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Accuracy of Information about the Intrauterine Device on the Internet

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Abstract

Background—Intrauterine devices (IUDs) are highly effective methods of contraception, but use continues to lag behind less effective methods such as oral contraceptive pills and condoms. Women who are aware of the actual effectiveness of various contraceptive methods are more likely to choose the IUD. Conversely, women who are misinformed about the safety of IUDs may be less like to use this method. Individuals increasingly use the Internet for health information. Information about IUDs obtained through the Internet may influence attitudes about IUD use among patients.

Objective—Our objective was to evaluate the quality of information about intrauterine devices (IUDs) among websites providing contraceptive information to the public.

Study Design—We developed a 56-item structured questionnaire to evaluate the quality of information about IUDs available through the Internet. We then conducted an online search to identify websites containing information about contraception and IUDs using common search engines. The search was performed in August 2013 and websites were reviewed in October 2015 to ensure no substantial changes.

Results—Our search identified over 2000 websites, of which 108 were eligible for review; 105 (97.2%) of these sites contained information about IUDs. Eighty-six percent of sites provided at least one mechanism of the IUD. Most websites accurately reported advantages of the IUD including that it is long-acting (91%), highly effective (82%), and reversible (68%). However, only 30% of sites explicitly indicated that IUDs are safe. Fifty percent of sites (n=53) contained

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inaccurate information about the IUD such as an increased risk of pelvic inflammatory disease beyond the insertion month (27%) or that women in non-monogamous relationships (30%) and nulliparous women (20%) are not appropriate candidates. Forty-four percent of websites stated that a mechanism of IUDs is prevention of implantation of a fertilized egg. Only 3% of websites incorrectly stated that IUDs are an abortifacient. More than a quarter of sites listed an inaccurate contraindication to the IUD such as nulliparity, history of pelvic inflammatory disease, or history of an ectopic pregnancy.

Conclusions—The quality of information about IUDs available on the Internet is variable. Accurate information was mixed with inaccurate or outdated information that could perpetuate myths about IUDs. Clinicians need knowledge about accurate, evidence-based Internet resources to provide to women given the inconsistent quality of information available through online sources.

Keywords

Intrauterine device; intrauterine system; Internet; health information

Introduction

Intrauterine devices (IUDs) are one of the most effective forms of reversible contraception, with typical one-year failure rates of less than one percent.¹ They are convenient with a positive safety profile and high rates of user continuation and satisfaction.^{2,3} Despite these appealing characteristics, use of IUDs in the U.S. continues to lag behind use of less effective methods such as oral contraceptive pills and condoms.⁴ This may in part be due to women's knowledge of IUDs. Contraceptive knowledge plays a role in women's contraceptive use.⁵ Women who are aware of the actual effectiveness of various contraceptive methods are more likely to choose the IUD.⁶ Conversely, women who are misinformed about the safety of IUDs may be less likely to use them. Past studies have revealed that many common concerns, including ones about infection, infertility, and cancer due to IUD, are based on inaccurate and outdated information.^{7,8} These concerns and knowledge gaps stress the importance of accurate information for patients who are considering contraceptive options.

Many patients report using the Internet to supplement the health information provided by health care professionals. For example, in 2012, 72% of adults reported looking for health information online in the past year, and of these 77% sought health information via a search engine.⁹ Currently, there are a number of websites designed for the lay public that provide information about contraception, and a recent study showed that web-based contraceptive education increased contraception knowledge.¹⁰ A recently published study showed that, among young adults, the Internet was the second most popular source of information about contraception after health professionals.¹¹

To provide effective contraceptive education, web-based resources must contain accurate, comprehensive, and up-to-date information. One study of the information available about the IUD on the Internet found that while most sites stated the IUD was effective and long lasting, fewer than half of the sites stated that it was safe, and more than half incorrectly

stated that the IUD increased the risk of pelvic inflammatory disease (PID), ectopic pregnancy, and infertility.¹² This study was performed more than a decade ago. Since then, the breadth of health information available on the Internet has greatly increased. Improved knowledge about the accuracy of Internet content could be useful for healthcare providers when performing contraceptive counseling. In addition, knowledge about which websites provide accurate and comprehensive information could identify reliable resources for patients. The objective of this study was to describe and evaluate the quality of available Internet-based health information about the IUD.

