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Pregnancy e-Health: a multicenter Italian cross-sectional study on Internet use and decision-making among pregnant women.

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Abstract

Background

Our study aimed to estimate the prevalence of pregnancy e-Health seekers in a large Italian sample; to explore the factors influencing the choices of the childbearing women regarding their lifestyles after Internet consultation; finally to investigate potential differences between primiparous and multiparous women in Internet use to find information about pregnancy.

Methods

A multicenter survey was carried out in seven Italian cities. Data were collected through a validated questionnaire administered in waiting rooms of outpatient departments by medical doctors. Respondents were questioned about their socio-demographic status, their use of the Internet to seek pregnancy information and their consequent choices to modify their lifestyles. Data were analyzed using descriptive statistics and logistic regression.

Results

Almost all women were pregnancy e-Health seekers (95%), including those who also received information from healthcare professionals. Indeed, the main reason for searching the Web was the need of further knowledge on pregnancy-related topic, over and beyond other key advantages of the net such as anonymity, simplicity and rapidity. A higher likelihood of changing lifestyle after pregnancy e-Health was observed among the women who searched institutional websites, declared more confidence in the information retrieved; participated into pregnancy-centered forum online; were residents in Italy.

Conclusions

To reduce the likelihood for women of both finding erroneous information or misinterpret correct ones, healthcare professionals should commit to fill the information gap and to guide pregnant women in the online searches. Also, future studies are strongly needed to analyze the quality and accuracy of health information found on the Web.

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Background

In the first quarter of 2012, according to Internet World Stats data updated on June 2012 there were around 2.4 billion Internet users worldwide, and Italy posted the 4th highest growth in Internet users worldwide in the period April 2011-April 2012 (+24%).[1]

After the introduction of the Web at the end of the last century and the growth rate for Internet use in the past decade, [2,3] people have been able to look for and find health information from anywhere in the world by simply using general search engines.[4] Scientific literature investigating the patients' use of the Web to search for health information and its consequences in doctor-patient relationships is widely available.[5-9] This phenomenon, called e-Health, is widespread worldwide, and the majority of the population, both in Europe and in America, have used the Web at least once with e-Health purposes.[10-12] A direct consequence of this practice has been the pivotal role of Internet in increasing the empowerment of patients through their frequency of online self-help groups and discussion forums.[4] However, a critical issue such as inequalities in access to the Web services and information can occur. In this regard, a previous study conducted in Italy showed as the females were more likely to practice e-Health (61.6% vs. 50.2% of male users) and pointed out that this phenomenon is strictly age-related with a greater use (78.8%) among 30-41 year-olds.[8,13] Lima-Pereira et al. also found a positive correlation between use of the Web and age with around 32% of women and men between 16–24 years of age have searched for health topics online.[14]

Considering these data, of particular concern is the situation of women facing a pregnancy. Indeed, after the Web consultation, women could make behavioral choices and it may be crucial to access evidence-base information.[3,15] It is known that pregnancy-related Websites are more and more available on the Internet and pregnancy e-Health practiced.[3,9,12,14,16-18] A US survey reported that more than 75% of pregnant women practiced pregnancy e-Health.[9,19] An Italian study, evaluating the role of Internet in providing evidence-based information to women searching for information about teratogenic risk factors and women's risk perception, reported a similar result with 72.4% of the participants consulted a Web source in the first trimester.[20] Another study in Sweden found that 84% of women used the Internet as a source of information on their pregnancy,[17] and a Chinese survey showed a figure similar to that in the western countries.[9] Most women search for information on the Internet once a month or more, most often during early stages of pregnancy when they have recently entered into a new life situation.[17]

These few studies have explored pregnant women's use of the Internet as a source of health information in western countries. In Italy, however, there have been only one study on e-Health practice by childbearing women to obtain pregnancy-related health information [20]. Moreover, no study has focused its aims on the potential differences between primiparous mothers and those who already had children, although a recent survey showed that 11% of primiparous mothers cite the Internet as its first source of information,[21] and another study indicated the primiparous status as one of the main predictors of Internet use.[22]

The purposes of our study were to estimate the use of Internet among pregnant women in a large Italian sample; to explore the factors influencing the choices of the childbearing women regarding their lifestyles after Internet consultation; to analyze potential differences between primiparous and multiparous women in pregnancy e-Health seek.

