

Pattern of Internet Use for Pregnancy-Related Information and Its Predictors Among Women Visiting Primary Healthcare in Qatar: A Cross-Sectional Study

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Abstract

Background

Internet usage has been steadily increasing and the available online information for pregnant women today is immense.

Objective

This study aimed to investigate the pattern of internet use for pregnancy-related information and its predictors among pregnant women visiting primary healthcare centers in Qatar.

Methods

A cross-sectional study was conducted at the antenatal clinics of six primary healthcare centers in Qatar between June and December 2019. Pregnant women were recruited through a systematic random sampling technique. Participants were interviewed using a structured questionnaire. Descriptive and analytic statistics were used when appropriate. A multivariable logistic regression analysis was constructed to identify the predictors of internet use for pregnancy-related information.

Results

The study included 403 pregnant women. Most of them were in the 26–35 years age category, in the second trimester (55.5%), and had 1–2 children at home (51.5%). The internet was the most common source (81.1%) of pregnancy-related information. The access to online information was mainly through websites (67.3%), mobile applications (48.3%), and social media platforms (39.7%). The most frequently searched topics online were fetal development (74.3%), diet during pregnancy (53.6%), and management of health problems (39.6%). The multivariable regression model identified the age group 26–35 years (AOR: 4.87; 95% CI: 2.10, 11.27), Arabs (AOR: 4.10; 95% CI: 2.02, 8.32), tertiary education (AOR: 5.22; 95% CI: 1.77, 15.33), having 1–2 children (AOR: 3.41; 95% CI: 1.45, 8.01), and being employed or a housewife as independent predictors of internet use for pregnancy-related information.

Conclusion

The internet was a commonly used source of health information among pregnant women in Qatar. Internet use was significantly associated with the age group of 26–35 years, Arabs, higher level of education, being employed or a housewife, and having up to two children.

Introduction

Pregnancy is a transformative period in a woman's life. In addition to its physiological changes, pregnancy impacts the family as a whole and brings about several lifestyle changes. As a result, many women would like to progress during this phase with plenty of assurance about their pregnancy and overall health. Moreover, pregnant women will seek health information to attain a sense of security in this regard. This information can be obtained from several sources such as health care professionals, family, friends, books, childbirth education classes, information centers, and the internet (1). Similarly, pregnant women typically receive credible information from their health care providers during their antenatal care visits. However, the former's need for information cannot be stalled by the lengthy interval of time between each antenatal care visit and the other. So, the internet has emerged as a convenient access portal for expecting women to have a vast amount of information pertaining to their pregnancy and childbirth (2).

Internet usage has been steadily increasing and the online information available for pregnant women today is immense. The prevalence of internet use for health information during pregnancy varies across countries and is generally higher in developed nations than developing ones (2–9). For example, a study among 1347 pregnant women in seven Italian cities found that the majority (86%) surfed the web for pregnancy-related information (3). Another study of 335 Chinese pregnant women revealed that most (88.7%) have used the internet for health information since early pregnancy (4). On the other hand, less than half (45%) of 185 Turkish pregnant women employed the internet as a source of information on pregnancy (5).

Such variation in internet usage for pregnancy-related information could be attributable to several factors. One study found that young age, higher education, employment, and first pregnancy were predictors of internet use for gestation-related information (5). The geographic origin of participants was an additional factor associated with internet use in another study (3). Likewise, there are several reasons that compel pregnant women to seek online health information such as the insufficiency of information given by health care providers, ability to ask questions anonymously, and increased control over their gestation-related decisions by preparing for upcoming antenatal visits (8, 10). In addition to that, the internet has proven to be a platform for social support, sharing experiences, and cooperation among this cohort of women during pregnancy. It satisfies several of their needs such as encouragement, reassurance, confirmation, and information (6, 11).

Pregnant women surf the web to gain knowledge about a wide variety of topics such as fetal development, pregnancy complications, delivery, and infant care. Moreover, those women have used the internet to learn more about their nutritional needs, physical exercise, sexuality, shopping necessities during pregnancy (2–5, 7). Other commonly searched themes include the physiology of pregnancy, lactation, and generic or specific advice during pregnancy (3).