Materials & Methods

We performed a search for information about the IUD using the most commonly used search engines, Google, Yahoo, Bing, and Ask.com, and the following terms: “birth control,” “contraception,” “contraceptive method,” “pregnancy prevention,” “intrauterine device,” “IUD,” “intrauterine system,” “intrauterine contraception,” “Mirena”, and “Paragard.” Skyla™ was not available when the study was designed and therefore not included in the search terms. All web searches were completed in August of 2013 using a web browser with no stored browsing history so as not to generate personalized results. We updated the search in October of 2015 to ensure that the previously coded websites were still available and had similar content. We included in our initial sample all websites identified on the first three pages of returns except paid advertisements and duplicate sites. Prior studies have shown that 62% of users will click on a result on the first page of search results and 90% of users are unlikely to go beyond the first three pages of search results.^{13,14}

The initially-identified websites were reviewed by a member of the research team for possible inclusion. Websites were eligible if they contained educational information about contraception that was intended for a lay audience. Duplicate sites, non-U.S. sites, and non-accessible sites were not included. Websites were also excluded if the site contained “non-relevant content” such as information for health care professionals, news articles, dictionary definitions, information about only emergency, male, or non-human contraception, or were focused on advocacy. Finally, sites were excluded if they were primarily forums, personal blogs, or paid advertisements.

We developed a 56-item instrument to evaluate the informational content of the eligible websites based on current guidelines and a prior study reporting common misconceptions.¹² The initial item assessed whether the site contained information about contraception in general and then specifically about IUDs. If the website contained information about IUDs, additional items asked about whether the website correctly identified the types of available IUDs, the mechanism of action of the different IUDs, and the advantages, disadvantages, contraindications, and risks of the IUD. The coding instrument contained separate items for the mechanism of the copper IUD and the LNG-IUS. There were also questions about the advantages and disadvantages which were specific to the IUD. If information about risks was presented, the instrument asked if and how the risks were presented and quantified. The instrument also specifically surveyed whether the website contained inaccurate information about the IUD such as “increases the risk of ectopic pregnancy” and “decreases fertility.”^{15,16} The correct responses were determined from two evidence-based

references.^{17,18} We considered a stated risk of PID other than in the first month following insertion to be incorrect.¹⁹ In order to assess the usability of the website, we used a 5-point Likert scale to quantify the coder's overall impression of the site from basic to comprehensive, inaccurate to accurate information, and whether the interface was user friendly. The coder's impression of the overall valence of the site as negative or positive towards IUDs was also recorded. Information about the type of organization hosting the website was collected. All data was entered directly into REDCap, a secure, web-based application designed to support data capture for research studies.²⁰ Institutional review board approval was not required as there were no human subjects involved in the research.

The first 30 web sites were independently coded by two research assistants (SC and MK). Inter-coder agreement and kappa were calculated for each item regarding the accuracy of the content. Coding was reviewed by the entire research team and minor discrepancies resolved by consensus. In cases of major discrepancies, the item was modified and the sites were recoded and re-reviewed. The remaining websites (n=75) were coded by one of the two trained coders. We calculated frequencies and proportions to describe the results. We also determined an accuracy score for the website content by subtracting the "inaccurate score" from the "accurate score." The "accurate score" was calculated by assigning one point for every accurate item coded and could have a possible maximum score of 44. The "inaccurate score" was calculated by assigning one point for every inaccurate or missing item coded and could have a possible maximum score of 22. The range of possible accuracy scores was -22 to 44. Statistical analyses were performed using STATA 11 (StataCorp, College Station, TX).

Results

Search Results

Searching the ten terms resulted in a return of 2,209 sites. Of these, 929 were sponsored websites and excluded as a result. The remaining 1,280 sites were evaluated by coders for eligibility. Of those sites, we excluded 1,172 sites that did not meet eligibility criteria. A full description of excluded sites can be found in Figure 1. This search resulted in a total of 108 sites eligible to be reviewed.

Description of Sites

Coders used a mean number of 3.9 clicks (SD 4.3, range 1–20) to search for the items in the coding instrument. The coders were asked to rate their impression of the following websites characteristics on a scale of 1 to 5; user friendliness, attitude, accuracy, and comprehensiveness of information. Sites varied in user friendliness with a mean score of 3.3 (1=user unfriendly to 5=user friendly). Sites also varied in attitude from negative to positive with a mean score of 3.6 (SD 1.2, 1=negative to 5 = positive valence) and accuracy (1=with a mean score of 3.4 (SD 1.6). Sites were slightly skewed towards a basic level of content with a mean score 2.7 (SD 1.3).

The websites were developed and hosted by a range of organizations, including health care-focused organizations (24%), general knowledge websites (22%), hospitals or academic

institutions (14%), non-profit organizations (13%), reproductive-focused organizations (18%), entertainment or media sites (10%), government sites (10%), advocacy-focused organizations (7%), pharmaceutical companies (5%), and religiously-affiliated institution/organizations (4%).

Information about Contraception and IUDs

Of the 108 sites that included information about contraception and/or IUDs, 105 (97.2%) contained information about IUDs and were coded further. Among these sites, 99 of 105 (94%) identified the hormonal IUD, 87 (83%) the copper IUD, and 86 (82%) identified both IUD types.

