Attitudes and Beliefs of Pregnant Women and New Mothers regarding Influenza Vaccination in British Columbia

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Abstract

Objective: Although pregnant women have increased risks for influenza morbidity and mortality, influenza vaccination rates among pregnant women in Canada are consistently very low. This mixed-methods study investigated the attitudes and behaviour of pregnant women and new mothers regarding seasonal and pandemic influenza vaccination.

Methods: We conducted a baseline survey and qualitative focus groups with 34 women (26 pregnant women and 8 mothers of newborns), with a follow-up survey to assess outcomes at the end of the subsequent influenza season. Data analysis included descriptive statistics and directed content analysis based on the health belief model.

Results: Most women did not consider influenza vaccination to be an important preventative measure to take while pregnant, although some were more willing to consider vaccination during a pandemic. Omission bias played a substantial role as justification for not vaccinating. Participants expressed confusion about recommendations regarding vaccination during pregnancy and frustration with inconsistent messages from health care providers (HCPs), particularly with regard to pandemic vaccines. Women were vaccinated when they perceived themselves and/or their babies to be at increased risk for influenza. Vaccinated women had strong normative influences (usually an HCP or a family member) that affected their decision. Intentions accurately predicted behaviour for women who did and did not intend to be vaccinated.

Conclusion: Pregnant women did not perceive themselves to be at increased risk for influenza and did not believe that influenza vaccination was a necessary preventative health measure. A lack of safety information about vaccination during pregnancy and inconsistent messages from HCPs were barriers to vaccine acceptance. Recommendations from maternity care providers and communication about the severity of and susceptibility to influenza for pregnant women would facilitate vaccine uptake.

Résumé

Objectif : Bien que les femmes enceintes courent un risque accru de morbidité et de mortalité associées à la grippe, le taux de vaccination antigrippale chez cette population demeure très faible au Canada. Nous avons utilisé une méthode mixte pour évaluer les attitudes et les comportements des femmes enceintes et des nouvelles mères en ce qui concerne la vaccination contre la grippe saisonnière et la grippe pandémique.

Méthodologie : Nous avons réalisé un sondage initial auprès de 34 femmes (26 femmes enceintes et 8 autres mères d’un nouveau-né) et étudié qualitativement leur point de vue en formant des groupes de discussion. Nous avons ensuite effectué un sondage de suivi après la saison de la grippe.

Analyse des données comprenait des méthodes de statistique descriptive et une analyse des discussions dirigées reposant sur le modèle de croyances relatives à la santé.

Résultats : Selon la plupart des femmes, la vaccination antigrippale n’est pas une mesure de prévention importante durant la grossesse; toutefois, certaines étaient plus enclines à l’envisager durant une pandémie. Le refus de la vaccination s’explique en bonne partie par le biais d’omission. Les participantes se sont dites perdues dans les recommandations de vaccination pendant la grossesse et frustrées par les contradictions entre les différents fournisseurs de soins, surtout en ce qui a trait aux vaccins antipandémiques. Les femmes qui se sont fait vacciner l’ont fait car elles sentaient qu’elles ou leur bébé couraient un risque accru de contracter la grippe. Les femmes vaccinées avaient été fortement influencées par un discours normatif (généralement celui d’un fournisseur de soins ou d’un membre de la famille), ce qui avait joué un rôle dans leur décision. De plus, l’intention des femmes de se faire vacciner ou non était un excellent indicateur de leur comportement ultérieur.