In the State of Qatar, pregnant women access antenatal care through specialized clinics across 25 primary healthcare (PHC) centers. The antenatal care package consists of clinical assessment, screening, management, and health promotion. During their prenatal period, women are followed up by primary care

physicians and midwives over 7–12 clinical consultations (12). However, there is a lack of data on the source of pregnancy-related information, including internet use, among pregnant women attending the antenatal care service at the PHC centers in the country. Thus, the present study aimed to investigate the pattern of internet use for pregnancy-related information and its predictors among expecting women visiting PHC centers in Qatar during 2019.

Methods

Study design and setting

This was an analytical cross-sectional study. It was conducted at the antenatal clinics (ANC) of six PHC centers between June and December 2019. PHC centers are the most common first-line contact between community individuals and Qatar's healthcare system. Each PHC center has a well-defined catchment population of different ethnic, cultural, social, and educational backgrounds; which offers a good representation of the community. The antenatal care of uncomplicated pregnancies is mainly provided through the primary healthcare system and is concluded by a referral to the nearest obstetric hospital at the 34th week of gestation (12). At the time of the study, there were 25 PHC centers distributed across the country's three geographical regions (North, West, and Central). The present study was conducted across six PHC centres, where two health centers were chosen from each region.

Study population and sampling

The target population included pregnant women, in any trimester, who speak Arabic or English and are attending one of the ANCs during the study period. Arabic and English are the most used languages in Qatar. The study excluded pregnant women who were unable to read or write. The recruitment of the participants was done through a systematic random sampling technique (every second woman) without replacement. The ANC's in-charge nurse generated the sampling frame from the daily appointment list in each chosen health center.

Sample size

The calculated sample size was 385 subjects based on a 5% absolute precision, 95% confidence, and a hypothesis that 50% of pregnant women were using the internet during pregnancy.

Data collection

The data was collected through a self-administered questionnaire (described below). The pregnant women were approached by trained interviewers (midwives and nurses) at the waiting areas of the ANC's in each selected PHC center. All potential participants were oriented about the study and assured that their participation was voluntary and had no effect on their quality of care. If they agreed to participate, they were requested to sign an informed consent and given a questionnaire in their preferred language (Arabic or English). Upon completion, the participants were appreciated for their participation and encouraged to ask any relevant questions.

Questionnaire

A structured and self-administered questionnaire was developed by the authors through an extensive review of the literature. It achieved face and content validity through critical review by an expert panel of community medicine consultants and public health specialists in Qatar. It encompassed three main sections and fourteen close-ended questions. Section A consisted of four questions on the socio-demographic characteristics. Section B included five questions related to the characteristics of the current pregnancy. Section C contained five questions on the sources of information and the patterns of internet use for pregnancy-related information. The survey was translated and back-translated (English-Arabic) by two independent translators and any aberrancy was corrected. After which, it was piloted on twenty pregnant women to assess its comprehensiveness and clarity. No modifications were made after the pilot phase.

Statistical analysis

The data were analyzed using IBM SPSS Statistics for Windows, version 23.0 (IBM Corp., Armonk, N.Y., USA). Descriptive statistics were calculated for continuous and categorical variables. Pearson's chi-squared test was used to assess the association between internet use and the independent variables. A multivariable logistic regression analysis was constructed to identify the independent predictors of internet use for pregnancy-related information. The adjusted odds ratio (AOR) with their 95% confidence interval were reported for all predictors. The level of statistical significance was set at 0.05.

Results

Demographic characteristics of participants

A total of 403 pregnant women participated in the study. The characteristics of the study participants are shown in Table 1. Most respondents (71.5%) were in the 26–35 years age category and had tertiary education (69.9%). Also, more than half of the participants were in the second trimester (55.5%) and had 1–2 children at home (51.5%). Most pregnant women reported having a health problem (77.4%) during the current pregnancy, such as heartburn (31.8%), morning sickness (25.8%), and low back pain (25.3%).

