



Evaluation on the information about absolute and relative indications of cesarean sections available on popular websites


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Abstract

Objectives: to evaluate the reliability of information available on popular websites, in other words, websites aimed lay pregnant women, about absolute and relative indications for cesarean sections.

Methods: this was a descriptive/comparative study based on the popular websites most likely to be visited by lay pregnant women and that contained information about indications for absolute and relative cesarean sections. Cohen's Kappa index of agreement was used to analyze the reliability degree on the indications for cesarean sections presented on the websites and the scientific evidence.

Results: there was a higher prevalence (62.63%) of information on the indications for cesarean sections that did not mention whether the indication was absolute or relative, and of these indications, 40.74% were not indications for cesarean sections. Low agreement was also observed among websites and the scientific evidence when the website mentioned the indication for cesarean section was absolute or relative.

Conclusion: this study showed that the reliability of the information on absolute and relative indications for cesarean sections available in popular websites is questionable.

Key words *Cesarean section, Pregnant woman, Internet, Health information, Women's health*



Introduction

The process of childbirth and birth is part of many women's reproductive cycle^{1,2} and, for a long time, it was an event experienced at home, shared with personal and private characters such as midwives and other women.^{1,2} Over the years, lifestyles have changed and values consolidated in technologies, economic benefit, and biological science detriment in human relationships.^{1,2} The technocratic model implicated in the institutionalization of childbirth in the 20th century³ and births in hospitals, consolidating a set of standardized obstetric practices, often performed without real indications.^{1,2}

In recent years, the prevalence of cesarean sections has been increasing worldwide. In the United States, the cesarean section rate is 33%.⁴ In Brazil, a 2018 study evaluating diagnoses related to pregnancy, childbirth, and puerperium showed that cesarean sections without complications or morbidities present at admission, in other words, elective cesarean sections present the highest cause of hospitalization in the private network (49.6%).⁵ A nationwide study, "*Nascer no Brasil: inquérito sobre o parto e nascimento*", (Born in Brazil: a survey on childbirth and birth) showed that cesarean rates ranged from 87.9% in the private sector to 42.9% in the public sector.⁶ However, it is worth mentioning that cesarean sections, when well indicated, have a fundamental role in reducing maternal and neonatal mortality rates in specific situations, such as the presence of placenta previa or uterine rupture, are the safest birth route.^{7,8}

Some factors influence women's preference for cesarean section, such as higher education and income, previous experience of cesarean section, white color/race, influence of the birth route by factors from the hospital where the pregnant woman will have her child, and primiparity.^{9,10} During pregnancy, women experience various sensations, perceptions, uncertainties, doubts, and fears, especially primigravidae. For this reason, many of these pregnant women usually do not directly participate in the choices that would be theirs, but may be influenced by a professional's opinion. Sociocultural determinants and the scarcity of adequate information contribute for women to undergo unnecessary cesarean sections.^{11,12}

Currently, the internet has become the main source of access of information, and pregnant women search for opinions, guidelines, and suggestions in order to reach certain conclusions.¹³ However, not all websites are reliable and the information is not secure,¹⁴ which can be harmful to pregnant women. According to data from the *Pesquisa sobre o uso das Tecnologias de Informação e Comunicação* (Survey on the use of Information and Communication Technologies) in Brazilian households, in 2018, 75% of Brazilians have access to internet,

and, of these, 90% access the network daily, the most accessed is the health area.¹⁵ Regarding pregnant women, a systematic review showed that women use internet as a source of information about pregnancy and that they search for information at least once a month, in addition to considering the health information on the internet as reliable and useful.¹³

It is known that the use of the internet for pregnant women provides an opportunity to share apprehensions and doubts with other pregnant women,¹⁶ in addition being able to influence the birth route. It is assumed as a hypothesis that the information available on popular websites provides concept formation by pregnant women on birth route and its indications, and influences on their decision making about the birth route. Therefore, the objective of this study was to evaluate the reliability of information about absolute and relative indications of cesarean sections available in popular websites, in other words, websites aim lay pregnant women.

