

# Web-Based Education and Attitude to Delivery by Caesarean Section in Nulliparous Women

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## Abstract

**Objective:** To measure the effect of a web-based educational tool on baseline knowledge of the risks and benefits of delivery by Caesarean section in healthy nulliparous women.

**Methods:** We constructed a web-based educational tool to provide evidence-based information on the potential benefits and risks of CS for healthy nulliparous women in the second trimester. We included women with an uncomplicated singleton pregnancy who were receiving antenatal care at Mount Sinai Hospital. Eligible women logged into the website to undertake a pre-test survey. After completing this survey, they received access to the educational tool, followed by a link to a second survey. The surveys collected baseline demographics and assessed participants' knowledge of the perceived safety and risks of vaginal delivery and CS, their sources of information, and the influence of these sources on their views.

**Results:** Seventy-three participants completed both surveys. Participants had a high baseline preference (84%) for vaginal delivery. The mean score for knowledge about vaginal delivery and CS increased significantly between the surveys, from 47% to 76% ( $P < 0.001$ ). There was no significant change in preference for mode of delivery between the two surveys. In both surveys, more participants responded that they were a "little fearful" or "not fearful at all" of vaginal deliveries. In the second survey, significantly more responded that they were "very fearful" or "fearful" of CS ( $P < 0.05$ ). Increased knowledge about specific risks of vaginal delivery did not deter participants from preferring a vaginal delivery. However, knowledge of risks associated with CS made them more likely to have "very favourable" or "somewhat favourable" views of vaginal delivery. Ethnicity and country of birth were not found to have a significant effect on preferred mode of delivery.

**Conclusions:** We demonstrated that a web-based educational tool significantly increased knowledge of the risks and benefits of vaginal delivery and CS. However, the educational intervention did not significantly change preferences.

J Obstet Gynaecol Can 2014;36(9):768–775

**Key Words:** Caesarean section, web-based patient education, attitude, safety

Competing Interests: None declared.

Received on April 13, 2014

Accepted on June 11, 2014

## Résumé

**Objectif :** Mesurer l'effet d'un outil pédagogique Web traitant des connaissances de base sur les risques et les avantages de la césarienne chez les nullipares en santé.

**Méthodes :** Nous avons créé un outil pédagogique Web visant à fournir des renseignements factuels sur les risques et les avantages possibles de la césarienne chez les nullipares en santé pendant le deuxième trimestre. Nous avons inclus des femmes présentant une grossesse monofœtale sans complications qui recevaient des soins prénatals au *Mount Sinai Hospital*. Les femmes admissibles ont ouvert une session sur le site Web afin de remplir un sondage prétest. Une fois le sondage rempli, elles ont obtenu accès à l'outil pédagogique et ont reçu un lien menant à un deuxième sondage. Ces sondages ont permis de recueillir des données démographiques de référence et d'évaluer les connaissances des participantes quant à l'innocuité et aux risques perçus de l'accouchement vaginal et de la césarienne, leurs sources d'information et l'influence qu'avaient ces sources sur leurs opinions.

**Résultats :** Soixante-treize participantes ont rempli les deux sondages. Elles présentaient, au départ, une préférence élevée (84 %) pour l'accouchement vaginal. Le score moyen quant aux connaissances sur l'accouchement vaginal et la césarienne a augmenté considérablement entre les sondages, passant de 47 % à 76 % ( $P < 0,001$ ). Aucun changement appréciable n'a été constaté entre les sondages en ce qui concerne la préférence en matière de mode d'accouchement. Dans les deux sondages, plus de participantes ont dit ne ressentir « aucune crainte » ou ressentir « une légère crainte » relativement à l'accouchement vaginal. Dans le deuxième sondage, par contre, un nombre considérablement plus élevé de participantes ont dit ressentir « de la crainte » ou « beaucoup de crainte » en ce qui concerne la césarienne ( $P < 0,05$ ). L'amélioration des connaissances à propos des risques propres à l'accouchement vaginal n'a pas empêché les participantes de continuer de privilégier l'accouchement vaginal. Toutefois, le fait d'en connaître plus au sujet des risques associés à la césarienne les rendait plus susceptibles d'avoir une opinion « relativement favorable » ou « très favorable » à l'égard de l'accouchement vaginal. L'ethnicité et le pays d'origine n'ont eu aucun effet appréciable sur la préférence en matière de méthode d'accouchement.

**Conclusions :** Nous avons démontré que l'utilisation d'un outil pédagogique Web améliorait considérablement les connaissances sur les risques et les avantages de l'accouchement vaginal et de la césarienne. Toutefois, l'intervention pédagogique n'a pas modifié les préférences de façon marquée.

