Medicines information needs during pregnancy: a multinational comparison

Katri Hämeen-Anttila,1 Johanna Jyrkkä,1 Hannes Enlund,1 Hedvig Nordeng,2,3 Angela Lupattelli,2 Esa Kokki1

ABSTRACT

Objectives: The aim was to assess the perceived needs of medicines information and information sources for pregnant women in various countries.

Design: Cross-sectional internet-based study.

Setting: Multinational.

Participants: Pregnant women and women with children less than 25 weeks.

Primary and secondary outcome measures: The need for information about medicines was assessed by a question: ‘Did you need information about medicines during the course of your pregnancy?’ A list of commonly used sources of information was given to explore those that are used.

Results: Altogether, 7092 eligible women responded to the survey (5090 pregnant women and 2002 women with a child less than 25 weeks). Of the respondents, 57% (n=4054, range between different countries 46–77%) indicated a need for information about medicines during their pregnancy. On average, respondents used three different information sources. The most commonly used information sources were healthcare professionals—physicians (73%), pharmacy personnel (46%) and midwives or nurses (33%)—and the internet (60%). There were distinct differences in the information needs and information sources used in different countries.

Conclusions: A large proportion of pregnant women have perceived information needs about medicines during pregnancy, and they rely on healthcare professionals. The internet is also a widely used information source. Further studies are needed to evaluate the use of the internet as a medicines information source by pregnant women.

INTRODUCTION

Medicine use during pregnancy is common.1 2 Most pregnant women use at least one medication during pregnancy.3 4 There is also evidence of an increase in the use of medicines during pregnancy, from an average number of 2.5 in 1976–1978 to 4.2 in 2006–2008 in the USA.4 Pregnant women’s beliefs and risk perceptions influence their decisions on whether or not to use a medication during pregnancy.5 The availability and use of reliable information sources are therefore important to ensure safe and rational use of medicines during pregnancy. The increasing use of the internet and social media as a source of information and social support is challenging for the healthcare sector in trying to maximise its benefits and minimise its risks.

Health information needs and internet use of pregnant women have been studied more widely5–9 than the information needs concerning medicines in specific. Questions related to medicine use are among the four most important questions pregnant women have.10 Earlier studies have shown that some 40–80% of pregnant women have perceived information needs about medicine use during their pregnancy.2 11 12 The most
commonly used source of information has been physi-
cians/prenatal care providers,\(^2\)\(^{11-15}\) followed by phar-
cists and family members.\(^2\)\(^12\) The use of books and
magazines has also been reported.\(^2\)\(^12\)\(^13\) However, with
growing access to the internet and social media, the role
of healthcare personnel is bound to change from the
keeper of information to the provider of coaching and
assessing information including second opinions. It is
also expected that women will use several different
sources to compare the information content.

This study was the first to compare pregnant women’s
needs for information and sources about medicines in
different countries. We hypothesise that the overall need
for information about medications during pregnancy is
widespread across different countries. Thus, our aim was
to assess the perceived need for medicines information
during pregnancy and which information sources are
used in different regions of the world.

MATERIAL AND METHODS

Study design and population

This study is part of a multinational collaborative study
about Medication Use in Pregnancy. Member countries
of Teratology Information Service network, that is,
ENTIS in Europe, OTIS in North and South America
and Mothersafe in Australia, were invited to take part in
the project. Of these, the following countries/regions
agreed to take part in the project and conduct the
study; Norway, Sweden, Finland, Iceland, Italy, France,
the UK, Austria, Switzerland, the Netherlands, Poland,
Sweden, Croatia, Serbia, Russia, the USA, Canada,
Australia and South America (table 1).

An anonymous self-completed internet-based ques-
tionnaire administered by the Questback programme
(http://www.questback.com/) was used. Invitations to
the study were posted on 1–4 internet websites used by
pregnant women in regions around the world. Before
being given access to the online questionnaire, each
study participant had to read the study description in
which the study objectives, participants’ right to with-
draw from the study at any time and contact persons in
the applicable country were presented. Each participant
was then asked whether she was willing to participate in
the study and fill out the online questionnaire. Only
after clicking ‘yes’ was the participant redirected to the
webpage on which the full online questionnaire could
be filled in. Reading the study description and complet-
ing the questionnaire were considered to be giving
informed consent.

