

# Natural childbirth and cesarean section: descriptive analysis of queries in Google search engine

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## ABSTRACT

**Objectives:** The use of internet-based search engines for health information is very popular and common. The Internet has become an important source of health information and has a considerable impact on patient's decision making process. Knowledge of pregnant women about childbirth comes from health professionals and personal experiences described by friends or family members. There is a growing interest in digital sources used by pregnant women. Analysis of queries related to regarding to natural childbirth and cesarean section in the Google search engine.

**Material and methods:** In this infodemiology, descriptive study tool "AlsoAsked" was used. This is a tool for analyzing data appearing in Google search results. "AlsoAsked" search was conducted on April 19, 2023. Search phrases "natural childbirth" and "cesarean section" in polish language were used. Questions that were typed into the Google search engine, ranked according to popularity (volume) and thematic connections have been discussed.

**Results:** The most frequently asked questions were related to the course and duration of labor as well as the preparation for labor and cesarean section (CS). Comparison between a natural labour and CS in the context of safety and pain received a great deal of attention.

**Conclusions:** The most popular questions regarding CS were related to elective CS and indications for it. Some questions concerned the connection between labor and clinical state of a newborn. Women's healthcare should include education about the possibility of incorrect information provided by the Internet Web sites and information about trustworthy Web sites.

**Keywords:** natural childbirth; cesarean section; infodemiology

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## INTRODUCTION

The development of the Internet and information technology enables us to obtain information on an unprecedented scale. It has changed the way health information is obtained and has become an important tool influencing medical condition decision making. Recent studies suggest that the information regarding health care obtained through an electronic medium (Internet and social media platforms) might be useful in epidemiological studies and traditional surveillance. This research field is called infodemiology (information epidemiology). As part of infodemic research the relationship between health information demands (through

Web queries analysis) and health information supply (via social media data analysis) is analyzed [1, 2].

Knowledge of pregnant women about childbirth comes from many sources: health professionals, digital sources, social exchanges and family members or friends' experiences. Unlimited access to digital sources including Google, social media, apps and blogs made them one of the most used tools. Reported percentage of pregnant women using the Internet is high: 51% [3], 77.9% [4], 81.1% [5] even 93% [6] in the Australian study. In Pilarska et al. [7] study more than 50% of Polish respondents used the Internet as a source of health information. The internet search is mainly used to

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verify medical diagnosis, get an answer to a question asked during medical consultation or obtain a further explanation of an ambiguous answer given by the doctor. The analysis showed that the main reason why pregnant women search for information on the Internet is the wish to supplement or verify knowledge provided by health professionals or improve communication with their doctor. Access to reliable information reduces levels of stress and anxiety [4]. It is important for decision making process and can help to choose the type of delivery and reduce the fear of childbirth. Sys et al. [8] emphasize that the critical element influencing women's attitudes towards childbirth is knowledge. In this Polish survey, preferences regarding the mode of birth after cesarean section (CS) were assessed. More than half of the women did not discuss this decision with a midwife, and every fifth did not discuss it with an obstetrician. The main source of information for them was the Internet. Health professionals should be active in e-discourse [9]. The Internet content should be verified, and trustworthy websites should be recommended to pregnant women.

### Objectives

Analysis of queries in the Google search engine regarding natural childbirth and CS. Evaluation of what kind of childbirth related issues attracts a lot of interest.

## MATERIAL AND METHODS

In this infodemiology, descriptive study tool „AlsoAsked” was used. This is a tool for analyzing data appearing in Google search results. „Also Asked” aggregates, organizes and displays “People Also Ask” data in real time as well as provides information about connections between topics. Also Asked search was conducted on April 19, 2023. Search phrases “natural childbirth” and “cesarean section” in Polish language were used. The obtained results are presented in a tabular summary separately for each issue. These are questions typed into the Google search engine, ranked according to popularity (volume), and thematic connections.

## RESULTS

Number of searches for the “natural birth” phrase per month was 3400, “cesarean section” was 1200 or “c-section” 7900 (data not shown). Most natural childbirth questions were related to its course, comparison with CS in the context of safety and pain, duration and preparation for birth (Tab. 1). According to popularity on the fifth position there were searches for videos presenting natural childbirth. Questions pertaining to the course of labor related to early symptoms of labor, its stages, duration, and pain. The nature of the questions that were asked (“Is labor that horrible?”; “What is more painful than labor?”; “What pain can be compared

to labor?”) may suggest, that childbirth is seen as a negative incident that is a source of concern mainly because of pain. What is more, this theme predominates in specific questions applying to comparison between natural and CS. Specific questions connected with duration of labor refer to preterm birth, its duration and induction. Also, some of these questions apply to duration and pain symptoms. People who ask questions want to know what kind of labor is associated with lower pain, what the character and level of pain is, what it can be compared with and what the methods of relieving the pain are.