Table 1
 Characteristics of participants and obstetric history (N = 403)

Variable	n (%)
Age (year)	74 (18.5)
18–25	286 (71.5)
26–35	40 (10.0)
36 or more	
Nationality	220 (55.1)
Arab	179 (44.9)
Non-Arab ^a	
Level of education	28 (7.0)
Primary education	93 (23.1)
Secondary education	281 (69.9)
Tertiary education ^b	
Employment status	242 (60.0)
Housewife	147 (36.5)
Employed	14 (3.5)
Student	
Gravida	107 (26.6)
Primigravida	296 (73.4)
Multigravida	
Number of living children	121 (30.1)
No children	208 (51.7)
1–2 children	73 (18.2)
3 children or more	

^a Non-Arab includes Asian, Western and African

^b College or university degree

^c Not mutually exclusive categories

^d Urinary tract infection, depression, hypertension

Variable	n (%)
Trimester	25 (6.3)
First	221 (55.5)
Second	152 (38.2)
Third	
Gender of the fetus	139 (34.5)
Male	104 (25.8)
Female	160 (39.7)
Prefer not to say	
Health problems during the current pregnancy	91 (22.6)
No	312 (77.4)
Yes ^c	128 (31.8)
Heartburn	104 (25.8)
Morning sickness	102 (25.3)
Low back pain	87 (21.6)
Gestational diabetes	70 (17.4)
Vomiting	60 (14.9)
Anemia	51 (12.7)
Others ^d	
^a Non-Arab includes Asian, Western and African	
^b College or university degree	
^c Not mutually exclusive categories	
^d Urinary tract infection, depression, hypertension	

Sources of pregnancy-related information

Table 2 shows the sources of pregnancy-related information among the study participants during their current pregnancy. The most reported source was the internet (81.1%). Other popular sources for gestation-related information included the healthcare providers (64.4%), family members (44.8%), and friends (24.9%). Only a small group (9.2%) of respondents had attended an educational activity on pregnancy and most (62.2%) did so at the PHC center.

Table 2
Sources of pregnancy-related information during the current pregnancy (N = 403)

Source of information	n (%)
Internet	327 (81.1)
Yes	76 (18.9)
No	
Healthcare providers	259 (64.4)
Yes	143 (35.6)
No	
Family members	188 (44.8)
Yes	222 (55.2)
No	
Friends	100 (24.9)
Yes	302 (75.1)
No	
Books or magazine	39 (9.7)
Yes	363 (90.3)
No	
Television	20 (5.0)
Yes	382 (95.0)
No	
Participation in educational activity	37 (9.2)
Yes	366 (90.8)
No	23 (62.2)
<i>Place of the educational activity (n = 37)</i>	6 (16.2)
Primary healthcare center	5 (13.5)
Governmental hospital	3 (8.1)
Private antenatal clinic	
Private hospital	

Internet use for pregnancy-related information

Table 3 shows the pattern of internet use for pregnancy-related information (N = 327). Many pregnant women (42.9%) reported using the internet daily and more than a quarter (27.9%) used it 3–4 times a week. Access to online information was mainly through websites (67.3%), mobile applications (48.3%), and social media platforms (39.7%). Moreover, most participants (89.2%) attributed their internet usage to the need for more pregnancy-related information. On the other hand, more than a quarter (28%) of internet users sought to share their experience with others online.

Table 3
Pattern of internet use for pregnancy-related information among study participants (N = 327)

Variable	n (%)
Frequency of internet use during the current pregnancy	140 (42.9)
Everyday	91 (27.9)
3–4 times a week	49 (15.0)
1–2 times a month	46 (14.1)
Few times	
Methods used to access pregnancy-related information	218 (67.3)
Website	157 (48.3)
Mobile application	129 (39.7)
Social media	27 (8.3)
Forum	
Main purpose of searching the internet during pregnancy	290 (89.2)
To look for pregnancy-related information	91 (28.0)
To share the experience with others	27 (8.3)
To look for support	21 (6.5)
To talk anonymously on sensitive issues	

Figure 1 shows the main topics searched online, the most frequently reported themes were fetal development (74.3%), diet during pregnancy (53.6%), management of health problems (39.6%), personal care (34.7%), and preparation for delivery (33.7%). Infant care (21.4%), infant feeding (19.8%), and intimacy (19.5%) were the least frequently reported topics among pregnant women.

