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Prenatal Care Providers and Influenza Prevention and Treatment: Lessons from the Field

Patricia W. Mersereau · Christine M. Layton · Lucia Rojas Smith · Juliette S. Kendrick · Elizabeth W. Mitchell · Jacqueline B. Amoozegar · Jennifer L. Williams

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Abstract To better understand the knowledge, attitudes, and behaviors of providers regarding influenza infection and vaccination in pregnancy, fourteen focus groups were conducted among 92 providers in Atlanta, GA; Dallas, TX; and Portland, OR in late 2009. NVivo 8.0 was used for analysis. Most providers had no experience with pregnant women severely affected by influenza. Many perceived the 2009 H1N1 pandemic to be limited and mild. Providers knew that pregnant women should receive the 2009 H1N1 vaccine and reported plans to vaccinate more patients than the previous season. Most knew CDC guidelines for antiviral treatment and prophylaxis, but some reported hesitancy with presumptive treatment. Although awareness of influenza's potential to cause severe illness in pregnant women was observed, providers' experience and comfort with influenza prevention and treatment was suboptimal. Sustained efforts to educate prenatal care providers about influenza in pregnancy through trusted channels are critical.

Keywords Antiviral medications · H1N1 virus · Influenza vaccine · Pandemic · Pregnancy · Prenatal care providers

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

P. W. Mersereau
SciMetrika, LLC, Research Triangle Park, NC, USA

P. W. Mersereau (✉)
National Center on Birth Defects and Developmental Disabilities, SciMetrika Contractor for the Centers for Disease Control and Prevention, 1600 Clifton Rd., NE, MS E-86, Atlanta, GA, USA
e-mail: pgm5@cdc.gov

C. M. Layton · L. R. Smith · J. B. Amoozegar
RTI International, Research Triangle Park, NC, USA

J. S. Kendrick
Division of Reproductive Health, Centers for Disease Control and Prevention, National Center on Chronic Disease Prevention and Health Promotion, 1600 Clifton Rd., NE, MS K-20, Atlanta, GA, USA

E. W. Mitchell · J. L. Williams
National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, 1600 Clifton Rd., NE, MS E-86, Atlanta, GA, USA

Introduction

An influenza pandemic occurs when a new influenza virus infects a population with no immunity and spreads rapidly from human to human worldwide. An influenza epidemic is similar but occurs within a community or region rather than worldwide. Over time, influenza type A viruses undergo changes in their surface antigens, hemagglutinin and neuraminidase, due to mutations in the virus gene or exchange of a gene segment with another subtype. A minor change is called antigenic "drift" while a major change is known as antigenic "shift". The antigenic "shift" makes a "new" virus for which there is currently no vaccine and little or no population immunity and can result in a pandemic. Previous experiences with seasonal, epidemic, and pandemic influenza demonstrated that pregnant women are at increased risk for severe complications [1–3]. Physiologic changes that occur in the cardiovascular and respiratory systems as well as shifts in immune response during pregnancy are thought to make pregnant women more susceptible to severe complications of influenza [4, 5].

Pregnant women were disproportionately affected during the 2009 H1N1 (pH1N1) pandemic. Although they constituted only one percent of the US population, five percent of the pH1N1 deaths reported from April 2009 through August 2009 occurred in pregnant women [6]. Other studies confirmed reports of severe complications in pregnant women [2, 7–9].

A lack of information existed regarding health care providers' knowledge, attitudes, and practices about prevention and treatment of influenza for pregnant women, both seasonal and pandemic influenza; their plans for a pandemic and adapted practices; and their trusted information sources and preferred communication methods. Pregnant women need accurate information presented in a manner that motivates adherence to appropriate health behaviors for the prevention and treatment of influenza. Studies indicate that providers are their most trusted information source and influencers for behavior change [10, 11]. The pandemic presented a unique opportunity to collect rare "real time" data with providers. Therefore, focus groups were conducted to explore the knowledge, attitudes, risk perception, barriers and behaviors of health care providers of pregnant women regarding seasonal and pH1N1 influenza; to identify misinformation, trusted sources, preferred information channels, and information needs and gaps; and to inform influenza emergency response strategies.