Conclusion : Les femmes enceintes ne croyaient pas qu’elles couraient un risque accru de contracter la grippe, ni que la vaccination antigrippale était une mesure préventive nécessaire. Le manque de renseignements sur l’innocuité de la vaccination pendant la grossesse et les discours contradictoires des fournisseurs de soins ont nui à l’acceptation des vaccins. Enfin, pour améliorer le taux de vaccination, il faudrait que les femmes reçoivent des recommandations de leur prestataire de soins de maternité et de l’information sur le risque de grippe et de la gravité de la maladie chez les femmes enceintes.
INFLUENZA VACCINATION NOT ONLY PROTECTS A PREGNANT WOMAN BUT CAN PROVIDE UP TO SIX MONTHS OF PROTECTION FOR HER NEWBORN INFANT. PREGNANT WOMEN ARE THREE TO FOUR TIMES AS LIKELY AS NON-PREGNANT WOMEN TO BE HOSPITALIZED WITH ACUTE RESPIRATORY DISTRESS DURING INFLUENZA SEASON. THIS RISK WAS AUGMENTED DURING THE 2009 PANDEMIC, WHEN THE RATE OF HOSPITALIZATION FOR PREGNANT WOMEN WAS FOUR TIMES THAT OF THE GENERAL POPULATION. AFFECTED PREGNANT WOMEN WERE MORE LIKELY TO REQUIRE ICU ADMISSION AND HAD A HIGHER RISK FOR PRETERM DELIVERY.

THE SOGC HAS RECOMMENDED SEASONAL INFLUENZA VACCINE FOR PREGNANT WOMEN SINCE 2007, INCLUDING THE MONOVALENT PANDEMIC VACCINE. THE NATIONAL ADVISORY COMMITTEE ON IMMUNIZATION LIKEWISE RECOMMENDS INFLUENZA VACCINATION FOR PREGNANT WOMEN, WHO ARE IDENTIFIED AS BEING “AT HIGH RISK OF INFLUENZA-RELATED COMPLICATIONS OR HOSPITALIZATION.

ALTHOUGH AN INCREASED UPTAKE OF PANDEMIC INFLUENZA VACCINE BY PREGNANT WOMEN WAS SEEN IN CANADA DURING THE 2009 PANDEMIC (RANGING FROM 43% TO 65%), RATES HAVE SUBSEQUENTLY FALLEN TO PRE-PANDEMIC LEVELS; LEGGE ET AL. REPORTED THAT FROM 2010 TO 2012, LESS THAN 20% OF WOMEN IN NOVA SCOTIA WHO WERE PREGNANT DURING INFLUENZA SEASON UNDERWENT VACCINATION. THIS IS IN CONTRAST TO RATES IN THE UNITED STATES, WHICH ANNUALLY APPROACH 50%.

DESPITE HIGHER RISKS OF INFLUENZA COMPLICATIONS DURING PREGNANCY AND RECOMMENDATIONS FROM EXPERTS TO IMMUNIZE, PREGNANT WOMEN IN CANADA ARE LESS LIKELY TO BE VACCINATED THAN NON-PREGNANT WOMEN, AND WOMEN DO NOT PERCEIVE THEMSELVES, THEIR UNBORN BABY, OR THEIR NEW INFANT TO BE AT INCREASED RISK FROM INFLUENZA INFECTION. TO INCREASE UPTAKE OF INFLUENZA VACCINE AMONG PREGNANT CANADIAN WOMEN, IT IS IMPORTANT TO UNDERSTAND THE CONCERNS OR BARRIERS THAT MAY BE PREVENTING VACCINATION IN THIS POPULATION.

QUANTITATIVE RESEARCH HAS DEMONSTRATED THAT SAFETY CONCERNS ABOUT VACCINES ARE ASSOCIATED WITH NOT HAVING INFLUENZA VACCINATION, WHILE PERCEIVED SUSCEPTIBILITY TO INFLUENZA, PERCEIVED BENEFITS FOR CHILDREN, AND CUES TO ACTION ARE ASSOCIATED WITH A GREATER LIKELIHOOD OF VACCINE UPTAKE AMONG PARENTS. IN THIS MIXED-METHODS STUDY, WE SOUGHT TO EXPAND ON THESE FINDINGS USING SURVEYS AND FOCUS GROUPS WITHIN A POPULATION OF PREGNANT WOMEN AND NEW MOTHERS IN BRITISH COLUMBIA WHO COULD REFLECT ON BOTH SEASONAL INFLUENZA AND THE H1N1 PANDEMIC.