When the relationship between internet use and the participants' characteristics was examined using the chi-squared test, a statistically significant difference was observed between internet use and the age group ($p < 0.001$), level of education ($p < 0.001$), occupation ($p = 0.003$), number of living children ($p = 0.02$), and stage of pregnancy ($p = 0.009$). It was determined that pregnant women between the ages of 26 and 35 years, with a tertiary education, currently employed, having 1–2 children at home, and in the

last stage of pregnancy (third trimester) were more likely to access the internet for information on pregnancy (Table 4).

Table 4
The relationship between participants' characteristics and the use of internet for pregnancy-related information (N = 403)

Variable	Internet use for pregnancy-related information		p-value
	Yes, n (%)	No, n (%)	
Age (year)	48 (64.9)	26 (35.1)	< 0.001*
18–25	246 (86.0)	40 (14.0)	
26–35	30 (75.0)	10 (25.0)	
36 or more			
Nationality	184 (83.6)	36 (16.4)	0.168
Arab	140 (78.2)	39 (21.8)	
Non-Arab*			
Level of education	17 (60.7)	11 (39.3)	< 0.001*
Primary education	60 (64.5)	33 (35.5)	
Secondary education	249 (88.6)	32 (11.4)	
Tertiary education			
Occupation	189 (78.1)	53 (21.9)	0.003*
Housewife	130 (88.4)	17 (11.6)	
Working	8 (57.1)	6 (42.9)	
Student			
Gravida	88 (82.2)	19 (17.8)	0.734
Primigravida	239 (80.7)	57 (19.3)	
Multigravida			
Living children	100 (82.6)	21 (17.4)	0.024*
No children	175 (84.1)	33 (15.9)	
1–2 children	51 (69.9)	22 (30.1)	
3 children or more			

* Statistically significant result (p < 0.05)

Variable	Internet use for pregnancy-related information		<i>p</i> -value
	Yes, n (%)	No, n (%)	
Trimester	18 (72.0)	7 (28.0)	0.009*
First	171 (77.4)	50 (22.6)	
Second	135(88.8)	17 (11.2)	
Third			
Gender of the fetus	121 (87.1)	18 (12.9)	0.074
Male	83 (79.8)	21 (20.2)	
Female	123 (76.9)	37 (23.1)	
I don't know			
* Statistically significant result ($p < 0.05$)			

The multivariate logistic regression analysis is shown in Table 5. The participants aged 26–35 years old were about five times more likely to use the internet for pregnancy-related information compared to those in the age group of 18–25 years (AOR: 4.87; 95% CI: 2.10, 11.27). In addition, the following variables were identified as independent predictors of internet use for pregnancy-related information: Arab nationality (AOR: 4.10; 95% CI: 2.02, 8.32), tertiary education (AOR: 5.22; 95% CI: 1.77, 15.33), having 1–2 children (AOR: 3.41; 95% CI: 1.45, 8.01), and being employed or a housewife.

Table 5: Predictors of internet use for pregnancy-related information (N=403)

Variable	Adjusted OR (95% CI)	<i>p</i> -value
Age (year)		
18-25	Reference	
26-35	4.87 (2.10, 11.27)	<0.001*
36 or more	2.81 (0.85, 9.22)	0.088
Nationality	4.10 (2.02-8.32)	
Arab	Reference	<0.001*
Non-Arab		
Level of education	Reference	
Primary education	1.32 (0.47, 3.72)	
Secondary education	5.22 (1.77, 15.33)	0.594
Tertiary education		0.003*
Occupation	6.41 (1.45, 28.35)	
Housewife	5.60 (1.32, 23.82)	0.014*
Working	Reference	0.019*
Student		
Gravida		
Primigravida	Reference	
Multigravida	0.82 (0.16, 4.12)	0.818
Living children	4.96 (0.88, 27.73)	
No children	3.41 (1.45, 8.01)	0.068
1-2 children	Reference	0.005*
3 children or more		

