Review Article

Internet Usage among Pregnant Women for Seeking Health Information: A Review Article

Abstract

Background: In recent years, the Internet has become one of the most popular sources of health information for users, and pregnant women are no exception. This study aimed to investigate Internet usage among pregnant women for achieving health information on the finding of related studies. **Materials and Methods:** This review study was conducted by searching databases such as IranMedex, Magiran, Scientific Information Database, Irandoc, PubMed, Science Direct, Cochrane, Google Scholar, and Scopus in December 2016. Restrictions were placed on publication to within 16 years and language of publication was restricted to English and Persian. Keywords used in the search included information-seeking behavior, information-seeking, information needs, access to information, pregnancy, and pregnant women. **Results:** This search resulted in 106 related publications and among them sixteen articles met inclusion criteria. This review showed that the use of the Internet by pregnant women was driven by information needs, ease, and speed of access and finding people with the same situation. Fetal development, symptoms, and complications of pregnancy, prenatal tests and nutrition, activities during pregnancy, and stages of delivery were the most often mentioned topics of interest. The benefits of internet use include reduced anxiety, personal support, creating an emotional connection and an increased confidence. **Conclusions:** Health providers must have sufficient ability for interpreting the achieved information from the Internet and should allocate efficient amount of time for discussing information-seeking manners with pregnant women. Furthermore, they must try to respond to the doubts of pregnant women and provide valid and reliable online educational resources.

Keywords: *Internet, Iran, Online health information, Pregnancy, Pregnant women*

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Introduction

Pregnancy is one of the most important periods in a woman's life. Pregnancy is associated with physical changes; however, health-related decisions during pregnancy are essential and might affect the life of the mother and her unborn child. Pregnant mothers require health-related information to secure their health and have a healthy delivery,[1] because this information will enable women to recognize and reduce pregnancy complications such as iron deficiency anemia and also to perform preventive health behaviors such as increased consumption of folic acid and iron during pregnancy, appropriate weight gain, and improved neonatal birth weight.[2]

Evidence suggests that appropriate health information and advice provided to women before and during pregnancy can significantly reduce the rate of caesarean section.[3,4] Furthermore, health information

has significant effects on reducing maternal and infant mortality rate,[5,6] and could also improve the sexual performance of the couples.[7] In recent years, the Internet has become a popular source of health information among pregnant women.[8,9] Publication of health information on the web is a new phenomenon and its accessibility and low costs have made it a popular media.[10,11] A study that was conducted in Sweden reported that 84% of women were using Internet as the source of their health information during pregnancy.[12] Searching the Internet is conducted in wide scales but one of the problems and challenges for the users is inability to judge about quality and accuracy of the found data about medical recommendations and consultations.[13] Although women perceive the information they read to be reliable, much of what is on the Internet is outdated or even erroneous.[14] Studies have shown that mothers usually do

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not discuss using Internet with their healthcare providers and care givers are usually not aware of the potentially wrong information and incorrect beliefs that mothers can achieve.[15] Considering all the mentioned matters and their importance, the present study was conducted to determine the condition of Internet usage among pregnant women for achieving health information.

Materials and Methods

In the present review article, to achieve the intended information, the abstracts, titles, and keywords of published articles in national Persian journals, databases for registry of clinical trials, Scientific Information Database (SID), Iranian Medical Articles database (IranMedex), Iranian Research Institute for Information Science and Technology (Irandoc), and Iranian Magazines Database (Magiran) were searched using general keywords including "information searching behaviors", "searching for information", "informational needs", "achieving information", "pregnancy", and "pregnant women". For English databases such as Science Direct, Google Scholar, Scopus, Cochrane and PubMed, English and Mesh equivalent of the words including "informational needs", "access to information", "information sources", "seeking information", and "health information-seeking behaviors" were searched. This search resulted in achieving 56 published articles in PubMed database, 35 articles in Google Scholar, 12 articles in Science Direct, 1 article in Cochrane, 6 articles in Magiran, and 2 articles in Irandoc; after finding the common articles between the databases; a total of 106 articles were retrieved.