Mechanism of Action

Among the 105 websites that included at least one type of IUD, 86% provided information about mechanism of action, including prevents fertilization (61%), thickening of cervical mucus (60%), thins endometrial lining (48%), and prevents sperm transport (47%). Forty-four percent (n=38) of sites listed prevention of implantation of a fertilized egg as a mechanism of the hormonal or copper IUD. For example, one site said “[t]he copper-coated IUD primarily prevents pregnancy by not allowing the sperm to fertilize the egg. It may also make it harder for a fertilized egg to implant in the uterus.” Of these sites, 24% (n=9) listed prevention of implantation as the primary or only mechanism. For example, one website said “Both options thicken your cervical mucus, which creates a hostile environment for embryo implantation and prevents pregnancy.” Another website said “... Alters the lining of the uterus so that a fertilized egg doesn't attach to it.” Three (2.8%) of sites specifically stated that the IUD acted as an abortifacient; “The other methods of contraception - namely the coil... are more abortive rather than contraceptive in that they prevent the implantation into the womb of an already fertilized egg.”

Advantages and disadvantages of IUDs

Table 1 shows advantages and disadvantages of the IUD that were commonly included in website content. Ninety-five percent of websites listed at least one advantage of the IUD, most commonly that IUDs were long-acting (91%), highly effective (82%), and reversible (68%). About half of sites mentioned that IUDs do not require regular maintenance (46%). Only 30 (29%) specifically stated that IUDs were safe.

The majority of websites correctly described disadvantages of the IUD, including the need for an exam or healthcare provider visit prior to starting the method (90%), lack of protection against sexually transmitted infections (65%), irregular bleeding or spotting (61%), and cramping during or after the insertion (55%). Six (5%) provide inaccurate disadvantages such as IUDs cause major depression and decreased libido and require “surgical implantation.”

Contraindications

Approximately half (53%) of sites correctly identified at least one evidence-based contraindication to IUD use, see Table 2. However, 27% of sites listed an inaccurate contraindication such as being in a non-monogamous relationship, teen age, nulliparity,

history of severe menstrual bleeding, history of pelvic inflammatory disease, and history of ectopic pregnancy, see Table 3. Examples of this incorrect contraindications include: “It seems that the IUD is a form of birth control that if you are not monogamous, monogamous, and you go out and have another partner, the bacteria is different, and so there's a string with the IUD that allows for bacteria to go up into your uterus and out the fallopian tubes and cause a possibility of pelvic inflammatory disease and infertility. So I wouldn't put it into a young girl who hasn't had their family, and I would put it into someone who is at the point where they've had their kids and they say they are done” and “Some methods of birth control which are discouraged for teens include... the IUD which is a small device is inserted in the uterus to prevent pregnancy; the device may not stay in place in a teen's uterus unless she has had a child already.”

Risks of IUDs

Seventy-two percent of websites correctly included the following risks of the IUD; expulsion (58%), perforation or injury to the uterus (52%), and infection within first month following insertion (39%). Seven percent specifically mentioned pregnancy-related complications if a women became pregnant with an IUD in place. Almost one fifth of sites (17%) stated inaccurate risks such as an increased risk of pelvic inflammatory disease (outside of the first month), risk of infertility, and risk of veno-thromboembolism (LNG-IUS).

IUD-related risks were quantified numerically in less than half of websites; 20 % of sites correctly quantified the risk of expulsion, 13% of sites the risk of perforation, and 5% of sites the risk of insertion-related infection. Among websites that quantified IUD-related risks (n=26), 35% used only percentages, 23% used only frequencies or absolute numbers, and 42% used both percentages and frequencies/absolute numbers. No site used odds ratios or relative risks to describe risks.

Accuracy Score

Fifty percent of websites contained at least one inaccuracy about IUDs. The most commonly identified inaccuracies included an increased risk of PID after the first month (28%), and risk of infertility (14%). Some websites incorrectly identified contraindication to IUD use including multiple sexual partners (29%), nulliparity (20%), and adolescent age (5%).

The accuracy score was calculated by subtracting the number of inaccurate items from the number of accurate items. The number of accurate items reported by sites ranged from 3 to 41 with a mean of 21.8 (SD 9.9) accurate items. The number of inaccurate items ranged from 0 to 10 with a mean of 3.0 (SD 2.1) inaccurate items. The final accuracy scores ranged from -3 to 41 (possible range -22 to 44) with a mean of 18.9 (SD 10.9). The six websites with the highest accuracy score and no more than one inaccuracy are shown in Table 4.

Comment

Findings from our study suggest that the accuracy and quality of IUD information available on the Internet is highly variable. Although we found accurate information about the IUD on many websites, this information was mixed with inaccurate information that could

perpetuate misconceptions about IUDs and contribute to continued low use in the U.S. For example, many websites include prevention of implantation of a fertilized egg as a mechanism which could dissuade people who are opposed to post-conception method. Although there is no clear evidence that IUDs work primarily through this mechanism.²¹ Others sites listed inaccurate risks such as pelvic inflammatory disease or infertility which are not consistent with evidence based information. Some also reported inaccurate contraindications such as being non-monogamous or nulliparous.