Methods

We carried out a multicenter cross-sectional study in seven Italian cities (Cassino, Chieti, Palermo, Roma, Siena, Torino, Udine), representative of the different geographical areas of the Country. Sample size was calculated on the basis of the number of new births in 2010 in every city of the study.[23] Considering the data available in a previous Italian study about the e-Health in Italian females (around 37%), it was the possible to provide an estimation of the number of interviews necessary in order to get valid data. We considered a +/- 20% of Internet usage as "Worst Acceptable" for results.

In order to assess the use of Internet by childbearing women for health related purposes, with particular reference to pregnancy-related ones, participants were recruited in the waiting rooms of out-patient departments while they were looking forward an ordinary check-up with ultrasound scan or blood tests. We administered an ad hoc questionnaire in anonymous and voluntary form. The questionnaire was validated through a pilot study.[24]

The Ethics Committee of the "Sant'Anna" University Hospital of Torino approved the protocol, and all participants were asked to sign an informed consent form.

The questionnaire

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All questionnaires were administered by previously trained medical doctors but were self-compiled. Information were collected on sociodemographic characteristics including age, marital status, education and employment. Similarly to Kummerwold, Renahy and Andreassen studies [11,25,26], respondents were asked to indicate their own self-perception of health status, that was assessed with a validated numeric related scale (NRS) from 0 to 10; we considered the range 0 to 5 as "poor", 6 to 8 as "moderate" and 9 to 10 as "excellent". A second part of the questionnaire was related to the use of the Internet for both general purposes and pregnancy-related topics. This part included 9 sections for a total of 73 sub-items:
I. General Internet use (n. 4 items)
II. Aim of the search and type of information searched during preconceptional (i.e. pregnancy information, fetus health, pregnancy calendar) (n. 10 items).
III. Specific aim of the search about pregnancy status and type of information (n. 13 items).
IV. Specific aim of the search about delivery and type of information (n.5 items).
V. Specific aim of the search about the fetus/ newborn health and type of information (n.12 items)
VI. Specific reasons regarding the access to Internet (n.5 items).
VII. Attitude towards and grade of reliability of the Website search (n.6 items).
VIII. Impact of Web's information on health choices (n.12 items).
IX. Potential reasons for searching on Internet rather than (or in addition to) talking face-to-face with a health professional (n.6 items).

Statistical analysis
Statistical analyses were carried out using STATA 11 (Stata Corp., College Station, TX, 2011). Initial descriptive statistics included the chi-squared test to evaluate the differences in proportions between groups (primiparous and multiparous women). Logistic regression was used to assess the potential predictors of a lifestyle change after the Web consultation. The covariates to be included into the final model were selected using a stepwise forward selection process, with a univariate p-value<0.25 as the main criterium.[27] Results are expressed as Odds Ratio (OR) with 95% Confidence Intervals (CI), and a two-tailed p-value <0.05 was considered significant for all analyses.

Results
Between November 2011 and September 2012, after contacting 1576 pregnant women aged 18-44y, we interviewed 1347 responders (the mean age of respondents was 32.4±5.4 years). We found indeed a refusal rate of about 17%, ranking from 13% to 21%. After the exclusion of missing data about parity, the sample consisted of 790 primiparous women (60.5%) and 516 multiparous women (39.5%). Most women were Italian (89.4%), married (66.9%) and workers (76.9%). More than 80% of women declared to have a medium or high educational level (high school/university) and a good/excellent self-perceived health. Internet users were found to be 94.6% of the total sample (n=1274; 96.2% of primiparous and 91.7% of multiparous women; p<0.001). Thirty-six subjects reported delegating the search of pregnancy information, and they were not considered in the analysis. The rate of pregnancy e-Health use (use of the Internet for pregnancy-related purposes) was 97.9% among the Internet users, with no significant difference between primiparous and multiparous women (98.0% and 97.6% respectively; p= 0.6) (Table 1).

