastfeed while using an IUD.

2.3.4. *Internally inconsistent or contradictory information*

These sites provide information in one area of the website that is directly contradicted in another. An example is a website that in one section states that the Mirena IUS is not yet available in the United States, yet in another section it

Table 1
Number of sites included in or excluded from the study

Study type	Include in study	Exclude from study (reasons for exclusion below)					Total
		Duplicate site	Not relevant ^b	Language not English	Provides links only	Cannot access site	
Contraception	28	42	25	0	3	1	99
IUD-specific ^a	115	294	42	61	6	6	524

^a IUD-specific study includes 87 consumer sites and 28 provider sites.

^b Sites were determined not relevant if the site content did not pertain to the study (e.g., the site only provided historical information on contraception or its purpose was to debate policy or religious issues related to the IUD or contraception).

reports that the Mirena became available in the United States in early 2001. Often, these are editing errors that reveal that a site is not routinely and thoroughly updated.

2.3.5. Site ownership provided

These sites clearly identified ownership by providing copyright information.

2.3.6. Site affiliation identified

These sites identified other organizations that sponsored, reviewed, or endorsed the website.

2.4. Data analysis

The unit of analysis is the website. While the sites in the Contraception Study were reviewed as a single group, the websites in the IUD-specific Study were categorized as either provider or consumer sites. Sites were categorized as provider sites if they clearly were designed for a specific group of professional membership, if the language and terminology used was directed to a specific professional audience, or if the materials provided on the site (e.g., medical handouts, descriptions of clinical procedures, advice on how to approach patients, papers published in peer-reviewed journals) were designed for professional use or education. In most cases, χ^2 tests were performed to determine whether categorical measures varied significantly by type of site (provider or consumer). In cases where there were expected to be one or more groups or five or fewer sites, two-sided Fisher exact tests were used.

3. Results

3.1. Study sample

The original search identified 99 websites during the Contraception Study search and 524 websites during the IUD-specific Study. Each of the original websites was reviewed to determine if it was eligible for the study (Table 1). After eliminating duplicate sites (42 Contraception Study sites and 294 IUD-specific Study sites), additional sites were excluded if the language was not English (61 IUD-specific Study sites), if the site content was not rele-

Table 2
Descriptive characteristics of all sites in the contraception study

Attribute	Yes	
	n	%
Site provides information on the IUD in discussions about birth control options	28	100
Information is up-to-date	10	35.7
Information accurately represents standard product information	18	64.3
Site ownership is identifiable	27	96.4
Site affiliation is identifiable	26	92.9
Total number of sites	28	

vant to the study (25 Contraception Study sites and 42 IUD-specific Study sites), if the site merely provided a list of links and no content (3 Contraception Study sites and 6 IUD-specific Study sites), and if it could not be accessed (1 Contraception Study site and 6 IUD-specific Study sites). Many of the sites excluded from the Contraception Study were originally identified by the search engines because the terms *birth control* and *contraception* often appear in discussions about religion, law, policy and history. In the end, 28 Contraception Study sites and 115 IUD-specific Study sites were included in the study. To further refine the analysis, the 115 sites in the IUD-specific Study were categorized into two groups: provider sites (n = 28) and consumer sites (n = 87). In all analyses except those measuring site affiliation, two of the provider sites were excluded from the analysis due to missing data, leaving n = 26 in those analyses.

3.2. The Contraception Study

The purpose of the Contraception Study was to understand the prevalence of information on the IUD within discussions about contraceptive choices. The most notable finding is that of the 28 sites included in the study, 100% included information on the IUD (Table 2). Slightly more than one third of the sites were up-to-date and included the latest safety and product information, and about two thirds of the sites accurately represented standard product information. Virtually all of the sites' owners and affiliations were identifiable.

Table 3
Characteristics of sites in IUD-specific Study and differing attributes of provider versus consumer sites