Methods

Formative Approach

Our research with providers was based on the Theory of Reasoned Action to examine intention to immunize pregnant women for influenza [12, 13]. This theory includes the determinants of intention: Attitudes or expected value; subjective norms; and perceived behavioral control. To elaborate on the model, we assessed their knowledge about the severity and treatment of seasonal and pandemic influenza in pregnant women as well as perceived barriers and facilitators for the use of antiviral medications and vaccines in this high risk group. Trusted sources of information and preferred channels were also gathered. Our methods of data collection included pre-questionnaires and focus groups.

Focus Groups

In September 2009 we conducted 14 focus groups with 92 prenatal care providers in three sites: Atlanta, Georgia; Dallas, Texas; and Portland, Oregon. Focus groups in Atlanta occurred just after the peak of reported influenza-like illnesses (ILIs) in Georgia, and focus groups in Dallas and Portland occurred prior to the peak of reported ILIs in Texas and Oregon, respectively.

Prenatal Health Care Provider Participants

A convenience sample of providers was recruited through professional focus group agencies. Eight groups were conducted among physicians (obstetrician/gynecologists [OB/GYNs] and family physicians [FPs]), and six groups were with non-physician providers which included certified nurse midwives (CNMs) and nurse practitioners (NPs) who provide prenatal care.

Participants were almost equally divided between non-physician providers (46%) and physicians (54%). Most providers practiced in private groups (63.7%) and in urban settings (76%). The mean number of years in practice was 14.2 years. Characteristics of the providers are detailed in Table 1.

Four focus groups were conducted with 31 participants in Atlanta and included 2 groups with physicians and 2 groups with non-physician providers. Five focus groups

Table 1 Characteristics of providers participating in focus groups

Category	Characteristics	All groups (n = 92)	Atlanta (n = 31)	Dallas (n = 23)	Portland (n = 38)
Profession	Nurse practitioner	17 (18.5%)	5 (16.1%)	8 (34.8%)	4 (10.5%)
	Midwife	25 (27.1%)	13 (41.9%)	1 (4.3%)	11 (28.9%)
	Physician	50 (54.3%)	13 (41.9%)	14 (60.9%)	23 (57.9%)
Rural versus urban	Urban	76 (82.6%)	31 (100%)	18 (78.3%)	27 (71.1%)
	Rural	16 (17.4%)	–	5 (21.7%)	11 (28.9%)
Practice type	Private group	63.7%	64.5%	47.8%	72.9%
	Solo practice	13.2%	–	30.4%	13.5%
	Community clinic/hospital	23.1%	35.5%	21.7%	13.5%
No. of years in practice	Mean (standard Deviation)	14.2 years (9.58)	14.1 years (9.8)	16.8 years (10.2)	13 years (9.4)

were conducted in both Dallas (23 participants) and Portland (38 participants) with 3 groups of physicians and 2 groups of non-physician providers in each city. The groups were further stratified by urban versus rural settings and private versus public type of practice. Participants received reimbursement for time and travel.

Data Collection and Analysis

Providers completed a questionnaire before the focus group which asked about perceived influenza illness severity, experience with and plans for providing influenza vaccine for their patients, trusted sources for professional information, and preferred methods of receiving urgent communication.

A trained moderator conducted the 90 minute focus groups in specifically designed focus group facilities. In some cases, rural providers participated via conference call. Focus groups were audio recorded and transcribed.

The moderator used a semi-structured guide to focus the discussion. Questions were designed to elicit discussion about (1) trusted sources of information, (2) knowledge and experience regarding seasonal flu vaccination, (3) attitudes and expectations regarding seasonal flu vaccination, (4) subjective norms regarding seasonal flu vaccination, (5) structural barriers to vaccination, (6) knowledge of pandemic influenza preparedness, (7) pandemic flu mitigation strategies, (8) government, medical system, and community responses, and (9) information and dissemination needs during a flu pandemic.

All data collection instruments and protocols were approved for use by appropriate institutional review boards. All participants completed consent forms that assured confidentiality.

NVivo 8.0 (QSR International, Doncaster, Victoria, Australia) was used to organize and analyze the qualitative data. All focus group transcripts were coded according to primary domains in the moderator's guides. The analytic team met as needed to discuss the coding structure and emergent themes warranting the creation of additional codes. Coded transcripts were sampled and compared to assure reliability. Reports of coded data were generated and reviewed to identify key themes across the discussions.