The number of questions related to CS at the time of conducting analysis was almost two times higher (Tab. 2). The most frequently asked questions about elective CS concerned indications, possibilities of receiving a referral to CS or refusal of this procedure. Similarly, to natural childbirth most questions were about stages and duration of CS. In this group questions concerning anesthesia, emotions after procedure and pain predominated. In detail there were questions about preparation for CS (toilette, outfit, preparation for procedure — shaving, enema) and early postpartum proceedings (food, toilet usage, getting-up, walking, newborn issues). What is more, in this group there were questions referring to aesthetic postpartum body image fears (postoperative scar, abdomen appearance). Searching for videos presenting c-section are not so common as with natural childbirth (20<sup>th</sup> position, volume 40 — data not shown). Negative emotional charge of questions concerning CS in comparison to natural childbirth is lower. However, pain constitutes a strong association between those two groups as it is mentioned frequently in questions regarding both labor and postoperative wound. Questions with a negative emotional charge regarding pain, fear and anxiety are marked with an asterisk.

## DISCUSSION

Infodemiology analyzes people's information needs and monitors their health information seeking behavior [1]. A general trend of increasing interest in medical information on the Internet is observed, which may affect patient-healthcare professional relationships. Search engines create databases based on knowledge and users' behavior becoming their digital reflection. Analysis of gathered data may provide trends research, as well as popularity of definite issues and users behavior' surveys.

The use of the Internet for searching medical information has been called Dr Google consultation. Does Dr Google improve or worsen communication between the obstetrician/midwife and the patient? Does Dr Google replace healthcare professionals? The problem is complex because it can have a big impact on communication and decision-making process in both positive and negative ways.

**Table 1. Listing of the most frequently asked questions concerning natural childbirth with its expansion**

| Main questions that were asked              | Volume <sup>1</sup> | Expansion of main questions  | Number of questions related to negative emotions — pain, fear, anxiety. Questions marked with “*” |
|---|---------------------|--|---|
| 1. What does natural childbirth looks like? | 150                 | How does a baby come out of vagina?<br>What does delivery look like step by step?<br>How long does the pushing pain last?*<br>How not to poop during labor?*<br>What stops the labor?<br>Is pushing during labor necessary?<br>How long is the quickest labor?<br>How long is the shortest labor?<br>How long is the labor since water breaks?<br>How long does natural childbirth last?<br>How long does fast labor last?<br>How to push a baby out?<br>How long does pushing during labor last?<br>How does labor start?<br>Is labor painful?*<br>What is more painful than labor?*<br>What can be compared to labor pain?*<br>What can be done to make labor painless?*<br>Is labor that horrible?*<br>What is the fastest kind of labor? | 7/20  |
| 2. What is worse: natural childbirth or CS? | 100                 | Why is CS dangerous?*<br>Which labor is more painful?*<br>Does CS hurt more?*<br>How long does CS last?<br>How to ask a doctor for a CS?<br>How much does natural labor hurt?*<br>Which type of labor is the safest?<br>Which labor is better for a child?<br>Is labor difficult?*<br>Which is the best hospital to give birth?<br>How fast do labor contractions progress?<br>Does genetics play a role in labor?<br>Is natural childbirth horrible?*<br>Is it possible to refuse natural childbirth?   | 6/14  |
| 3. How much time does natural labor last?   | 80                  | What is the longest time of labor?<br>What causes fast labor?<br>Why labor is painful?*<br>Is labor painful?*<br>Is it possible to be in labor for a couple of days?<br>How much pain do you feel in labor?*<br>How long does labor take?<br>What can labor be compared with?<br>How long does it take to give birth to the first child?<br>What to do to speed up labor?<br>What is the time of birth determined by?<br>Are girls born before time of birth?<br>Why are children born before the time of birth?<br>Does induced labor last longer?<br>Does balloon hurt?*<br>What happens after giving oxytocin?<br>Do I need to agree for oxytocin?  | 4/17  |
| 4. Natural childbirth — how to prepare?     | 40                  | Do I need to shave for labor?<br>How long does it take to poop after labor?<br>What can I eat before labor?<br>How to help a child to come into birth canal?<br>What can I do not to induce labor?<br>Does every labor hurt?*<br>What can I expect during labor?<br>How to massage vagina before labor?<br>How to survive labor well?<br>How to give birth fast and painless?*<br>How to make crotch massage before labor?   | 2/11  |