Trimester	Reference	
First	0.75 (0.24, 2.35)	
Second	2.18 (0.60, 7.92)	0.634
Third		0.233
Gender of the fetus	1.83 (0.86, 3.85)	
Male	0.91 (0.42, 2.00)	0.112
Female	Reference	0.828
I don't know		

OR=Odds ratio; CI= Confidence intervals; *statistically significant= $p < 0.05$

Discussion

The current study investigated internet usage as a source of health information among pregnant women in Qatar. It was found that accessing the internet for such purpose was prevalent (81.1%) among our study participants and significantly associated with a specific age group, Arabs, higher level of education, being employed or a housewife, and having up to two children.

In this study, pregnant internet users represented a majority (88.1%) of the total sample. This result aligns with the findings of earlier studies that reported a high prevalence of internet use as a source of health information during pregnancy in developed countries such as Sweden, China, and Canada (2, 4, 14). The widespread use of online sources for health info during pregnancy can be explained by increased internet availability among the global population. It is estimated that by the end of 2019, 4.1 billion individuals or more than half (53.6 %) of the global population were using the internet. This represents almost a seven-fold increase in the percentage of internet users since 2001 at 8% (15). Another driving force behind this trend could be the abundance of online health information. However, the credibility of this information varies widely among different sources and it becomes the responsibility of the consumer to navigate, seek, and validate it (16).

In addition to that, nearly two-thirds (64.4%) of participants recognized their healthcare providers as a source of pregnancy-related information during the current gestation. Subsequently, healthcare professionals in the country must adopt a patient-centered communication strategy through open dialogue about the use of the internet for health information. Also, pregnant women are a vulnerable cohort and must be empowered with the proper skills to access online health information and encouraged to discuss this info with their health care providers. Similarly, Qatar's health officials must collaborate with experts in the field to develop comprehensive, user-friendly, and culturally appropriate online resources for pregnant women. In the meantime, health professionals must be trained on how to identify and recommend valid online sources for pregnant internet users (17).

Another study finding was the low level of participation in educational activities related to pregnancy, where only a small proportion (9.2%) of participants acknowledged doing so. Likewise, there is a declining trend of attending childbirth education classes as evidenced in the literature. Childbirth education classes have a well-documented positive impact on pregnancy outcomes (18–20). Hence, organizers of such classes in the country need to integrate internet use as part of the class activities as an effort to attract this large cohort of pregnant women. The classes will offer an organized environment for the sharing and flow of credible pregnancy-related information without the overwhelming and puzzling aspect of the online environment. Given the COVID-19 pandemic, there is an opportunity to offer these classes as part of the virtual consultations taking place across Qatar's PHC centers.

Regarding the most searched online topics, fetal development and diet during pregnancy were the most frequently reported themes. These results corroborate the evidence of an earlier systematic review that detected these two topics as the most common areas of interest among expecting mothers on the internet (21). Seeking online information about fetal development might reflect a maternal need for comfort or reassurance in this regard. Many pregnant women will be concerned regarding their fetal wellbeing. Regarding nutrition during pregnancy, a study in China associated this concern with the popular underlying belief that nutrition plays an important role in maternal health (22). On the other hand, intimacy was the least searched online theme in this study. This could be due to the sensitivity of such issues among the conservative community in Qatar. Moreover, healthcare providers should be aware of these themes and provide more evidence-based information to their pregnant women in a timely and comprehensible manner. Specifically, health professionals may want to focus on the normal intrauterine development of the fetus during the different stages of pregnancy as well as nutritional guidance to pregnant women during this critical phase of their life.

Our study has identified a significant association between several participant characteristics and using the internet for pregnancy-related information. First, participants between the ages of 26 and 35 years were the most (86%) likely to surf the internet for health information during pregnancy. This result conforms with that of a Turkish study in which participants aged 25–34 years reported using the internet more frequently than their younger (18–24 year) and older (≥ 35 years old) peers (5). On the other hand, an earlier study among 19 pregnant Swedish women did not find any significant association between age and using the internet for health information (2). This area requires further research to understand the drivers behind such differences.