After preparing a primary list of the articles, their titles were checked by two members of the research team and the repeated tiles were eliminated. Then, the title and abstract of the remaining articles were carefully reviewed and ineligible articles were removed from the list. Then, the full texts of the remaining articles were reviewed and eligible articles were selected for the study. The following data were extracted from all included studies: Title, author, and date of study; Details of the study including aim, design, participant recruitment and research ethics; Results and limitations of study. Finally, selected articles were evaluated to determine the rate of Internet usage by pregnant women, its causes, advantages, and disadvantages of using the Internet and also the searched subject on the Internet. Related words to health information-seeking were combined with related words to Internet and pregnancy using "and" operator.

The inclusion criteria for the articles were: being published from January 1, 2000 to December 20, 2016, being related to Internet usage among pregnant women or its related topics, and being published in English or Farsi languages. The exclusion criteria for the articles were: being presented at seminars and conferences, being a review article, case

report or letter to editor and inaccessibility to the full texts of the articles.

Ethical considerations

Research ethics confirmation (ethical approval code: IR.MUI.REC.1395.3.955) was received from the ethics committee of Isfahan University of Medical Sciences.

Results

Study selection outcome

In reviewing the studies, from a total of 106 articles found in the primary search, 16 were selected for final evaluation; from them 13 were qualitative studies and 3 were quantitative studies. Results of the study fell under five main themes, including (1) The rate of Internet usage by pregnant women, (2) The time to start Internet searching, (3) The reasons for searching the Internet, (4) Women's perceptions of the usefulness and faults of retrieved health information, and (5) Type of information sought. These five main themes are described below.

The rate of Internet usage by pregnant women

Reviewing these studies showed that the rate of Internet usage among pregnant women for achieving health information varied between 28 to 95%[16,17] and it has specifically increased during the recent years. In Italy and Sweden 95%,[15,16] in Canada 93.50%,[18] and in China 88.70%[8] of pregnant women were using Internet for acquiring health information.

The time to start Internet searching

Reviewing the studies revealed that 81.50% of women from the first trimester, 13.50% from the second trimester, and 5.10% from the third trimester started to search the Internet.[8]

The reasons for searching the Internet

The specific reasons that women reported for using the Internet varied widely. It included the need for more information, the ease and speed of access,[15] and finding people in similar situation.[16]

Women's perceptions of the usefulness and faults of retrieved health information

One of the notable results of the present study was the benefits of using the Internet among pregnant women. Studies showed that achieved information from the Internet could decrease the concerns and fears of the unknown events in pregnant mothers and help them to making decisions about their pregnancy after Internet usage.[15,19] Results also showed that the Internet could be used to achieve personal and virtual support for pregnant mothers.[20] Creating emotional relations, reduced anxiety, encouragement, and taking positive energy from each other in online forums could increase the self-esteem of pregnant

mothers.[21] In the reviewed studies, despite the mentioned advantages of Internet usage, mothers were concerned about unreliability of the provided health information on the Internet.[19] However, one study showed that most of the pregnant mothers (70%) did not discuss the achieved information from the Internet with their midwives.[22]

Type of information sought

The most often mentioned topics of interest included fetal development,[8,21] symptoms and complications of pregnancy,[8] activities during pregnancy,[23] nutrition during pregnancy,[8] and stages of delivery and birth giving.[21,22] A summary of the results is shown in Table 1.

Discussion

Nowadays websites are one of the main channels for gaining information, and pregnant women are some of the most active users of health information.[19] The present article is a review of published studies in the field of Internet usage by pregnant women for achieving health information during the past 16 years (from 2000 to 2016) and eventually, has reported the results of 16 qualitative and quantitative studies that has been published in Farsi and English languages.

This review aimed to discover how often pregnant women searched the Internet, the reasons for searching the Internet, the type of information they sought and their perceptions
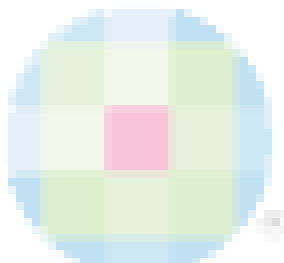
Table 1: Studies on using the Internet to achieve health information among pregnant women from 2000 to 2016