Methods

This is a descriptive/comparative study, based on popular websites most likely to be visited by pregnant women and brings information about the absolute and relative indications in performing a cesarean section.

The sample was composed of websites with information for pregnant women on birth route. The search was performed using Google, with the possible terms that a lay pregnant woman could use: "cesarean section," "indications for cesarean section," and "cesarean childbirth. These selected terms were based on the professional practice of two researchers who have extensive experience in women's health. It is also noteworthy that after the terms were defined, a pilot search was conducted to understand whether the terms were sensitive to the study objective. Google, as a website search, was chosen because it is a highly widespread search website among lay pregnant women.¹⁷

To compose the sample of this study, we considered the first 100 websites present for each term used in the search, since after that number, the search was less specific on the topic. As the aim was to identify popular websites for pregnant women, information that was not specific for pregnant women, that did not address the proposed theme, that contained content aimed for health professionals, government institutions websites, and those that had unavailable access links at the time of data collection were disregarded.

Data collection occurred in two stages. In the first stage, a simulation based on a random search for a pregnant woman was performed using Google Chrome internet browser in an anonymous window on a computer formatted

for the study, in other words, the previous content of the machine was totally erased, and a new operating system had to be reinstalled, thus ensuring that searches previously performed on the machine did not influence the results of the study. The search of the websites was conducted between September 1 and September 30, 2020.

In the second phase, the websites were evaluated according to the content, being analyzed: blogs, media reports, and maternity. It is noteworthy that the entire data collection stage was carried out independently by two academic nursing researchers and supervised by a nurse with extensive experience in women's health.

For data collection, a structured instrument was prepared by the researchers, with important information on birth route, based on the indications for cesarean sections of the *Comissão Nacional de Incorporação de Tecnologias no Sistema Único de Saúde (CONITEC) - Diretrizes de Atenção à Gestante: a operação cesariana*¹⁸ (National Commission for Incorporation of Technology in the Public Health System-Guidelines for Pregnant Women's Care: the cesarean section), Amorim *et al.*¹⁹ Amorim *et al.*²⁰ and Souza *et al.*²¹ which should be available in a complete and easy-to-understand form for a layperson on the topic. This step was completed on October 15, 2020. The absolute and relative indications of cesarean sections used for comparison were described in Table 1.

Inconsistencies between two evaluators' evaluations were resolved together with a third evaluator. In addition, the clarity of cesarean indications for the lay population according to scientific evidence and language, and the appropriateness of technical/scientific terms were evaluated; and, were categorized as: information was clear, information was unclear, and information was partially clear for this population. Data regarding the website were

also collected, such as: date of publication and update, and author.

For data analysis, the Statistical Software for professional (Stata), version 16.0 was used. The data were presented by absolute and relative frequencies and the number of indications of cesarean sections per website was presented by mean and standard deviation (SD).

To analyze the degree of reliability of cesarean indications presented by the websites and the scientific evidence,²⁰⁻²³ Cohen's Kappa index of agreement was used. Agreement was considered poor for Kappa index with values between 0 and 0.20, weak (between 0.21 and 0.40), average (between 0.41 and 0.60), good (between 0.61 and 0.80), and excellent or near perfect (between 0.81 and 1).

Since this is data from public websites available on search engines, no ethics committee approval was required to conduct the research.

Results

The content of 300 websites was evaluated, and 39 websites were excluded because they were duplicated among the three terms used in the search. Subsequently, another 97 websites were excluded for not indicating cesarean sections and 107 for being directed to health professionals (websites on government institutions, scientific articles). Therefore, the sample was composed of 57 websites that indicated the performance on cesarean sections, presenting an average of 8.14 (SD=4.28) indications of cesarean sections of each website (Figure 1).