**Table 1. (cont.) Listing of the most frequently asked questions concerning natural childbirth with its expansion**

| Main questions that were asked                 | Volume <sup>1</sup> | Expansion of main questions                           | Number of questions related to negative emotions — pain, fear, anxiety. Questions marked with “**” |
|--|---------------------|---|--|
| 5. What hurts more — natural childbirth or CS? | 40                  | How to make labor painless?*                          | 11/24  |
|  |                     | How to make labor fast?                               |  |
|  |                     | Does housework fasten the labor?                      |  |
|  |                     | What to do to induce labor?                           |  |
|  |                     | How should I walk up and down stairs to induce labor? |  |
|  |                     | May hot bath induce labor.                            |  |
|  |                     | How to relieve pain during labor?*                    |  |
|  |                     | Does giving oxytocin hurt?*                           |  |
|  |                     | What does labor look like with an epidural?           |  |
|  |                     | Is it possible to prepare for labor?                  |  |
|  |                     | Is it possible to get anesthesia for labor?           |  |
|  |                     | Does laughing gas help during labor?                  |  |
|  |                     | How to breathe during labor?                          |  |
|  |                     | Is it possible to withstand labor pain?*              |  |
|  |                     | How long does pushing pain last?*                     |  |
|  |                     | How to describe labor pain?*                          |  |
|  |                     | How long does it take to fully dilate?                |  |
|  |                     | How to avoid episiotomy?                              |  |
|  |                     | What is the most painful during labor?*               |  |
|  |                     | Why does labor hurt so much?*                         |  |
|  |                     | How to get rid of anxiety before labor?*              |  |
|  |                     | What is soft labor determined by?                     |  |
|  |                     | Does a child feel pain during labor?*                 |  |
|  |                     | Is water labor less painful?*                         |  |
| 6. What does natural birth look like — video   | 30                  | Not applicable  |  |

<sup>1</sup>monthly search volume; CS — cesarean section

The interest of Google users in birth-related topics has increased over time [9]. Research results show that pregnant women still prefer midwives and obstetricians as a source of information [3, 4, 10]. However, in the absence or insufficiency of information provided by health care providers or in an emergency, they look for information on the Internet [4, 11]. A study in the Netherlands reported that pregnant women did not feel the need to explore the Internet as long as they received enough information from other sources [12].

Access to information during pregnancy is very important to women's well-being. It is a starting point for dialogue with healthcare professionals, preparation for childbirth and parenting and decision-making regarding childbirth. Women want access to accurate, accessible, consistent and reliable information during pregnancy [6]. The Internet is an easily accessible (24 hours a day), unlimited by place and time source of information. It also gives the opportunity to express emotions, exchange experiences, share advice and information, access women's birth stories through forums and social media [13, 14]. In the Turkish study 54.7% of the pregnant women spent less than one hour a day on the Internet to learn about childbirth [15]. Al-Dahshan et al. [5] states that many pregnant women reported using the internet every day.

Sources of information are usually not verified by professionals and vary widely in the content quality. In a survey on the quality of the information available on the Internet regarding CS, Fioretti et al. [16] found that 30% of the pages were of poor or very poor quality and 47% were of moderate quality.

In the opinion of Peddie et al. [17] the most user-friendly, balanced and informative websites appear to be those funded by government agencies. Authors did not find any research assessing quality of Polish online information regarding childbirth. To assess trustworthiness of information women usually compare obtained information on several websites or ask midwives to indicate recommended websites [3, 4]. Women's perception of the trustworthiness and usefulness of information correlates with age, level of education, gestational age, personal beliefs, and values [18, 19]. Ellis and Roberts [14] conducted a quality assessment of Internet discussion forums. They stated that 20.9% of responses were erroneous, incomplete, or misleading, 24.3% lacked credible evidence, and 5.5% were potentially harmful. Pregnant women should be informed by healthcare professionals about risk of misinformation. Reliable, trustworthy websites with verified content should be recommended. It is essential for supporting positive emotions connected with labor and decision-making process (choosing the type of