Attributes	All sites		Provider ^a		Consumer ^a		p-value
	n	%	n	%	n	%	
Site							
Information is up-to-date	47	41.6	11	42.3	36	41.4	0.93
Information accurately represents standard product information	52	46.0	10	38.5	42	48.3	0.38
Clearly false information	24	21.2	2	7.7	22	25.3	0.05
Inconsistent/contradictory information within the site	8	7.1	1	3.8	7	8.0	0.68*
Total number of sites	113		26		87		
Sites with the following positive characteristics of the IUD							
Safe	50	44.2	14	53.8	36	41.4	0.26
Highly effective	97	85.8	23	88.5	74	85.1	1.00*
Reversible	64	56.6	15	57.7	49	56.3	0.90
Convenient	71	62.8	13	50.0	58	66.7	0.12
May be used long-term	102	90.3	24	92.3	78	89.7	1.00*
May protect against specific illnesses	18	15.9	6	23.1	12	13.8	0.36*
Accurate description of side effects	83	73.5	19	73.1	64	73.6	0.96
Method of emergency contraception	38	33.6	5	19.2	33	37.9	0.08
Total number of sites	113		26		87		
Sites with the following erroneous or irrelevant claims about the IUD							
Increases risk of PID and other sexually transmitted illnesses	58	51.3	7	26.9	51	58.6	0.01
Increases risk of ectopic pregnancy	41	36.3	6	23.1	35	40.2	0.11
Acts as abortifacient	5	4.4	1	3.8	4	4.6	1.00*
Decreases fertility	27	23.9	3	11.5	24	27.6	0.09
Recommended for women with at least one child or after family is complete	47	41.6	7	26.9	40	46.0	0.08
Recommended for women with low risk of STIs or in monogamous relationships	61	54.0	8	30.8	53	60.9	0.01
Dalkon Shield history is relevant for today's IUDs	2	1.8	0	0.0	2	2.3	1.00*
Total number of sites	113		26		87		
Site affiliation							
Site ownership is identifiable	113	98.3					
Site affiliation is identifiable	113	98.3					
Total number of sites	115						

^a Provider sites are designed for healthcare providers or professionals, but these sites often contain information useful and accessible to consumers. Consumer sites are those intended to provide information to the general public.

* p-values are based on two-sided Fisher exact tests.

3.3. The IUD-specific Study

The IUD-specific Study was conducted to understand the availability and quality of online information on the IUD. Overall, less than half of all sites were up-to-date or accurately represented standard product information about the IUD (Table 3). More than 20% of sites had clearly false information.

A large majority of sites reported that the IUD is highly effective (85.8%) and usable long-term (90.3%). Most cited that it is convenient (62.8%) and reversible (56.6%). Nearly three quarters of sites provided accurate information on common side effects of the IUD, including amenorrhea and dysmenorrhea. Less than half of all sites specifically stated that the IUD is a safe method of birth control (44.2%), and only 15.9% noted that the Mirena IUS is likely to provide a protective effect against illnesses such as endometrial cancer, cervical cancer and endometriosis; or that it may be used as an alternative to hysterectomy or as hormone replacement therapy. One third of sites indicated that the Copper T-380A might be used as a form of emergency contraception.

A significant percentage of sites contained erroneous information on the IUD. Half of all sites stated that the IUD increases risk of pelvic inflammatory disease (PID); this statistic does not include sites that correctly reported there may be a slight increase in the risk of PID during and within 3 weeks of the insertion process [8]. More than two thirds of sites stated that the IUD increases the risk of ectopic pregnancy, and nearly one quarter of all sites claimed that the IUD is a fertility risk—either as a consequence of PID or an ectopic pregnancy, or simply by having the device in place. Less than 2% of sites cited the Dalkon Shield experience as evidence of the IUD's continued lack of safety.¹

Almost all sites provided clear identification of site ownership and identification.

¹ The Dalkon Shield IUD appeared to cause PID and more severe effects, including infertility and death, among women during the early 1970s and was permanently pulled from the market in 1975.

3.4. Consumer vs. provider sites in the IUD-specific Study

To better understand the nuances of how information is presented to different types of online visitors, the sites in the IUD-specific Study were broken into two groups—providers and consumers—and compared. Overall, both groups of sites provided similar patterns of information on the majority of topics and attributes. A large majority of consumer and provider sites stated that the IUD is highly effective, useful long-term and had an accurate description of common side effects. However, the comparative analysis did reveal that provider sites give less false information and more accurately present risks associated with IUD use and standard product information, such as mechanisms of action, than do consumer sites.

Less than 60% of either provider or consumer sites indicated that the IUD is a reversible form of birth control (Table 3). Nearly 54% of provider sites and 41.4% of consumer sites noted that the IUD is safe, and 23.1% of provider sites and 13.8% of consumer sites informed a visitor that the Mirena IUS may protect against illnesses such as endometriosis or cervical cancer. An interesting exception to this pattern is that more consumer sites (37.9%) informed the visitor that the Copper T-380A may be used as a form of emergency contraception than did provider sites (19.2%).

An analysis of measures of misinformation showed that almost 27% of provider sites and 60% of consumer sites ($p < 0.05$) claimed that IUDs cause an increased risk of PID. These sites did not clarify that the increase in risk of PID is isolated to the time of insertion and the 3 subsequent weeks. Similarly, 23.1% of provider sites and 40.2% of consumer sites stated that IUDs cause an increased risk of ectopic pregnancy. More than 10% of provider sites reported that the IUD decreases fertility (often as a consequence of PID or an ectopic pregnancy), and 27.6% of consumer sites made that claim.