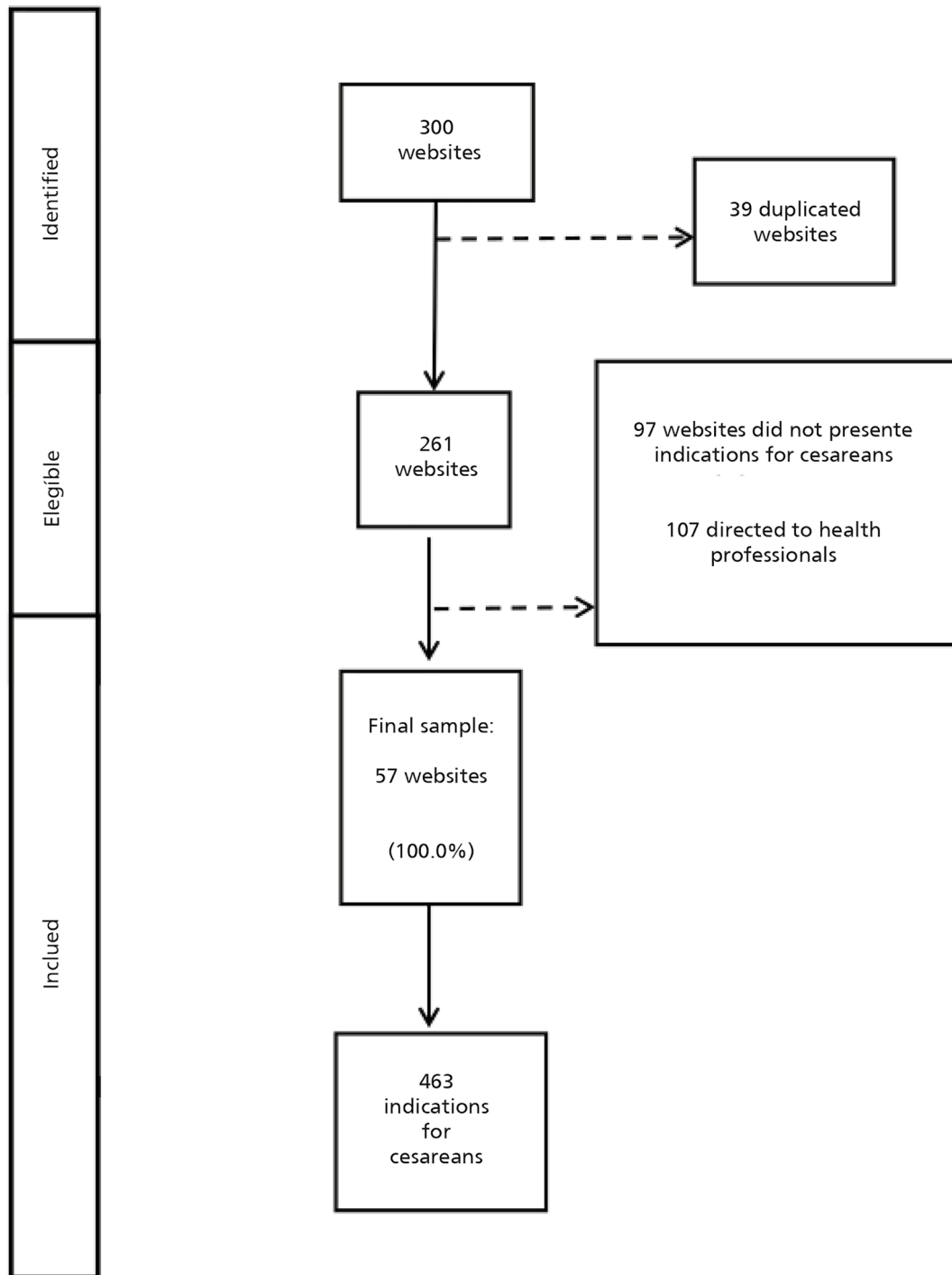
Table 2 shows the characteristics of the 57 websites evaluated. The majority (75.44%) of the websites did not have health professionals as authors or did not identify their profession, and when the author was a health

Table 1

Absolute and relative indications of cesarean sections evaluated. Belo Horizonte, 2021.	
Absolute Indications	Cord prolapse;
	Premature detachment of placenta with live fetus;
	Partial or total placenta previa;
	Ruptura de vasa praevia;
Relative Indications	Genital herpes with active lesion at the time of labor
	Cormic presentation (after attempted external cephalic version);
	Cephalopelvic disproportion;
	Non-tranquilizing fetal heart rate;
	Stalled labor progression;
	Pelvic presentation (after attempted external cephalic version);
	Iteractivity - Two or more previous cesarean sections;
HIV+ with low or unknown CD4 count and/or viral load above 1,000 copies or unknown;	