## INTRODUCTION

The World Health Organization recommends an optimum Caesarean section rate of 10% to 15% in healthy nulliparous women.<sup>1</sup> A 2010 WHO report which analyzed the rates of excess CS in 137 countries, representing 95% of global births, demonstrated that 46 countries had CS rates of greater than 20%. Brazil and China accounted for almost 50% of the total number of “excess” CS.<sup>1</sup> Canada’s national rate continues to rise, from 17.6% in 1993 to 23.8% in 2002 and to 26.3% in 2005.<sup>2</sup> The total composite CS rate at Mount Sinai Hospital in 2004 to 2005 was 23% for the nulliparous population at term.<sup>3</sup> Factors potentially contributing to the high overall CS rate in this group include sociodemographic factors, such as older maternal age, higher education levels and higher incomes, as well as fear of vaginal birth and the belief that Caesarean section is less painful.<sup>4</sup> Perceived medico-legal concerns compound these factors, as does the increasing perception that CS is a safe and convenient operation.<sup>4</sup> Some women prefer to deliver by CS to avoid the pain of labour and perceived long-term side effects for them or their baby arising from vaginal delivery.<sup>5–7</sup> In Toronto in 2007, 65% of women who gave birth were born outside of Canada<sup>8</sup>; therefore, a wide variety of women from different cultures import new attitudes to CS, especially from resource-poor or G20 countries that have significantly higher rates of elective non-indicated CS than Canada. The Canadian Maternity Experiences Survey, conducted in 2009, indicated that CS occurred more frequently in older nulliparous women, women with higher levels of education, and women living in higher-income households.<sup>9</sup>

A recent study demonstrated that the rising total CS rate in Western countries can be attributed to rising rates in nulliparous women at term with singleton pregnancies and cephalic presentations.<sup>10</sup> This contribution to the total CS rate has risen steadily since 2000. Therefore, further research into the reasons propagating the rising rate of CS in this large group of pregnant women may be useful to plan strategies for reducing the rate in Canada.<sup>10</sup>

Primary CS is a major open abdominal surgery, yet has low intra- and postoperative risks. However, the risks of planned CS are higher than those associated with vaginal delivery.<sup>11</sup> Overall, subsequent pregnancies have a 70% repeat CS rate.<sup>12</sup> For women intending three or more pregnancies, the risks of repeating this operation multiple times rise exponentially.<sup>12</sup> The specific risks of a repeat CS following multiple Caesarean sections include bladder and other organ injury, placenta previa, and, most significantly, invasive placenta previa requiring multidisciplinary team-based elective Caesarean hysterectomy.<sup>11</sup>

Women accrue information about CS from multiple sources, including family and friends, lay and official sources, and increasingly online resources. A 2009 study noted that 70% of individuals used the Internet to find medical or health-related information.<sup>13</sup> A more recent study from our hospital found that 100% of the sample had used the Internet to find information on pregnancy.<sup>14</sup>

The objectives of this study were to assess baseline knowledge of and attitudes towards CS, and to determine the potential effect of a web-based educational tool on individual attitudes to CS across a wide spectrum of nulliparous women during their second trimester.

## METHODS

After providing written informed consent, healthy nulliparous women receiving antenatal care at Mount Sinai Hospital in Toronto participated in a web-based educational study of attitudes towards mode of delivery. Inclusion criteria were:

1. no prior pregnancy > 20 weeks’ gestation,
2. singleton pregnancy,
3. current pregnancy 20 to 26 weeks’ gestation, and
4. uncomplicated pregnancy.

Exclusion criteria were lack of Internet access and poor command of English. Participating women were emailed a link to the first survey (online eAppendix 1). This survey collected baseline demographic information, including education, ethnicity, country of birth, and Internet access and usage. The survey assessed the participants’ baseline knowledge of CS, as well as their perceptions of and attitudes towards the risks and benefits of the procedure in comparison with vaginal delivery. Following completion of the first survey, a link to an educational website about CS (online eAppendix 2) was emailed to the participants, together with a second survey on their attitudes. The second survey (online eAppendix 3) reassessed their knowledge of CS in the same fashion, as well as their perceptions of and attitudes towards the risks and benefits of the procedure.

To assess their level of knowledge in each survey, participants were given a list of 15 potential complications of vaginal delivery and CS and were asked to indicate if they believed the complication to be a specific risk of vaginal delivery or of CS, in a categorical manner. Each participant’s correct answers resulted in a score out of 15. The scores were expressed as a percentage and analyses were performed using percentages. Participants were then given a list of 11 potential complications of vaginal delivery and CS and were asked to indicate if that particular

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