4. Discussion

While the IUD is well represented in online discussions about birth control options, there is a great deal of misinformation about the IUD on the Internet that may contribute to its underuse in the US. About 40% of sites had outdated information and did not inform the visitor about new methods or new evidence of the IUD's safety and therapeutic potential.

A substantial percentage of both healthcare provider and consumer sites overemphasize risks associated with the IUD or otherwise cast the method in a negative light. Many sites recommended the IUD as a method of last resort for women who cannot use other methods. Twenty-seven percent of provider sites and 46% of consumer sites recommended it only to women who have at least one child or who have completed childbearing, and 31% of provider sites and 61%

of consumer sites recommended it only for women who are in monogamous relationships or at low risk of sexually transmitted infections (STIs), biases that are not reflected in discussions of other birth control methods. Regardless of whether women choose the birth control pill, an injectable, implant, or any other nonbarrier form of birth control including the IUD, the best protection against STIs is to also use a barrier method such as the condom. Nearly as damaging as the promotion of poor information is the missed opportunity to publicize one of the IUD's significant attributes: less than 60% of sites mention the IUD's reversibility and potential use as an alternative to sterilization. Such misinformation and biased and outdated guidance on its appropriate use may limit women's consideration of the IUD as an appropriate birth control option for their needs.

Because the Internet is a dynamic and shifting medium, these findings should be viewed as relevant to a specific point in time. Nevertheless, the findings of this study are consistent with other analyses of online health information. Three recent studies on the quality and/or bias of health information on the Internet concluded that information often was not supported by peer-reviewed scientific literature [4–6]. These studies also reveal the challenge of conducting an objective study of information on the Internet. While one study succeeded in identifying clear, specific and measurable attributes for analyzing website quality, the other two studies used measures that are more subjective and harder to define. For example, by what measures is an image “graphic” and “explicit”? The similarity between the conclusions of this study and others underscores the need to improve the quality of medical information on the Internet. This is particularly true for consumers who are taking a more active role in making decisions about their medical care, and increasingly turn to the Internet for information to help them make these important choices. While imposing formal monitoring of the Internet may be impossible and undesirable given its openness, individual websites can take steps to improve their reliability. For example, website editors should update online information at least annually. Outside clinical experts could review sites for currency and accuracy of information and bestow an endorsement on sites that meet certain peer-reviewed standards. Consumer advocacy organizations can also play a role by providing updated content. For example, the finding that more consumer sites than provider sites state that the ParaGard IUD can also be used as an emergency contraceptive is likely a result of the dedicated efforts of advocates to promote awareness of emergency contraception. As a result of this study, the Reproductive Health Technologies Project—an advocacy organization that works to promote public awareness of methods to prevent unintended pregnancy and STIs—will submit recommendations for making information about the IUD up-to-date and accurate to each of the editors of websites reviewed. These efforts, while preliminary, may be both timely and important as the Internet, one of the most intriguing tools of our time, continues to develop.

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References

- [1] Stanwood, Garrett, J, Konrad T. Obstetrician-gynecologists and the intrauterine device: A survey of attitudes and practice. *Obstet Gynecol* 2002;99:275–80.
- [2] Abma J, Chandra A, Mosher W, Peterson L, Piccinino L. Fertility, family planning and women's health: new data from the 1995 National Survey of Family Growth. National Center for Health Statistics. *Vital Health Stat* 1997;23.
- [3] Fox S, Rainie L. Vital decisions: how Internet users decide what information to trust when they or their loved ones are sick. Pew Internet and American Life Project. Available at: http://www.pewinternet.org/reports/pdfs/PIP_Vital_Decisions_May2002.pdf. Accessed May 22, 2002.
- [4] Latthe M, Latthe P, Charlton R. Quality of information on emergency contraception on the Internet. *Br J Fam Plann* 2000;26:39–43.
- [5] Mashiach R, Seidman G, Seidman D. Use of mifepristone as an example of conflicting and misleading medical information on the Internet. *Br J Obstet Gynaecol* 2002;109:437–42.
- [6] Wolfe R, Sharp L, Lipsky M. Content and design attributes of anti-vaccination web sites. *JAMA* 2000;287:3245–8.
- [7] World Health Organization. Improving access to quality care in family planning: Medical eligibility criteria for contraceptive use. 2nd ed. Geneva: Reproductive Health and Research, World Health Organization, 2000.
- [8] Cheng D. The intrauterine device: still misunderstood after all these years. *South Med J* 2000;93:859–64.