METHODS

PARTICIPANTS WERE RECRUITED VIA POSTERS AND DIRECT APPROACH IN WAITING AREAS AT BC WOMEN’S HOSPITAL IN VANCOUVER AND AT CLINICS AFFILIATED WITH THE UNIVERSITY OF BRITISH COLUMBIA’S FACULTY OF MEDICINE WITHIN THE GREATER VANCOUVER REGION AS WELL AS AT COMMUNITY PERINATAL SUPPORT EVENTS. OF 81 POTENTIAL PARTICIPANTS, 47 (58%) DECLINED TO PARTICIPATE OR DID NOT RESPOND. REASONS FOR REFUSAL INCLUDED LACK OF INTEREST, BEING “TOO BUSY,” HAVING MISCARRIED, BEING IN LABOUR, OR BEING IN ILL HEALTH. THE RESULTING SAMPLE OF 34 WOMEN WAS SUFFICIENT TO REACH DATA SATURATION AND TO CONDUCT OUR ANALYSES. ALL PARTICIPANTS PROVIDED WRITTEN INFORMED CONSENT AND RECEIVED A $25 GIFT CARD. EACH PARTICIPANT WAS IDENTIFIED BY A UNIQUE CODE NUMBER THAT WAS USED TO IDENTIFY RESPONSES IN THE BASELINE QUESTIONNAIRES, IN FOCUS GROUP TRANSCRIPTS, AND IN THE FOLLOW-UP INTERNET SURVEY.

DEMOGRAPHIC INFORMATION AND BASELINE INFORMATION ABOUT ATTITUDES AND BEHAVIOURS REGARDING VACCINES WAS COLLECTED FROM ALL PARTICIPANTS AT STUDY INTAKE (IMMEDIATELY BEFORE THE FOCUS GROUP INTERVIEW). TOWARDS THE END OF THE SUBSEQUENT INFLUENZA SEASON (APRIL TO JUNE 2011), ALL PARTICIPANTS WERE ASKED TO PARTICIPATE IN AN ONLINE SURVEY TO DETERMINE WHETHER THEIR INTENTION AT INTAKE REGARDING VACCINATION PREDICTED THEIR SUBSEQUENT BEHAVIOUR AND TO Elicit ADDITIONAL INFORMATION ON THEIR SOURCES OF INFORMATION ABOUT INFLUENZA VACCINATION AND THE FACTORS WHICH ENCOURAGED OR DISCOURAGED IMMUNIZATION. TWENTY-TWO OF THE 34 PARTICIPANTS RESPONDED TO THE SURVEY. DESCRIPTIVE STATISTICS WERE GENERATED FOR THE SURVEY VARIABLES USING SAS VERSION 9.1 (SAS INSTITUTE INC., CARY, NC).

designed to elicit discussions about knowledge, attitudes, and beliefs regarding influenza vaccination, perceived severity of and susceptibility to influenza, perceived safety of influenza vaccination, the attitudes of friends and family towards influenza vaccination, and the intention of individuals to be immunized and to immunize their family. The analytic method was directed content analysis,23 a semi-structured approach to content analysis that uses concepts from an existing theoretical framework as initial deductive codes, which are then tested and expanded upon with inductive qualitative coding. We used the HBM and theory of planned behaviour as the theoretical bases for the focus group questions and carried these forward to the data analysis, focusing analysis on the components of these behavioural models (e.g., perceived risk, perceived susceptibility, and social norms). Focus groups were audio recorded and transcribed for analysis using Nvivo 9 (QSR International Americas Inc., Burlington, MA).

Ethics approval for the study was provided by the University of British Columbia Research Ethics Board.

RESULTS

The characteristics of the 34 participants are shown in Table 1. Most were aged 30 to 39 and had a university degree, and all but two participants were living with a partner. Approximately half of the participants were born in Canada. Perinatal care providers for participants were divided evenly among midwives, obstetrician-gynaecologists, and family physicians. The median gestational age for pregnant participants at intake was 31 weeks (range 10 to 40), and 75% of those with newborns (n = 8) had delivered at term. The majority of participants (64.7%, 22/34) were primigravid; 24% (8/34) had one other child, and 9% (3/34) had two.