More than half of the women in both groups searched for information both before and after consulting a Doctor, with no significant differences. The majority of women performed their research through general search engines (96.6% of primiparous and 95.1% of multiparous women; p= 0.2), followed by the Websites of their hospitals (15.8% in both groups; p= 0.9). Among the reasons of Web use, in alternative or in addition to the doctor, the most frequent ones were quickness of results retrieval (around 60% in both primiparous and multiparous women) and the wish to deepen the knowledge (≈50% in both groups; p=0.08). Around 9% of primiparous and 13% of multiparous women declared to participate in online discussions about pregnancy using specific forum and blogs.
We divided the topics most searched by childbearing women according to four categories: "reproduction phase", "pregnancy", "delivery" and "newborn's health". Concerning the "reproduction" phase, the three most searched topics were the desire for pregnancy (37.2%), the calendar of ovulation (22.8%) and reproductive physiology (18.8%). As regards the "pregnancy" phase, the three most searched topics were fetal development and prenatal tests calendars (51.3%), lifestyles in pregnancy (48.7%) and the physiology of pregnancy (39.8%). With regard to the "delivery" phase, the most searched topics were pain relief

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(29.7%) and the place of delivery (29.1%), while for the "newborn's health" phase were the breastfeeding (36.8%), the preservation of the umbilical cord (36.1%) and the health tips (29.2%).

Multivariate analysis

The results of the logistic regression model investigating potential independent predictors of a change in lifestyle after pregnancy e-Health have been reported in Table 2.

Since no significant differences were found in the univariate analysis between primiparous and multiparous women (multiparous OR=0.93; p=0.7) we decided not to include this item in the regression model. The independent predictors of changing lifestyle after pregnancy e-Health were research about lifestyle topics, such as nutrition, physical activity, tobacco and alcohol prevention (OR=2.34; p<0.001); research on institutional Websites, such as the Ministry of Health or the "Istituto Superiore di Sanità" websites (OR=1.79; p=0.018); good confidence in the information retrieved (OR=1.14; p=0.008); and participating into pregnancy-centered online forum (OR=1.66; p =0.023).

Conversely, Italian women were less likely to change their behavior in comparison with foreigners (OR=0.51; p=0.002). Self-perception of good or excellent health and age did not significantly influences lifestyle changes.

Discussion

This multicenter Italian study was performed to investigate the influence of Internet on the health choices of pregnant women, focusing on lifestyle behaviors and analyzing possible differences between primiparous and multiparous women.

In our research Internet users were found to be around 95% of the total sample with a small though significant difference by parity (96.2% of primiparous and 91.7% of multiparous women). Among the Internet users, almost all used the Internet for pregnancy-related issues. These findings confirm how this phenomenon is spreading worldwide according to international statistics.[11]

Although the internet use may have some positive consequences – women reported they feel empowered and informed after the e-Health consultation, especially when they have to speak to health professionals as ''an equal''.[3,33,35] – such a large reliance on online sources may also be alarming, given the several criticisms related to Internet use and the subsequent potential harms [9,39]: the incomplete comprehension by many women,[3,36] the digital divide,[8,13] the reliability and accuracy of information retrieved and the lack of a regulatory framework addressing this issue [9,17,37,38]. However, it should be acknowledged that, on one side, the Internet use cannot be stopped neither probably reduced (just because of anonymity, simplicity, comfort, and rapidity), and on the other side there is a need of information which is not fully satisfied by health professionals. Indeed, in our study as in several others [7,9,12,17,34], the main reasons for searching on the Web was deepening the knowledge on some specific topics. Thus, healthcare professionals should certainly try to provide more information to pregnant women, especially on those topics that are more frequently searched online (i.e. fetal development and prenatal tests calendars), but they should also try to guide pregnant women in the online searches and recommend high-quality Websites. [4,9,12,14,20,31,33] Finally, and importantly, there is a strong need for a systematic evaluation of the accuracy and credibility of the most commonly viewed websites on pregnancy-related issues.