The questionnaire was accessible during a period of
2 months in each country. All the data were collected
during the period of 1 October 2011 to 29 February
2012. Pregnant women and breastfeeding women with a
child less than 1-year old were eligible to participate in
the study; however, in this substudy, only pregnant
women and breastfeeding women with a child less than
6 months (less than 25 weeks) were eligible. The women
were advised to answer the questions related to their
current or latest pregnancy.

The number of women who accessed the on-line ques-
tionnaire in the various countries was 9615. Of these
women, 9483 (98.6%) accepted the participation in the
study and filled in the questionnaire. Of these responses,
5090 were from pregnant women and 2002 from women
with a child less than 25 weeks old. Thus, the final study
population was 7092 (figure 1). The study population in
each country was compared with the birthing population
using national or population-based statistics (see online
supplementary file 1).

The ethics approval for the study was obtained from
the Norwegian Regional Ethics Committee. All data
were handled and stored anonymously.

Questionnaire

The internet questionnaire, originally developed by
researchers at the University of Oslo (AL and HN), was
first translated into English and then into the respective
languages of the participating countries. The study ques-
tions largely followed the ones used in the study by
Nordeng et al.\(^2\)\(^5\) The questionnaire was piloted in four
countries (Norway, Sweden, Finland and Italy) and only
minor changes were made. The pilot responses were not
included in the study dataset.

The questionnaire included the following sections:
background information about the pregnant woman
and her pregnancy; health disorders and use of medi-
cines during pregnancy; needs for information; medi-
cines for chronic diseases during pregnancy; attitudes
towards using medicines in general and during the preg-
nancy; and perceptions of risks during pregnancy.
Standardised questions about maternal factors were
posed to the subjects, with emphasis on the presence of
acute and long-term illnesses during pregnancy. In
affirmative case, women were questioned about the use
of medicines for each individual illness as free-text entry.
This study analyses and reports on the data about the
information needs.

Main outcome measures

Women were asked about their needs for information
regarding the use of medicines during pregnancy and
the sources of information they had used. The need for
information was assessed by a question: ‘Did you need
information about medicines during the course of your
pregnancy?’ A list of commonly used sources of informa-
tion was also given to explore the information sources
used, and the respondent had a chance to mention
other sources used (table 2).

Statistical analysis

The Statistical Package for Social Sciences, V.20 (SPSS
Inc, Chicago, Illinois, USA) was used to analyse the data.
Descriptive statistics were used to calculate the results,
that is, frequencies, percentages and cross-tabulation.
RESULTS

Study population

The average age of the respondents was 29 years (interpercentile range 23–36; table 1). Of the respondents, 53% were primiparous, and 55% had a university or college degree. Overall, the mean age of our study populations is quite close to that of the target populations in each participating country (table 1). The percentage of primiparity was somewhat higher among our study participants than among most national populations. Likewise, our participants had a somewhat higher education when measured by the percentage of university or college graduates.

Information needs

Of the respondents, 57% (n=4054) stated having needed information about medicines during their pregnancy (figure 2). Respondents from Eastern Europe needed information the most (72%). The respondents in other regions of the world needed it less: Northern Europe 57%, Australia 56%, Western Europe 51% and North and South America 50%. The need for information varied between countries from 46% (the UK and Norway) to 77% (Finland).

Information sources

The most commonly used information sources were healthcare professionals, especially physicians (73%), pharmacy personnel (46%), midwives or nurses (33%) and the internet (60%; table 2). On average, the respondents used three different information sources.

There were differences in the information sources used in different countries. Midwives and nurses were often asked for information in Northern Europe (50%), but they were rarely contacted in Eastern Europe (14%). On the other hand, the internet was most commonly used in Eastern Europe (75%). Pregnant women in Northern Europe (49%) used drug handbooks and information leaflets more often than women in other parts of the world. Drug information centres were commonly used in Australia (24%) and the USA (24%), but they were very rarely used in Eastern Europe (1%).