Overall, the participants had favourable attitudes and behaviour towards vaccines, as illustrated in the Figure. A majority (22/34; 64.7%) completely agreed with the statement “in general vaccines are an effective way of protecting my health” and 79.4% (27/34) of participants had had influenza vaccination in the past. However, when asked if they considered vaccines to be safe for pregnant women, only 17.6% (6/34) completely agreed and 67.6% (23/34) somewhat agreed. Half of the women (17/34) completely or somewhat agreed with the statement “I felt I had enough information to make a decision about vaccinating myself during my pregnancy.”

Focus Group Findings

Perceptions of susceptibility to and severity of influenza
According to the HBM,21 an individual’s perceptions of susceptibility and the severity of a health threat are major influences on the likelihood of that person behaving in a way to avoid the threat. We found that perceptions of susceptibility and severity were important in making decisions about maternal influenza vaccination, and that these perceptions were weighed against the perceived risks and benefits of vaccination. In our focus groups, most participants perceived neither themselves nor their infants to be highly susceptible to infection. Some women compared seasonal influenza with other perceived risks, ranking influenza as a lesser risk. This risk assessment appeared to have more to do with previous public health messaging campaigns, or other media attention to a topic, than to statistical probability because some other risks were overestimated.

Women in the focus groups also perceived the severity of seasonal influenza to be minor for themselves and their infants (Table 2).

Notably, a minority of mothers did perceive themselves or their families to be at greater risk, often due to underlying health issues (e.g., asthma) or occupational hazards (e.g., nursing), and these women were highly likely to be vaccinated.

Echoing the theme that greater media focus on a health risk (e.g., alcohol consumption in pregnancy) resulted in greater

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<tr>
<th>Characteristic</th>
<th>N = 34</th>
<th>%</th>
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<tr>
<td>Age group</td>
<td></td>
<td></td>
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<tr>
<td>20 to 29 years</td>
<td>7</td>
<td>20.6</td>
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<tr>
<td>30 to 39 years</td>
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<td>40+ years</td>
<td>3</td>
<td>8.8</td>
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<tr>
<td>Education level</td>
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<tr>
<td>College or technical/trade</td>
<td>3</td>
<td>8.8</td>
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<tr>
<td>High school diploma</td>
<td>9</td>
<td>26.5</td>
</tr>
<tr>
<td>University degree</td>
<td>22</td>
<td>64.7</td>
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<tr>
<td>Prenatal care provider</td>
<td></td>
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<tr>
<td>Midwife</td>
<td>15</td>
<td>44.1</td>
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<tr>
<td>Family physician</td>
<td>7</td>
<td>20.5</td>
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<tr>
<td>Obstetrician-gynaecologist</td>
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<td>35.3</td>
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<td>Participant’s place of birth</td>
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<tr>
<td>Canada</td>
<td>18</td>
<td>52.9</td>
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<tr>
<td>Asia (Japan, China, Nepal, Philippines)</td>
<td>13</td>
<td>38.2</td>
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<tr>
<td>Europe (Russia, Scotland, France)</td>
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<tr>
<td>Annual household income</td>
<td></td>
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<tr>
<td>Under $35 000</td>
<td>7</td>
<td>20.6</td>
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<td>$35 000 to $75 000</td>
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<tr>
<td>Over $75 000</td>
<td>15</td>
<td>44.1</td>
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<tr>
<td>Prefer not to answer</td>
<td>6</td>
<td>17.6</td>
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perception of susceptibility and severity; the severity of pandemic influenza was also recognized to be greater than seasonal influenza. Women in the focus groups reported hearing a great deal about the H1N1 pandemic and were “shocked” and “frightened” by reports that young women were at greater risk of major complications and death.

Some participants were specifically concerned about an increased risk of miscarriage and severe risks of H1N1 for their infants. Even participants who were unconvinced about having seasonal influenza vaccination were much more likely to prioritize vaccination for H1N1 pandemic influenza for themselves and their children (Table 2).

**Perceptions of the risks and benefits of vaccination**

Participants discussed the internal calculus they used to weigh the risks and benefits of influenza vaccination. For most, the unknown risks from the vaccine did not outweigh the benefits of vaccination. Some were concerned that adverse effects of vaccination might be identified years in the future. Even during a pandemic, when many recognized a higher susceptibility to or severity of infection, participants felt that the risks of infection with pandemic influenza were not greater than the unknown risks of a new and, in their perception, untested vaccine.