We found that some characteristics were associated with a higher likelihood of changing lifestyle behavior after the Web consultation: being foreigner, searching information on institutional Websites, participating into online forum and having a greater trust/confidence on the information retrieved. The differences related to nationality could be attributed to the different level of access to health services between Italian and foreign women and the potential different comprehension level of information provided by the healthcare workers, with the consequent need to seek and deepen the information on the Web.[28]

Furthermore, according to Lagan et al., pregnant women use to share information through online discussion forums, in order to have support from other pregnant women or mothers. Our findings confirm this view and report that future mothers using online forums are more likely to change behavior.[3] Indeed, current literature report how the sharing of personal experiences in health-related Websites could contribute in substantial way to modify own habits and health choices.[29]

With regard to the association between intention to change and confidence on information retrieved, some studies reported that many Internet users are skeptical on the reliability of Internet-based information;[3,6,7] while other studies, in line with our results (70.3% declared good/excellent confidence in the information retrieved), reported that most pregnant women considered the Internet a highly reliable source of

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information.[3,9,12,17,20,30] Importantly, we found that the majority of women used general search engines, followed by the hospitals' Websites. These findings are in line with other studies exploring online health information seekers and could be judged alarming if we consider the results of the Pew Research Center Internet project [23], where around 75% of e-Health users declared they did not check the sources of the online information.[31-33] At least, our results suggest that women who do not consult the institutional Websites are less likely to modify their lifestyles.

This survey analyzed the Internet use on pregnancy-related issues for the first time in Italy, and its strengths were the multicentric design, the relatively large sample and the evaluation of some potential predictors that were never assessed so far. However, this study has also some limitations that must be considered when interpreting the results. First, the study was carried out in different Italian regions in both urban and rural areas in order to obtain a representative sample of the general population. The interviews were carried out in the waiting rooms of out-patient departments while women were expecting an ordinary check-up with ultrasound scan or blood tests. A limitation of this study could be due to the geographical differences in the way women interface with health services based on the social and cultural patterns of the geographical areas. However, this issue will be addressed in future analyses of the same project. In addition, women refusing to answer the questions may be introspective or shy and for this reason a possible seeker of information on the Internet. This could cause the potential loss of a part of the sample. In fact, we did not administer the survey by phone to reduce the likelihood of finding fewer significant results due to the higher rates of refusal or incompleteness.[40] Moreover, the decision to use medical doctors to administer the questionnaire allowed us to have a greater participation in the research and to improve the compliance and the completeness of the questionnaires, with a consequent low refusal rate.

Conclusions

In this sample Italian pregnant women, almost all were pregnancy e-Health seekers, including those who also received information from healthcare professionals. Indeed, the main reason for searching the Web was the need of further knowledge on pregnancy-related topic, over and beyond other key advantages of the net such as anonymity, simplicity and rapidity. To reduce the likelihood for women of both finding erroneous information or misinterpret correct ones, healthcare professionals should commit to fill the information gap and to guide pregnant women in the online searches. To do that, the operators need to increase their knowledge on the topics that are more frequently searched and on the websites that are more frequently viewed. In addition, future studies are strongly needed to analyze the quality and accuracy of health information found on the Web.

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What is already known on this subject?

- It is known that pregnancy-related Websites are more and more available on the Internet and pregnancy e-Health practiced

- After the Web consultation, women could make behavioral choices and it may be crucial to access evidence-base information.

- Most women search for information on the Internet once a month or more, most often during early stages of pregnancy when they have recently entered into a new life situation.

What this study adds?