**Table 2.** Listing of most frequently asked questions concerning cesarean section (CS) with its expansion

| Main questions that were asked | Volume <sup>1</sup> | Expansion of main questions   | Number of questions related to negative emotions — pain, fear, anxiety. Questions marked with “**” |
|--------------------------------|---------------------|---|--|
| 1. How to ask doctor for CS?   | 300                 | How to get a referral for a CS?<br>Can a CS be refused in hospital?<br>When does a doctor give referral for a CS?<br>Can a referral for a CS be undermined in hospital?<br>What do I need for a CS?<br>Which doctor performs CS?<br>Can I ask my doctor for a CS?<br>Can CS be refused?<br>How much does the national health fund pay for CS?<br>How does qualification for CS look like?<br>Who can give referral for a CS?<br>When does the doctor decide about CS?<br>When should I come to a hospital if there is CS?<br>How to get a medical certificate for CS?<br>When does the doctor set time of birth?<br>Can neurologist give referral for a CS?   | 0  |
| 2. How CS looks like?          | 250                 | What does CS look like step by step?<br>How to shave for a CS?<br>How is anesthesia given during CS?<br>What is worse, natural delivery or CS?<br>What is more painful natural childbirth or CS?*<br>How soon after CS can I stand up?<br>How does puerperium look like after CS?<br>Does CS hurt?*<br>Does CS shorten life?*<br>How long does the worst pain after CS last?*<br>What is felt during CS?<br>How long does abdomen hurt after CS?*<br>Is injection for CS painful?*<br>Why is CS dangerous?*<br>How long does it take to pull around after CS?<br>Can I carry my child after CS?<br>What happens with a child after CS?<br>Do I have to walk a lot after CS?<br>Can I walk up and down stairs after CS?<br>How to get up after CS? Does it hurt?<br>How long do I have to stay in hospital after CS?<br>Who takes care of a child after CS?<br>When can I eat after CS?<br>Is kangaroo mother care possible after CS?<br>How does scar after CS look like? | 7/26   |
| 3. How long does CS last?      | 200                 | How long do I have to lay after CS?<br>How many kg are lost after CS?<br>How long does it take for a swelling in the abdomen to go away after CS?<br>How long does suture hurt after CS?*<br>How is anesthesia given during CS?<br>What is felt during CS?<br>How many days do you have to stay in hospital after CS?<br>How long should CS last?<br>What is forbidden after CS?<br>Who takes care of a child after CS?<br>What happens with a child after CS?<br>How to sleep after CS?  | 1/12   |
| 4. CS name — from what?        | 150                 | When did CS come out?<br>Who invented CS?   | 0  |



| Table 2. (cont.) Listing of most frequently asked questions concerning cesarean section (CS) with its expansion |                     |  |  |
|---|---------------------|--|--|
| Main questions that were asked  | Volume <sup>1</sup> | Expansion of main questions  | Number of questions related to negative emotions — pain, fear, anxiety. Questions marked with “**” |
| 5. CS — what next?  | 150                 | How long does uterus heal after CS?<br>What is the best position after CS?<br>How long do I have to be on a diet after CS?<br>What should concern me during puerperium?<br>When after the delivery will my belly get smaller?<br>How long does lochia last?<br>How many kg can I lose after CS?<br>Who takes care of a child after CS?<br>How long does the organism cleanse after CS?<br>What should concern me after CS?<br>Will my CS belly go away?<br>What is forbidden after CS?<br>Can I hold my child after CS?<br>Can my husband be with me during CS?<br>Do I need pants for CS?<br>How to poop after CS?<br>Are postpartum pads needed after CS?<br>When does puerperium start after CS?<br>Do I have to walk a lot after CS?<br>How long does it take for CS incision to heal? | 0/20   |
| 6. CS — how to prepare?   | 70                  | How to take a shower after CS?<br>Who takes care of a child after CS?<br>How to get up after CS?<br>How is a catheter inserted into the bladder for CS?<br>Can water be drunk before CS?<br>Is enema given before CS?<br>Are sanitary napkins needed after CS?<br>When is food allowed after CS?<br>How much time do I have to lay after CS?<br>What to wear for a CS?<br>What pyjamas for a CS?<br>How many hours before CS should I eat?<br>Can an accompanying person be with me after CS?<br>Do I need to shave for CS?<br>What is felt during CS?<br>How to prepare abdomen for CS?   | 0  |

<sup>1</sup>monthly search volume; CS — cesarean section

labor). In Serçekuş et al. [15] research, 60.8% of the pregnant women stated that they did not associate the information obtained from the Internet with the fear of childbirth, 24.3% stated that it had decreased their fears, and 14.8% stated that their fears had increased.