Unknown risks (which might not be known for years) were difficult to weigh against potential benefits and loomed large as barriers to obtaining influenza vaccination, especially for the H1N1 pandemic strain. As one participant commented, comparing unknown risk with a risk that was clearly quantifiable based on past evidence, “For me, the risk that’s unknown is actually scarier.”

Participants were very concerned about vaccine ingredients, specifically the adjuvant added to the pandemic influenza vaccine. They acknowledged a lack of clear statements from health care providers and public health officials on this subject and found the information provided to be contradictory and confusing. This in turn increased their concerns about the safety of the vaccine ingredients.

The thalidomide tragedy\textsuperscript{24} spontaneously emerged as a topic of discussion in three of the focus groups as a cautionary example of a new drug that had been given to pregnant women with unforeseen consequences. Although this event occurred more than 40 years ago, it was repeatedly presented as an example of what can happen if a woman is not careful about what she does during pregnancy.

Perceptions of the benefits of vaccination against influenza were diverse. For some women, vaccination in pregnancy was a “no-brainer.” However, others perceived the benefit of vaccination to be minimal, especially compared with other risk-mitigating activities such as wearing a seatbelt or...
taking prenatal vitamin supplements. The repeated comparison of the risks of influenza and the risks and benefits of vaccination against other more established medical advice for pregnant women (e.g., risks of influenza versus risks of smoking) suggested that participants felt that they had limited time for mitigating risk, and, thus, risks needed to be prioritized so that the most important might be managed.

**Values as modifying factors**

Three values held by some participants about vaccinations emerged as factors that modified women's decisions about influenza vaccination. The first of these was omission bias, or the preference for a harm caused by inaction (e.g., non-vaccination) over a harm caused by action (e.g., vaccination). A related second value was a natural ideology, in which participants expressed a preference for risks perceived as natural (e.g., a "home remedy") as opposed to those made by human science or industry (e.g., a pharmaceutical preparation). The third value that modified decisions about vaccination was aversion to ambiguity (i.e., frustration or avoidance if the risks of action are unclear). In some cases, these three values may coincide; an example of this would be when the "natural" option may be not to vaccinate and this option is selected in part due to perceived ambiguity of risks and benefits. However, they may also manifest separately, such as when action is taken that is perceived to be "natural" (e.g., use of homeopathic nosodes or deliberate exposure to contagion). All three of these values are known to correlate with hesitancy about vaccines and anti-vaccine attitudes more broadly, yet they appeared within the focus groups of this generally pro-vaccine sample of women (Table 2).

Omission bias in this study was entangled with the issue of unknown risks of fetal exposure to vaccination, particularly with the new H1N1 vaccine. However, even with seasonal influenza vaccination, some participants described identifying with the value of omission bias.

Although the study sample was generally pro-vaccine and readily used scientific and statistical language, the natural ideology rationale was occasionally apparent. In this context, natural ideology bias emerged as a preference for immunity based on experiencing illness over immunity from a vaccine. Both omission bias and natural ideology were intertwined with aversion to ambiguity among some women in this sample, in that "scientific" interventions were sometimes perceived as carrying hidden threats, even if risks were fairly well documented.

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<th>Table 2. Key concepts from focus groups</th>
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<tr>
<td><strong>Concept</strong></td>
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<tr>
<td>susceptibility to influenza</td>
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<td>benefits of vaccination</td>
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<td>values as modifying factors</td>
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Cues to action: HCPs and the media
The majority of participants (n = 20) in the focus groups believed that their HCP was a good source of information and said that their HCP's recommendation to be vaccinated against influenza would influence them to be vaccinated. However, only seven participants recalled receiving information about influenza vaccination from their HCP; others found their HCP to be neutral on the subject, and two noted that their HCP appeared annoyed and rushed when they asked questions about the vaccine. Although most women did not recall their HCP ever discussing the influenza vaccine with them, a small minority admitted to feeling pressured by their family, their HCP, or both, to undergo vaccination.