Adapted by the authors. *Comissão Nacional de Incorporação de Tecnologias no Sistema Único de Saúde (CONITEC) - Diretrizes de Atenção à Gestante: a operação cesariana*. 2016.¹⁸ (National Commission for Incorporation of Technology in the Public Health System-Guidelines for Pregnant Women's Care:the cesarean section) Amorim MMR, Souza ASR, Porto AMF. *Indicações de cesariana baseadas em evidências: parte I*;¹⁹ (Evidence-based indications for cesarean section: part I) Amorim MMR, Souza ASR, Porto AMF. *Indicações de cesariana baseadas em evidências: parte II*;²⁰ (Evidence-based indications for cesarean section: part II) Souza ASR, Amorim MMR, Porto AMF. *Condições frequentemente associadas com cesariana, sem respaldo científico*.²¹ (Conditions frequently associated with cesarean section, with no scientific support)

Figure 1
Flowchart of the selection of websites included in the study. Belo Horizonte, 2021.



professional the highest prevalence (90.91%) was an obstetrician.

In regards to the indications of cesarean sections presented on the websites, 463 of them were evaluated. The indications of absolute cesarean sections were observed 141 times (30.45%) and, of these, 35.46% were indications of absolute cesarean sections. According to the websites, 32 (6.91%) indications of relative cesarean sections were presented, and of these, 68.75% were

relative cesarean indications. When the websites did not mention whether the indication presented was an absolute or relative cesarean indication, it was observed that, 40.74% of the indications presented were not cesarean indications (Table 3).

When analyzing the indications of cesarean sections presented on the websites according to the author, it was observed that when the website author was not a health professional, in 202 (61.77%) of the indications were not reported whether

Table 2

Characteristics of the 54 websites evaluated. Belo Horizonte, 2021.		
Characteristics	n*	%
Website author		
Health Professional	11	19.30
Doula	3	5.26
Others**	45	78.95
Health professional's profession as website author		
Physician	1	9.09
Obstetrician	10	90.91
Year of the creation of the website		
2011 until 2015	11	19.30
2016 to 2020	13	22.81
Does not inform	33	57.89
Year of the website update		
2011 – 2015	3	5.26
2016 – 2020	6	10.53
Does not inform	48	84.21

* 57 websites; ** Other include: journalist, social media, communication specialist or the academic background not identified on the website.

they were absolute or relative indications of cesarean sections. It is noteworthy that 32.25% of the 102 absolute indications of cesarean sections presented on the websites were actually indications of absolute cesarean sections (Table 3).

When the website author was a doula, it was found that all (100%) information on indications for relative cesarean sections were in accordance with scientific evidence. When the website author was an obstetrician, in 74 (68.52%) occasions he/she did not mention whether it was an indication for absolute or relative cesarean section, and of those, 35.14% were not indications for cesarean section (Table 3).

When checking whether the wording of cesarean indications presented on the websites would be easy to understand for the lay population, in 55.51% of the cesarean indications were found that the text was partially understandable to the lay population. When the information was not understandable to the lay population, most (93.33%) of the indications were not cesarean indications (Table 3).

Table 3

Comparative analysis of cesarean section indications presented by the 54 websites evaluated in relation to scientific evidence. 18-21 Belo Horizonte, 2021.