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Table 1 Characteristics of the study population (n=7092), and comparative national population data (see online supplementary file 1)

<table>
<thead>
<tr>
<th></th>
<th>Age of mother Mean (IPR)†</th>
<th>National data on age Mean age</th>
<th>Mother primiparous Per cent</th>
<th>National data on primiparity Per cent</th>
<th>Education university/college Per cent</th>
<th>National data on education Per cent</th>
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<td>53</td>
<td>55</td>
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<td>Russia</td>
<td>606</td>
<td>27 (21 to 34)</td>
<td>56</td>
<td>NA</td>
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<td>NA</td>
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<td>44</td>
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<td>32 (26 to 37)</td>
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<td>49</td>
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<td>Northern Europe</td>
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<td>29 (23 to 35)†</td>
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<td>42</td>
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<td>42</td>
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<td>Australia</td>
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<td>31 (24 to 38)</td>
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<td>44</td>
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<td>49</td>
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<td>40</td>
<td>46</td>
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<td>42</td>
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<td></td>
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<tr>
<td>The USA</td>
<td>231</td>
<td>29 (21 to 37)</td>
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<td>46</td>
<td>65</td>
<td>58</td>
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<tr>
<td>Canada</td>
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<td>28 (21 to 34)</td>
<td>52</td>
<td>43</td>
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<td>70</td>
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<td>South-American Countries</td>
<td>265</td>
<td>27 (20 to 34)</td>
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<td>42</td>
<td>NA</td>
<td>30</td>
</tr>
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</table>

*Interpercentile range (IPR) calculated 10th to 90th percentile.
†Calculated based on 7028 values, because 64 values from Iceland were not available.
‡Calculated based on 2120 values, because 64 values from Iceland were not available.
§Not shown because 64 values were not available.
and complementary medicine personnel. On average, one-fourth of the respondents discussed medicine use with their family and friends.

**DISCUSSION**

This is the first study to assess women’s needs for medicine information during pregnancy on a multinational level. Over half of the pregnant women who responded to the internet survey in different countries indicated a need for information related to medicine use during pregnancy. Pregnant women used multiple information sources, however, healthcare professionals, especially physicians, being the most common. The internet was also a widely used information source for pregnant women. There were distinct differences in the perceived needs for information and sources of information used in different countries.

The fact that most of the pregnant women in this as well as previous studies report using healthcare professionals as a source is reassuring.2,11,12 Physicians are the key persons when counselling pregnant women on medicine use. However, our results show that the internet is also commonly used today in different regions of the world (ranging from 45% to 90%) by pregnant women. This is consistent with some previous studies.2,7,9,12 The differences in information sources used between different countries most probably reflect different situations in terms of antenatal care as well as available information sources in the countries. For example, in Eastern Europe, where women did not

![Diagram](image)

**Figure 1** Formation of final study population.

![Table](table)

**Table 2** Medicines information sources used by pregnant women (n=4054)

<table>
<thead>
<tr>
<th>Source</th>
<th>Total (n=4054)</th>
<th>Eastern Europe (n=1095)</th>
<th>Russia (n=456)</th>
<th>Croatia (n=130)</th>
<th>Poland (n=344)</th>
<th>Serbia (n=88)</th>
<th>Slovenia (n=77)</th>
<th>Northern Europe (n=1250)</th>
<th>Finland (n=372)</th>
<th>Iceland (n=44)</th>
<th>Sweden (n=408)</th>
<th>Norway (n=426)</th>
<th>Australia (n=98)</th>
<th>Western Europe (n=1273)</th>
<th>Austria (n=32)</th>
<th>Italy (n=419)</th>
<th>Switzerland (n=245)</th>
<th>France (n=159)</th>
<th>The Netherlands (n=23)</th>
<th>The UK (n=395)</th>
<th>Americas (n=338)</th>
<th>The USA (n=124)</th>
<th>Canada (n=96)</th>
<th>South-American (n=118)</th>
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<tbody>
<tr>
<td>Physician, gynaecologist, specialist (%)</td>
<td>73</td>
<td>77</td>
<td>70</td>
<td>71</td>
<td>89</td>
<td>88</td>
<td>68</td>
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<td>Internet (%)</td>
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<td>75</td>
<td>90</td>
<td>78</td>
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<td>42</td>
<td>37</td>
<td>35</td>
<td>58</td>
<td>23</td>
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<tr>
<td>Drug handbook, information leaflet (%)</td>
<td>35</td>
<td>32</td>
<td>26</td>
<td>38</td>
<td>34</td>
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<td>40</td>
<td>31</td>
<td>16</td>
<td>31</td>
<td>27</td>
<td>16</td>
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<tr>
<td>Drug information centre (%) *</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>7</td>
<td>7</td>
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<tr>
<td>Other (%) †</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
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<td>5</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>7</td>
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</table>

*Poison information centres, teratology information services and national centres of information on medicines.
†Herbal shop personnel, complementary medicine personnel, magazines, media and books.
often use midwives or nurses as information sources, the use of the internet was most common. On the other hand, in Australia the use of drug information centres was high, most probably because of the availability of such centres. The prevalent use of the internet is challenging for healthcare professionals. Increased awareness and readiness to accept this is necessary to ensure a rational approach towards the use of the internet in health contexts.