Authors and publication year	Type of the study	Sample size	Location of the study	Data collection tools	Results
Bert *et al.* (2013)[15]	Cross-sectional	1347 pregnant women	Italy	Questionnaire	In this study, most of the pregnant women (95%) were using electronic search for information. The main reason for searching the Internet (50%) was stated as the need for knowledge. Some other stated benefits were the ease and speed of access (60%)
Bernhardt and Felter (2004)[19]	Qualitative	20	America	Focus Group	In this study, all pregnant women were using the Internet to achieve health information. Pregnant women search the Internet to learn about fetal development and to find social support
Bakhireva *et al.* (2011)[24]	Cross-sectional	404 pregnant women	Mexico	Questionnaire	In this study, the most common used sources of information for pregnant women were Internet, magazines and newspaper, and women with higher educational levels had a tendency toward searching for information three times more than women with high school degrees
Bjelke *et al.* (2016)[16]	Cross-sectional	13 pregnant women with a gestational age of at least 34 weeks	Sweden	Questionnaire	At least 95% of women in this study used Internet as a source for achieving information. The main reason for using the Internet was to find other people with similar situation. Many of the women (65.60%) in this study experienced anxiety when reading the information on the Internet
Jaques *et al.* (2004)[20]	Descriptive	737 pregnant women of 37 years old or more	Australia	Questionnaire	In this study, Internet was mentioned as the sixth favorable source of information
Soltani and Dickinson (2005)[17]	Cross-sectional	329 postpartum women	England	Questionnaire	In this study, 28% of pregnant women were using the Internet to achieve health information

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Authors and publication year	Type of the study	Sample size	Location of the study	Data collection tools	Results
Gholami and Mohammadi (2015)[21]	Qualitative	Studying all messages in the "ninisite" forum during a 6-month period	Iran	Documents	From all the 584 messages that were studied in the pregnancy forum, 245 (45%) messages were about the symptoms and complications of pregnancy, 100 (17%) messages were about the embryo's issues, 141 (24%) were about prenatal measures, and 98 (16%) messages were about delivery and birth giving
Grimes *et al.* (2014)[25]	Cross-sectional	350 women who gave birth	Australia	Questionnaire	Less than half of the women (44%) in this study were using the Internet for achieving information. In this study applying the prenatal care model was affective on women's sources of information. Women who were receiving care from the midwives during their pregnancy mentioned that the best source of information for them was having discussions with the midwives, while women who received prenatal care from their physicians or prenatal clinics stated that Internet was the best source of information for them
Gao *et al.* (2013)[8]	Cross-sectional	335 pregnant women with a gestational age of at least 37 weeks	China	Questionnaire	Most of the pregnant women (88.70%) at least once used the Internet to achieve information. 81.50% of the women from the first trimester, 13.50% from the second trimester and 5.10% from the third trimester started searching the Internet. The most common favorable topics of women were fetal development (57%), nutrition during pregnancy (56%), and complications of pregnancy (26%). Most of the pregnant women (67%) stated that their criterion for evaluating the validity of the achieved information from the Internet was comparing it with other sources

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Authors and publication year	Type of the study	Sample size	Location of the study	Data collection tools	Results
Larsson (2009)[22]	Cross-sectional	182 pregnant women with a gestational age of at least 32 weeks	Sweden	Questionnaire	In this study, most of the pregnant women (91%) had access to the Internet and a large number of them (84%) used the Internet for achieving information from the early stages of pregnancy. Fetal development and stages of pregnancy were some of the important preferred topics by the women. The most important criterion for the mothers to approve the validity of the achieved information from websites was its compatibility with other sources of information. Most of the pregnant mothers (70%) did not discuss the achieved information from the Internet with their midwives
Lagan *et al.* (2011)[9]	Cross-sectional	303 midwives working with pregnant mothers	Midwives from different countries	Questionnaire	In this study, most of the midwives (89%) believed that using the Internet has increased among pregnant mothers. Most of the midwives (86%) at least once had a discussion with a pregnant mother about the achieved information from the Internet
Lima-Pereira *et al.* (2012)[18]	Cross-sectional	114 women and 21 men	Canada	Questionnaire	93.50% of the studied women have used the Internet. 26.90% of them had used the Internet during the past 24 hours. Internet was the most favorable source of information during pregnancy (18.50% in women and 25.80% in men) after the physician
Huberty *et al.* (2013)[23]	Exploratory descriptive	293 pregnant women or at most one year after delivery	Mid-Western states of the United States	Questionnaire	In this study, half of the women were using the Internet to gain information about physical activity during pregnancy. Women who used this information reported increased levels of physical activity and self-confidence for performing these activities. Results about the nutrition were also similar; only no significant difference was observed in the level of women's self-confidence