	Indications for cesarean sections according to scientific evidence*						Total	
	Absolute		Relative		No indication for cesarean section		n	%
	n	%	n	%	n	%		
Indication of cesarean section according to the website								
Absolute	50	35.46	50	35.46	41	29.08	141	30.45
Relative	0	-	22	68.75	10	31.25	32	6.91
Not mentioned	60	50.69	113	38.97	117	40.34	290	62.63
Indication of cesarean section according to the website when the author was not a health professional								
Absolute	33	32.25	36	35.29	33	32.25	102	31.19
Relative	0	-	14	60.87	9	39.13	23	7.03
Not mentioned	40	19.80	76	37.62	86	42.57	202	61.77
Indication of cesarean section according to the website when the author was a doula								
Absolute	6	85.71	1	14.29	0	-	7	50.00
Relative	0	-	7	100.0	0	-	7	50.00
Not mentioned	0	-	0	-	0	-		
Indication of cesarean section according to the website when the author was an obstetrician								
Absolute	12	37.50	12	37.50	8	25.00	32	29.63
Relative	0	-	1	50.00	1	50.00	2	1.85
Not mentioned	17	22.97	31	41.89	26	35.14	74	68.52
Indication of cesarean section according to the website when the author was a physician								
Not mentioned	3	21.43	6	42.86	5	35.71	14	100.0
Indication of cesarean section easy for the lay population to understand								
Yes	10	38.46	16	61.54	0	-	26	5.62
No	3	1.67	9	5.00	168	93.33	180	38.88
In parts	97	37.74	160	62.26	0	-	257	55.51

* Analysis according to absolute and relative indications of cesarean sections. *Comissão Nacional de Incorporação de Tecnologias no Sistema Único de Saúde (CONITEC) - Diretrizes de Atenção à Gestante: a operação cesariana.* 2016.¹⁸ (National Commission for Incorporation of Technology in the Public Health System-Guidelines for Pregnant Women's Care: the cesarean section) Amorim MMR, Souza ASR, Porto AMF. *Indicações de cesariana baseadas em evidências: parte I;*¹⁹ (Evidence-based indications for caesarean section: part I) Amorim MMR, Souza ASR, Porto AMF. *Indicações de cesariana baseadas em evidências: parte II;*²⁰ (Evidence-based indications for cesarean section: part II) Souza ASR, Amorim MMR, Porto AMF. *Condições frequentemente associadas com cesariana, sem respaldo científico.*²¹ (Conditions frequently associated with cesarean section, with no scientific support)

Finally, the Kappa index of agreement between indications for cesarean sections presented on the websites and the scientific evidence was also analyzed. Low agreement was observed in relation to scientific evidence ($\kappa=0.150$) when the website mentioned the indication for cesarean section was absolute or relative and when the website author was not a health professional ($\kappa=0.122$). The indications of cesarean section presented by the website showed an average agreement with the scientific evidence ($\kappa=0.502$) when they were easy to understand for the lay population (Table 4).

Discussion

This study evaluated information on 463 absolute and relative cesarean section indications in 57 websites. There was a higher prevalence (62.63%) of information on indications that did not mention whether they were absolute or relative cesarean indications, and of these, 40.74% in fact were not indications. The birth route is influenced by cultural and social factors, and the cesarean section is culturally perceived by most of the lay population as the most reliable and safe way to give

birth,¹⁹⁻²¹ together with the evolution of the internet, which has brought an ease to access information, but with questioned reliability on the information.¹³ It is noteworthy that many women consider the information obtained from websites as reliable and useful, and do not discuss this information with the health professional who accompanied them during prenatal consultations.^{13,17}

Nowadays, the role of the internet in the world is enormous; it represents for the population and for pregnant women an important source of information that is cheap and easy to access. A study showed that most pregnant women find health information on the internet. Moreover, pregnant women want to receive as much information as possible to have a sense of confidence about pregnancy and childbirth, and the internet can play an important role in this necessity.²²

In this sense, the concept of digital health is emerging in contemporary society. In 2019, the World Health Organization developed the Global Strategy on Digital Health,²³ which aims to promote health for everyone and everywhere, and to expand the definition of digital health, since it encompasses advanced concepts of technology, such as the use of personal devices, social networks,

Table 4

Unweighted Kappa index values according to the indication for cesarean section presented by the websites compared to the scientific evidence.18-21 Belo Horizonte, 2021.