Our findings may reflect that pregnancy is a special time when the need for information is great, but the findings could also be a more general cohort effect reflecting the generations of young women today. The societal change in the information society is concretised by Palfrey and Gasser’s definitions of ‘Digital Natives’ as those generations born after 1980 and ‘Digital Immigrants’ as those born before 1980. Thus, the new generations internalise new forms of information and communications technologies from childhood in a way that has not happened before. Information about medicines is readily available for everyone and Digital Natives find it and use it particularly easily. In this study, the average age of the respondents was 29 years, indicating that most of them were Digital Natives, and thus natural internet users.

The development of the information society and eHealth initiatives is aimed at empowering the consumer and client. This is also in line with current trends in healthcare from paternalism towards concordance. At the same time, the role of healthcare professionals should expand from a mere information provider to a supporter of care of an empowered patient. Healthcare professionals need to be ready to discuss any topics raised on health and medicines information although there are some reports indicating that pregnant women are not very prone to discuss information retrieved from internet with their midwife. Healthcare professionals need to discuss with their clients about what information sources they use, interpret health information and tailor it to specific needs. Moreover, there is also a growing need to assess the quality of information with clients. It is important to promote the use of tools such as the DARTS checklist for the assessment of the quality of online medicines information.

eHealth functions are much broader than just medicines information, as they include functions such as health information networks, electronic health records, health portals and all kinds of tools to assist prevention, diagnosis, treatment, health monitoring and lifestyle management. As such, this major change in the
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healthcare sector also changes the way the medicines information is delivered to medicine users. In fact, there is a need for being prepared to increase visibility and participation of healthcare professionals on the internet and social media to balance lay views on issues related to health and medicines. In the European Union, an eHealth action plan was adopted in 200418 aimed at facilitating a more harmonious and complementary European approach to eHealth. The action plan is currently being revised.19

One limitation of our study is the fact that the questionnaire was only available through internet websites used by pregnant women. Using this kind of approach, a conventional response rate cannot be calculated. However, epidemiological studies using web-based recruitment methods have shown reasonable validity.20–22 Internet use is relatively high among individuals aged 25–34 years in Europe, ranging from 48% in Russia to 100% in Iceland.23 The internet penetration rates in other parts of the world vary, being highest in the USA, Australia, and Canada (80–94%) and lowest in South America (48%).24–27 Thus, the degree to which our findings can be extrapolated to the target population is based on the representativeness of the respondents to the general birthing populations in each country. Overall, the age structure of our study population match quite well with the target population in each participating country. However, as in most questionnaire-based studies, the participating women had somewhat higher educational level than the general birthing populations in each country. It is commonly known that more resourceful individuals tend to be more favourable to participate in questionnaire-based studies.28–30 This is likely the case for this study as well since the study population is better educated than the general birthing population. As women with higher education tend to seek information and to a larger degree use several sources,28,30 we might have overestimated the need for information about medicines during pregnancy. Among our study population, we had also somewhat more primiparous women indicating a higher need for medicines information in this subgroup. Finally, we do not know which internet websites the respondents have used. Some of the information used may be highly reliable and relevant, while others may be unreliable or biased.

In conclusion, a large proportion of pregnant women report the need for information about medicines during pregnancy, and they rely on healthcare professionals. The internet is also a widely used information source across the countries in this study. Further studies are needed in order to evaluate internet use as a medicines information source by pregnant women.

Contributors HN and AL conceived and collected data for the main study ‘Medication Use in Pregnancy—an International study’. KH-A, JJ, HE, HN and AL conceived this subsidy. EK performed the statistical analysis and KH-A wrote the first draft of the manuscript. All the authors contributed to the interpretation of the results and to the final manuscript. All the authors read and approved the final manuscript.

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Data sharing statement No additional data are available. Researchers can apply for data access for subprojects within the overall aims of the main study ‘Medication Use in Pregnancy—an International Study’.

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Medicines information needs during pregnancy: a multinational comparison

Katri Hämeen-Anttila, Johanna Jyrkkä, Hannes Enlund, Hedvig Nordeng, Angela Lupattelli and Esa Kokki

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