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Authors and publication year	Type of the study	Sample size	Location of the study	Data collection tools	Results
Hämeen-Anttila (2014)[26]	Cross-sectional	509 pregnant women and 2002 women with a child of younger than 25 weeks old	Eastern, Western and Northern Europe, America and Australia	Online questionnaire	In this study, 20.40% of women used the Internet as the only source for gaining information and 67.10% of women used the Internet along with other sources of information
Almoajel and Almarqabi (2016)[27]	Cross-sectional	15 pregnant women	Saudi Arabia	Questionnaire	In this study after the physician (23.30%), Internet (21.30%) was the most referred source of information among pregnant women. The most searched topics in this study were fetal development (8.70%), nutrition during pregnancy (7.30%), and taking care of the infant (6.70%). Back pain during pregnancy, marital relation during and after pregnancy, vaginal delivery, taking care of the mother after delivery, breastfeeding and stages of delivery were among other searched topics by the women

of the usefulness and faults of retrieved health information. Results of this review indicated that most of the pregnant women have used the Internet to gain health information, in recent years[15,16,19] and they most often used the Internet during the early stages of pregnancy.[8]

According to the results of the studies the increase in the use of Internet during recent years has been due to the abundance of online resources of information,[28] online (web-based) health programs,[29] and helping in and facilitating the process of decision making for people.[30] Based on the results of this review, Internet has an important role in seeking information early in pregnancy about fetal development, which will lead to improved confidence and have an impact on mothers decision making; therefore, it is necessary for healthcare providers to have complete access to valid and evidence-based information for interpreting the information that has been achieved by the mothers from the Internet. This issue must be considered during educational courses.

Also, reviewing the studies revealed that most of the mothers have not discussed the information obtained from the Internet with their healthcare providers.[22] Sayakhot and Carolan-Olah in their systematic review that was titled "Internet use by pregnant women seeking pregnancy related information" in 2014 reviewed published articles during 10 years (from 2004 to 2014) and eventually reported the results of 7 English language quantitative studies. These researchers also resulted that most of the pregnant women would not discuss the achieved information from Internet with their health providers.[13] It seems that, considering the

healthcare providers' unawareness of the wrong achieved information and incorrect beliefs of the mothers; it is necessary for the healthcare providers to allocate a time for discussing information-seeking and the searched topics on the Internet with pregnant women. They should warn the mothers about the wrong and confusing information on the Internet and be able to provide correct information to them.

Reviewing the studies showed that pregnant mothers searched the Internet to resolve their informational needs[8,19,21,23] and most of the mothers were not satisfied with provided information from the care givers. The mentioned reason for using the Internet by the mothers was healthcare providers' lack of time to provide information for the mothers.[9] Hardy in his study mentioned that the mean time that the physicians spent with the patients is very limited, and patients have stated that they need more information than what the physicians are presenting to them.[31] Therefore, unanswered questions could be one of the reasons for searching other information resources such as the Internet.[32]

The increase in using the Internet as a resource for searching health information have increased the concerns about its potential effects on the relation between the patient and the care giver,[33,34] as well as about patients' ability for assessing and evaluating the validity of these resources.[35] Considering the present results, and since healthcare providers are not able to provide every piece of information to the pregnant mothers, Internet could be considered a valuable source of information that would allow the mother and the physician to spend their limited

time together discussing more important issues and prevent repeated visits for concerns about small issues. But, considering mothers' inability to asses and evaluate the validity of online sources, it is necessary for the care givers to get familiar with valid websites so that they would be able to introduce them to their patients. Furthermore, it is necessary for them to design valid websites according to the needs of pregnant mothers, and guide mothers toward finding high-quality online information. It must be noted that lack of access to some of the databases and the full text of some of the articles was the most important limitation of the present study.

Conclusion

Results of the present review study revealed that most of the women would use the Internet for receiving health information during their pregnancy. Information achieved from the Internet might decrease the concerns of pregnant women and their fear of the unknown events. It might also help them make decisions about their pregnancy. Most of the mothers would not discuss the achieved information from the Internet with their healthcare providers. Therefore, healthcare providers should be aware of this issue and allocate an efficient amount of time for discussing information-seeking on the Internet with pregnant women. They also should have sufficient ability in interpreting the achieved information from the Internet.

Conflicts of interest

Nothing to declare.

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