Secondly, pregnant women with tertiary education as well as those who were employed reported the highest internet usage as a source of pregnancy-related info. Similarly, a study on the information needs and health-seeking practices of pregnant women found that the internet was not widely accessed by pregnant women with a low income and low education level (23). However, unemployed participants in our study might still have a high income depending on their spouses' or families' financial status. As such, we cannot infer a similar explanation in this study. Nevertheless, being highly educated is associated with possessing the skills to search for health information online (21).

Third, our study detected that pregnant women, with up to 2 children at home, used the internet more frequently than their peers. Moreover, there was a minimal difference in internet use between those participants who had no children (82.6%) and those having 1–2 children at home (84.1%). These results are like that of a multicenter Italian study that found no significant difference regarding internet access among primiparous and multiparous women (6). In contrast, a study among American pregnant women found that nulliparous participants (50.3%) were two times more likely to use the internet than their multiparous counterparts (21.3%) (24). A similar finding was noted among pregnant women in our study, with 3 or more children at home, who reported the least internet use (69.9%) for online information. Thus, pregnant women with more than two children might have gained enough knowledge and experience from the earlier pregnancies. Subsequently, these participants have assimilated a higher level of confidence that explains their relative independence from using the internet as a source of pregnancy-related information.

Finally, the respondents who were in the third trimester of their pregnancy reported more usage of the internet as a source of health information (88.8%) in comparison to those in the first (72%) and second trimesters (77.4%). So, our participants portrayed an increasing need for health information throughout their pregnancy. In contrast, a study among Chinese pregnant women revealed a drastic decrease in internet usage from the first (81.5%) till the third trimester (5.1%). This was attributed to a stronger need for information during the early stage of pregnancy, where the clinical consultations under the Chinese antenatal program begin from the 20th week of gestation (4). On the other hand, the Qatari antenatal program initiates clinical visits early on from the 6th week of pregnancy and offers up to six visits during the first trimester (25). Consequently, more research is needed to understand the increasing trend of internet use by stage of pregnancy among pregnant women in Qatar.

The current study has some limitations. First, it was conducted among pregnant women attending the antenatal clinics under the Primary Health Care Corporation, Qatar's governmental primary health care provider. So, our results cannot be extrapolated onto the pregnant women seeking antenatal care in the private health sector. Another limitation of this study was that certain questions in the questionnaire relied on pregnant women's ability to remember. Additionally, the cross-sectional study design cannot generate enough evidence to establish causality.

Nevertheless, our study has several strengths. It is the first study to assess the use of the internet as a source of pregnancy-related information among pregnant women in Qatar. Moreover, the high level of response among the participants and the completeness of the questionnaires can be attributable to employing nurses and midwives for administering the questionnaire. Furthermore, a probability sampling technique was employed to select participants from the appointment list of each chosen PHC center. All governmental PHC centers cater to a population of diverse ethnicities and cultures. Therefore, the results can be generalizable to most of the population in Qatar. In addition, the study has identified several gap areas that can be used in enhancing the quality and comprehensiveness of antenatal care in the country.

Conclusion

In conclusion, the present study showed that the internet was a widely used source of health information among pregnant women in Qatar. Internet use was significantly associated with the age group of 26–35 years, Arabs, higher level of education, being employed or a housewife, and having up to two children. These findings will inform public health officials on guiding pregnant women to high-quality and valid online health sources.

Declarations

Ethics approval and consent to participate

This study was approved by the ethical committee of the Primary Health Care Corporation under protocol ID (PHCC/RC/18/11/002). All methods were performed in accordance with the relevant guidelines and regulations. Written informed consents was obtained from all participants.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Author contribution

AAD: Conceptualization, Methodology, Formal analysis, Writing- Reviewing and Editing. **MC:** Methodology, Writing - Original Draft. **AM:** Data curation **NAK:** Project administration **NS:** Supervision.