	Indications for cesarean sections according to scientific evidence						Concordance		
	Absolute		Relative		No indication for Cesarean section	Observed	Kappa	Score	
	n	%	n	%					
Indication of cesarean section according to website						41.62%	0.150	Low	
Absolute	50	100.0	50	69.44	41	80.39			
Relative	0	-	22	30.56	10	19.61			
Indication of cesarean section according to the website when the author was not a health professional						37.60%	0.122	Low	
Absolute	33	100.0	36	72.00	23	78.57			
Relative	0	-	14	28.0	9	21.43			
Indication of cesarean section according to the website when the information was clear to the lay population						73.68%	0.502	Average	
Absolute	6	100.0	5	38.46	0	-			
Relative	0	-	8	61.54	0	-			
Indication of cesarean section according to the website when the information was unclear for the lay population						3.64%	0.000	Low	
Absolute	2	100.0	2	100.0	41	80.39			
Relative	-	-	0	-	10	19.61			
Indication of cesarean section according to the website when the information was partially clear to the lay population						56.57%	0.216	Weak	
Absolute	42	100.0	43	75.44	0	-			
Relative	0	-	14	24.56	0	-			

Artificial Intelligence, among others. Thus, digital health is understood as an area that uses Information and Communication Technology resources to produce and make reliable information on health status available to the populations, health professionals, and public managers.²⁴

Another result in this study showed low agreement between the indications for absolute or relative cesarean sections presented on the websites and scientific evidence. It is known that internet presents a growing evolution as a space for health information; however, one should question the way the information is transmitted to the lay population, committing to characteristics such as reliability, quality, and comprehensibility of the available information.^{22,25}

Domingues *et al.*¹² sought to understand the course of primigravidae - from the initial preference for childbirth assessed to the final birth route, and showed that in the public sector the initial preference for cesarean was 15.5% and the final prevalence of cesarean was 15%. However, when assessing the path in the public sector, the prevalence of preference for the cesarean birth route among primiparous women was 36.1% and, at the end of these women's pregnancy course, the prevalence of cesarean was 67.7%,¹² demonstrating that women were influenced to choose one birth route over the other by several factors, including the information they obtained. Women began prenatal care with a possible preference for the birth route chosen, but they did not always maintain this choice at the time of the childbirth.¹²

It is noteworthy that internet and the professionals of the multidisciplinary team could be means and vehicles for the women's empowerment, since a woman who knows the real indications for cesarean sections could even argue with health professionals about their indication based on scientific evidence.²⁶⁻²⁸

Elective cesarean sections have worse perinatal outcomes when compared to the vaginal route,⁴ such as: higher risk of puerperal infection, prematurity, and neonatal mortality, in addition to contributing to longer hospital stay.^{4,29} The results of this study highlight the importance of health education, especially during prenatal care,³⁰ making this moment a space for knowledge exchange between pregnant women and prenatal care professionals.

Finally, it is noteworthy that this study has some limitations, the first of which is the use of only one website search, despite being the most accessed by pregnant women. The second limitation is the non-validation of the language evaluation instrument and the adequacy of technical/scientific terms for the lay population in the analyzed websites. Finally, another limitation concerns the fact that this research did not include social media that are quite widespread among pregnant women and

evaluate aspects related to the design of the websites. The potential of this study refers to the fact that it is, to our knowledge, the first study to assess the reliability of websites on cesarean information.

Based on the above considerations, this study demonstrated that the reliability of information about absolute and relative indications of cesarean sections available on popular websites is questionable. Since important information gaps were observed and showed low agreement with the scientific evidence. However, they showed medium agreement with scientific evidence when the cesarean indications were easy to understand for the lay population and almost perfect agreement with the scientific evidence when the website author was a doula.

The importance of professionals from the multidisciplinary team as mediators of the information is highlighted, as well as the necessity to regulate the production and dissemination of health information on the internet.

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Authors' contribution

Silva TPR and Matozinhos FP: drafting of the article, data analysis and interpretation, writing, critical revision of the content and preparation of the final version of the manuscript. Leão TLC and Rocha BMM: writing, critical revision of the content and preparation of the final version of the manuscript. Araújo LA and Faria APV: critical revision of the content and preparation of the final version of the manuscript. All authors approved the final version of the article and declare no conflict of interest.

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