In addition to inaccurate information, some websites had inconsistent or contradictory information within them. For example, some sites had two different pages about IUDs with different information within each page. In addition, even among accurate sites, there were often text boxes summarizing information that differed from the information in the main body of the sites. Individuals seeking information about the IUD might not be getting consistent information needed to make an informed decision about contraception even within reputable sites. In order to facilitate decision making, guidelines suggest that individuals understand risks, benefits, and uncertainties in balanced, transparent formats.²² However, more than half of websites did not quantify risks numerically.²³

Finally, many websites had dense text, poor user interfaces, or imbalanced information overemphasizing harms and underemphasizing benefits. The U.S. Department of Health and Human Services suggests that effective health communication websites include accurate information with content easily accessible, up to date, reliable and balanced information.²⁴ Many of these sites failed to meet these standards.

This study should be interpreted in the context of some study limitations. The Internet is dynamic and changing over time. The content of sites, especially sites such as Wikipedia with open access sourcing, could also change over time. To address this, we conducted the search and then re-reviewed the identified sites to ensure that the sites contained similar content to the time we initially coded the information. In addition, our coding instrument was developed specifically for this study. We did have two trained coders available to review the websites and coding was reviewed as a group to ensure consistency between the coders.

Our study suggests that clinicians and public health advocates should remain cautious about referring individuals to online sources for IUD or general contraceptive information. Clinicians can benefit from identification of websites with accurate and transparent information. Knowledge about reliable websites could serve as resources for clinicians and patients to improve contraceptive counseling and support informed, evidence-based contraceptive decision making.

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Figure 1.
Inclusion/exclusion of websites identified through search.

Table 1

Accurate and Inaccurate Advantages and Disadvantages of Intrauterine Devices (N= 105)

		N (%)
Accurate Advantages	Long-acting	96 (91)
	Highly effective	86 (82)
	Decreased menses (hormonal IUD)	72 (69)
	Reversible	71 (68)
	Do not need to remember to use regularly	48 (46)
	Does not contain hormones (copper IUD)	42 (40)
	Do not need to do anything at time of sex	34 (30)
	Safe	32 (30)
	Can be used as emergency contraception (copper IUD)	30 (29)
	Safe to use while breastfeeding	30 (29)
Accurate Disadvantages	Requires appointment with healthcare provider or exam to start method	94 (90)
	Does not protect against STIs	70 (67)
	Irregular bleeding or spotting	64 (61)
	Longer or more painful periods (copper IUD)	59 (56)
	Cramping at insertion	56 (53)
	Frequent or unpredictable bleeding (hormonal IUD)	44 (42)
	No periods (hormonal IUD)	41 (39)
	Expensive	25 (24)
Inaccurate Disadvantages	Increases the risk of pelvic inflammatory disease (other than first month after insertion)	28 (27)
	Decreases fertility or causes infertility	15 (14)
	Increases the risk of sexually transmitted infections	3 (3)

IUD – intrauterine device; STI – sexually transmitted infections

Table 2

Correctly Identified Contraindications of Intrauterine Devices (N=105)

	N (%)
Known or suspected pregnancy	46 (44)
Current cervical infection	43 (41)
Recent PID	40 (38)
Cancer of the genital tract	40 (38)
General Contraindications to the IUD Uterine anomalies	40 (38)
Abnormal uterine bleeding	38 (36)
History of breast cancer – hormonal only	27 (25)
Wilson's disease or copper allergy – copper only	23 (22)
Recent postpartum or postabortion infection	21 (20)

IUD – intrauterine device

Table 3

Inaccurate Information Listed about Intrauterine Devices

	N (%)
Inaccurate Information	Not appropriate for women in non-monogamous relationships
	31 (29)
	Increases the risk of pelvic inflammatory disease (other than first month after insertion)
	28 (27)
	Not appropriate for women who have not had children (nulliparous)
	21 (20)
	Decreases fertility or causes infertility
	15 (14)
	Increases the overall risk of ectopic pregnancy
	8 (8)
	Not appropriate for teens
	5 (5)
	Acts as an abortifacient
	3 (3)
	Increases the risk of sexually transmitted infections
	3 (3)

Table 4

Top Six Websites with Highest Accuracy Scores.

Website	Number of Accurate Items	Number of Inaccurate Items	Accuracy Score
Association of Reproductive Health Professionals	41	0	41
Planned Parenthood	37	0	37
Wikipedia	37	0	37
Reproductive Health Technologies Project	35	1	34
Go Ask Alice	35	1	34
Brown University Health Education	34	0	34