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Figures

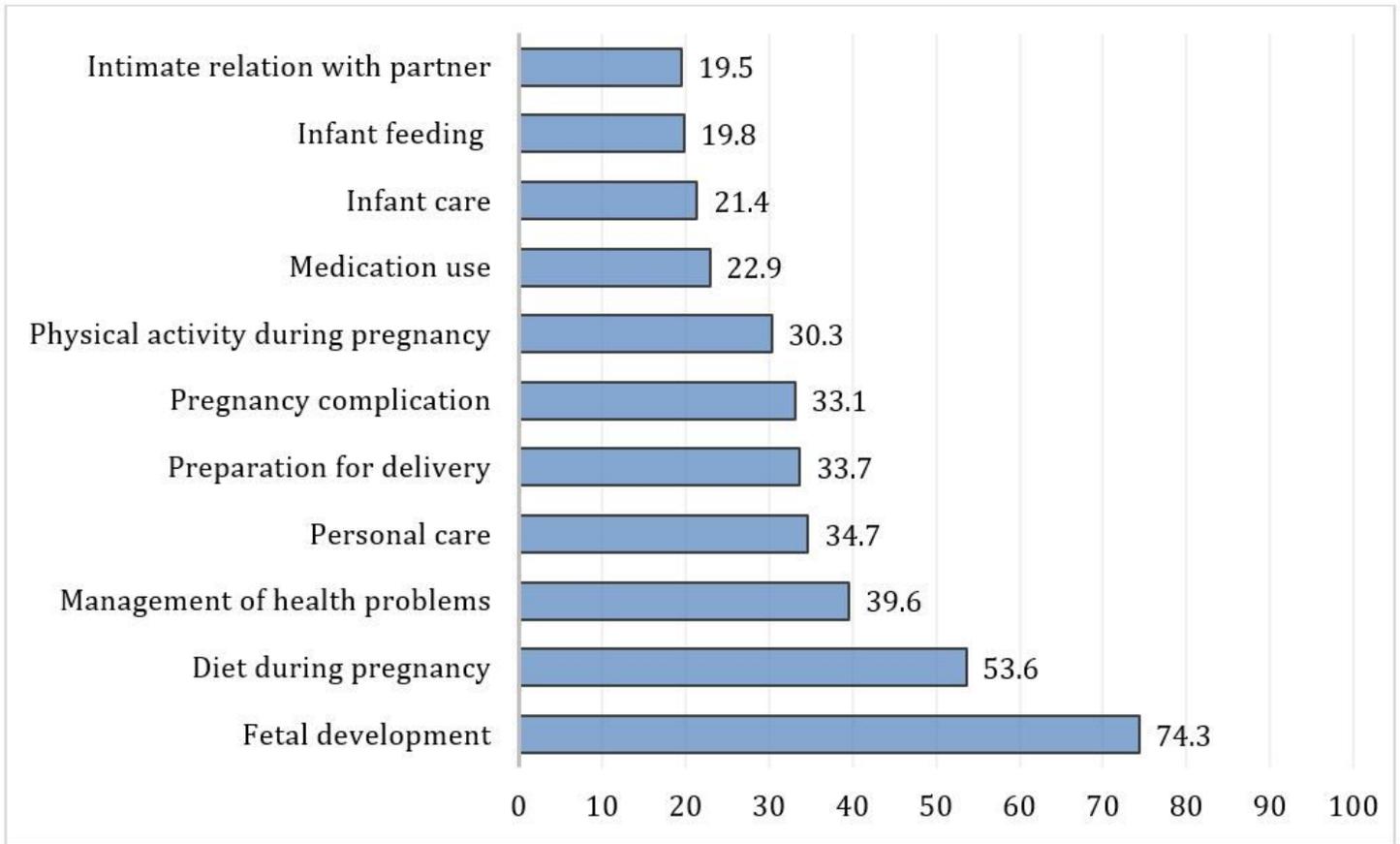


Figure 1

Main topics searched online by study participants (N=327)