- Our survey is the first investigating the Internet use on pregnancy-related issues, focusing on possible differences between primiparous and multiparous women in Italy.

- Pregnancy e-Health is widely widespread in Italy(95%), without differences between primiparous and multiparous women.

- A higher likelihood of changing lifestyle after pregnancy e-Health was observed among the Italian women who searched institutional websites, declared more confidence in the information retrieved; participated into pregnancy-centered forum online; were residents in Italy.

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Table 1 - Internet use to find information about pregnancy.

		Primiparous women % (N)	Multiparous women % (N)	p
Internet Use		96.2 (760)	91.7 (474)	<0.001
Pregnancy e-Health		98.0 (701)	97.6 (402)	0.6
Timing of research	Before the doctor	60.1 (428)	57.6 (234)	0.4
	After the doctor	56.1 (400)	50.2 (205)	0.06
Ways to access information	General search engines	96.6 (687)	95.1 (385)	0.2
	Hospital websites	15.8 (112)	15.8 (64)	0.9
	Pharmaceutical company websites	2.0 (14)	2.5 (10)	0.6
	Institutional websites	9.3 (66)	6.4 (26)	0.09
	Advertising websites	2.5 (18)	2.0 (8)	0.6
Reasons for Web use	Quickness	60.8 (428)	59.3 (239)	0.4
	Uneasiness	7.3 (51)	5.0 (20)	0.1
	Deepening	49.8 (350)	55.3 (223)	0.08
	Dissatisfaction	3.4 (24)	3.5 (14)	0.9
	Other	7.4 (52)	7.0 (28)	0.8
Forum online use		8.9 (63)	12.9 (52)	0.04
Confidence in the information	Poor	5.2 (37)	3.2 (13)	
	Medium	21.5 (152)	29.0 (117)	0.01
	High	73.2 (517)	67.8 (274)	

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Table 2 - Potential predictors of a lifestyle change after "pregnancy e-Health".

		Crude OR	95% CI	Adjusted OR	95% CI
Age	18 - 25 y old	1 (Ref.)	--	1 (Ref.)	--
	26 - 35 y old	1.27	(0.81-1.98)	0.93	(0.57-1.50)
	> 36 y old	1.14	(0.71-1.84)	0.82	(0.49-1.37)
Nationality	Foreign	1 (Ref.)	--	1 (Ref.)	--
	Italian	0.52	(0.35-0.77)	0.51	(0.33-0.78)
Parity	Primiparous	1 (Ref.)	--	1 (Ref.)	--
	Multiparous	0.93	(0.72-1.23)	--	--
Marital Status	Unmarried	1 (Ref.)	--	1 (Ref.)	--
	Cohabitant	1.24	(0.70-2.20)	1.12	(0.61-2.05)
	Married	1.47	(0.86-2.50)	1.24	(0.71-2.17)
	Other	1.79	(0.63-5.06)	1.32	(0.42-4.21)
Self perceived Health	Poor	1 (Ref.)	--	1 (Ref.)	--
	Good	0.97	(0.89-1.05)	0.94	(0.85-1.03)
Timing of research	Before the doctor	1.55	(1.18-2.02)	1.18	(0.87-1.59)
	After the doctor	1.50	(1.15-1.95)	1.31	(0.98 -1.74)
Research on lifestyle topics	Yes	2.49	(1.90-3.26)	2.34	(1.74-3.13)
Research on institutional websites	Yes	1.82	(1.18-2.83)	1.79	(1.11-2.88)
Confidence in the information	Poor	1 (Ref.)	--	1 (Ref.)	--
	Good	1.19	(1.09-1.29)	1.14	(1.03-1.26)
Understanding of the information	Poor	1 (Ref.)	--	1 (Ref.)	--
	Good	1.07	(0.97-1.16)	0.97	(0.88-1.08)
Participation into online forum	Yes	1.92	(1.30-2.82)	1.66	(1.07-2.57)

OR = Odds Ratio. CI = Confidence Interval.

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