Survey Results: Vaccination Intentions and Behaviours
Of the 22 women who completed the follow-up survey, 11 intended to be vaccinated at study intake, seven were undecided, and four intended not to be vaccinated. Intentions accurately predicted behaviour (P = 0.04) for the four women who did not intend to be vaccinated, none of whom reported obtaining the vaccine. Intentions were fairly accurate at predicting behaviour for those who intended to be vaccinated, as 64% (7/11) did undergo vaccination (P = 0.36). Of the seven who were undecided at intake, three were vaccinated and four were not.

Of the 10 follow-up survey respondents who were vaccinated, all reported that they felt well informed about the influenza vaccine and believed that it was safe and would protect their baby and family. Eight reported that a health professional had recommended influenza vaccination to them. Among the 12 women who were not vaccinated, all reported thinking they would not be infected with influenza, 42% did not feel well informed enough to make a decision to be vaccinated, 42% were concerned about vaccine safety, and 50% did not discuss vaccination with their HCP.

DISCUSSION
We used a mixed-method study to examine intentions and behaviour towards influenza vaccination over time and found that intentions accurately predicted behaviour for those who intended not to vaccinate and moderately predicted behaviour for those who did intend to vaccinate. Even for participants who were unsure, their behaviour reflected their intentions, with some choosing to vaccinate and others not. Feeling informed about the influenza vaccine and having a recommendation from a health professional to vaccinate both correlated with being vaccinated. However, many participants described balancing their perceived susceptibility to influenza, the potential severity of infection, the benefits of being immunized against perceived (and sometimes unknown) risks of vaccination, and values that may cause bias against medical intervention. For those who were undecided, cues to action in the form of advice from a health professional and clear media communication about the risks and benefits of influenza and the vaccine could tip the balance in favour of vaccination.

The lack of perception of personal risk for influenza infection and of complications during pregnancy expressed by the majority of our participants was striking. This occurred despite some acknowledgement that pregnant women and young infants are at increased risk for influenza complications. Most pregnant women in our study did not view themselves as personally at risk for influenza and its complications, and most participants did not view their unborn child or infant as being at increased risk; they also did not think that the benefits of potentially preventing something they may not acquire exceeded the risks that a poor decision on their part (i.e., accepting a vaccine that later proved to be unsafe) could have on their baby. Many expressed the belief that influenza infection was “natural” and not something they should try to prevent, even during pregnancy. The lack of information about the safety of influenza vaccine during pregnancy and inconsistent messages from HCPs were barriers to vaccine acceptance. Conflicting messages from the health community on vaccine additives, such as the adjuvanted pandemic vaccine, created confusion and doubt, even in women who were confident in their decision to vaccinate.

However, study participants placed a great deal of trust in their HCPs. Although a recommendation from a HCP did not universally lead to vaccine acceptance, the lack of a recommendation was linked to hesitancy about vaccination, and sometimes outright rejection, in our participants. Maternity care providers, including obstetricians, family physicians, midwives, and doulas, were viewed as credible, respected sources of information, and they therefore have great potential to influence influenza vaccine uptake among pregnant women. There is great potential for these care providers to improve outcomes for their patients by recommending vaccination and answering questions and concerns about vaccination and its safety.

A limitation of this study is that it involved a small convenience sample of pregnant women and new mothers in one urban area. As such, the findings reflect the attitudes
and concerns of these women towards influenza vaccination during pregnancy, but may not be generalizable to the broader population of pregnant women in Canada. Factors such as recall and social desirability bias may also have played a role in participants’ responses.

CONCLUSION

Our mixed-methods analysis of the intentions, beliefs, and actions of pregnant women regarding influenza vaccination suggests that many pregnant women may struggle with weighing the risks and benefits of influenza vaccination. Improving communications about the potential severity of influenza, the increased susceptibility to infection of pregnant women and newborns, and the risks and benefits of vaccination could lead to increased uptake of vaccination among this at-risk population. Because maternity care providers are highly trusted by pregnant women, we recommend they take a more active role in such communications. Maternity care providers can have a direct influence on preventing influenza infection during pregnancy through positive and consistent messaging on the benefits of vaccination.

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