The results of the authors' own research show that most questions concerned mainly the course of labor, duration of natural childbirth and CS as well as preparation for them. In the category of questions related to CS, those connected with early postpartum proceedings were also popular. Although Guerra-Reyes et al. [10] state that mental and sexual health are the most common types of postpartum health information those were not found in the analyzed data. Similarly, to Brazilian research [16] there were a lot of questions about indications for CS. In the research about health behavior during pregnancy, the most searched topics were related to fetal development, pregnancy complications, healthy lifestyle during pregnancy, advice for pregnancy

time, and lactation [13], diet during pregnancy, management of health problems, personal care, and preparation for delivery [5]. The German study examined knowledge of non-pregnant women without birth experience. The following knowledge gaps were identified: signs of beginning of birth, non-medical approaches to pain relief, and duration of birth. However, possible places of birth, indication for perineal cut, reasons for CS, and postpartum management were well known [20].

Based on gathered answers, women develop assumptions about childbirth, especially childbirth pain. A more natural or more medical perspective to birth might be needed. Analysis of the internet content indicated that videos presenting natural childbirth attracted a lot of attention. On the other hand, videos showing CS were not popular. Watching natural childbirth verifies any assumptions about it, helps to adapt to the unknown, breaks unavailability taboo. Rublein and Muschalla [20] state that women who

watched childbirth developed natural birth-related mindset and low childbirth fear. Visual media are reported to have longer lasting impact on women than other media, because of the realistic nature of message [21].

There were a lot of questions related to pain connected with natural childbirth and CS in both theme groups. Phrases used suggest that labor is perceived as negative, difficult event that raises fears especially because of pain experience. It is the unknown feeling for women that never gave birth and this is the reason why they want to compare it to something that is familiar, specifically regarding duration and intensity. In a European cohort study from six countries 12.3% pregnant women suffered from childbirth fear [22]. Sheen and Slade [23] emphasize the following causes of childbirth fear: generic fear of the unknown, potential risk for injury or harm, fear of pain, perceived capacity to give birth, losing control, and interactions with care providers. The most important moderators of childbirth fear are negative birth experiences (via personal experience or other people's reports), information about birth, and support from care providers. Research results assessing the connection between knowledge about labor and childbirth fear are divergent and confirm relation between them [24–26] or deny it [20, 27].

## CONCLUSIONS

Knowledge is crucial to proper preparation for birth, and the delivery method is one of the primary concerns of primiparous women. Nowadays, due to the fear of childbirth, and the increasing number of CSs, childbirth requires more detailed attention in the communication process. Maintaining effective, accurate, clear patient–obstetrician communication is very important during pregnancy. It allows to explain medical interventions related to childbirth and allay woman fears and anxieties. Hence obstetricians in addition to medical and technical skills should have professional communication skills. Communication skills teaching should be implemented in medical curricula, preferably in a simulated setting.

Note that the decision-making process in pregnancy, especially related to childbirth mode can be influenced by digital sources of information. Therefore, healthcare providers must contribute to recognizing and eliminating incorrect and potentially harmful information. Women's healthcare should include education about the possibility of incorrect information provided by the Internet Web sites and information about trustworthy Web sites.

### Article information and declarations

#### Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

#### Ethics statement

The research study was conducted without human participation within the meaning of ethical requirements.

#### Author contributions

Agata Michalska — 100% concept, 100% assumptions, 80% study design, 60% analysis and interpretation of data, 80% article draft, 80% preparation of the manuscript, corresponding author.

Katarzyna Niechcial, Robert Niechcial — 100% acquisition of data, 30% analysis and interpretation of data.

Daniel Wolder — 10% article draft, 10% analysis and interpretation of data.

Aleksandra Gladys-Jakubczyk — 10% article draft, 20% preparation of the manuscript.

Karol Bielasik — 10% study design, 50% revised article critically.

Grzegorz Swiercz — 10% study design, 50% revised article critically.

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#### Conflict of interest

The authors have no conflict of interests to declare.

#### Supplementary material

None.

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