Results

Providers' Pre-Focus Group Questionnaire

Almost half of the providers regarded influenza during pregnancy as either concerning or most concerning (based on a 4-point Likert scale) of the potential conditions adversely affecting pregnancy. Slightly less concern was reported in Atlanta than in Dallas or Portland.

The majority of providers estimated that fewer than half of their pregnant patients received seasonal influenza vaccine in the last season. Atlanta's providers estimated the lowest vaccination rates among their pregnant patients and the lowest vaccination rates given at point of care, but reported plans to offer vaccinations at point of care in Atlanta increased from 43.3% in 2008 to 63.3% in 2009. Based on providers' estimates, it appears that higher vaccination rates occurred in locations where point of care vaccination was offered. (Table 2).

Focus Group Findings

Segmentation

Although the focus groups were segmented by provider type and setting, there were very few distinctions between the groups so results are presented for the overall sample.

Awareness, Knowledge, and Threat Perceptions

Awareness and knowledge of pH1N1 were good. Prior to the focus groups, the American College of Obstetricians and Gynecologists (ACOG), the American College of Nurse-Midwives (ACNM), and the Centers for Disease Control and Prevention (CDC) had issued various guidance

Table 2 Selected pre-focus group questionnaire results

Questions	Possible answers	Atlanta (%)	Dallas (%)	Portland (%)	All groups (%)
About what percentage of your OB patients receive seasonal influenza vaccine in an average season?	0–24%	53.3	21.1	27.5	34.8
	25–49%	20.0	36.8	15.0	21.4
	50–74%	26.7	26.3	35.0	30.3
	≥75%	0.0	15.8	22.5	13.5
Did you provide your obstetrical patients seasonal influenza vaccination at your practice last season?	Yes	43.3	73.7	72.5	62.9
	No	56.7	26.3	27.5	37.1
Are you providing seasonal influenza vaccination at your practice this season (2009–2010)?	Yes	63.3	79.0	72.5	70.8
	No	36.7	21.1	27.5	29.2

documents for the prevention and treatment of pH1N1. Overall, providers were aware of pH1N1 guidance documents and that pregnant women were a 2009 H1N1 vaccine priority group. Most providers knew that guidance encouraged treating high risk individuals, including pregnant women, with antiviral medications if they had an ILI and that prophylaxis could be considered for pregnant women exposed to pH1N1.

Perceptions of pH1N1 as a severe threat among pregnant women were mixed. Although most providers reported a low level of concern among their patients regarding seasonal influenza in the past, patient concern increased due to the media attention focused on pH1N1. Providers reported that some patients were overly concerned.

Several participants commented that they believed "pandemic" referred not just to increased disease transmission but increased severity as well. Thus, they did not believe the 2009 outbreak of novel H1N1 influenza represented a real pandemic. Some providers expressed belief that all influenza strains are equally severe and cause for concern in pregnant women. However, most providers had little or no personal or community experience with severely affected pregnant women, and they previously treated patients who had mild cases of seasonal influenza infection with supportive care only. They were split in their opinions about the relative severity and prevalence of pH1N1, and there was a general sense that the media had blown pH1N1 out of proportion.

> "This type of virus is acting no worse, and, in fact, it turned out to be less bad than some of the predicted seasonal flu as far as its effects."

Mitigation Practices and Issues

Practice Pattern Changes Most providers were concerned about exposing their well pregnant patients to others who might be infected. They discouraged anyone with flu symptoms from going into the office and even provided consultation and treatment over the phone. Most providers offered hand sanitizers, masks, and tissues in their waiting rooms and posted signs requesting that sick patients use them. In some practices, providers created a separate waiting room to isolate sick patients or asked staff to take them directly to an examination room. Still another approach involved scheduling sick patients during a block of time when well patients would not be there.

> "We had hours in which flu patients came and only flu patients. After, we shut down for 30 minutes and cleaned everything."

Providers and hospital administrators were making plans in the event of a severe pandemic. Providers indicated that they would treat most patients over the phone. Extremely ill patients would be sent to the hospital, but providers noted limitations to surge capacity. Providers generally agreed that babies need to be delivered in the hospital and that labor and delivery cannot be changed in major ways if the hospitals are overcrowded. They expressed concerned that malpractice insurance would not cover home deliveries.

Large facilities were more likely to have formal emergency management plans in place than were small office-based practices. However, general consensus was that hospital systems typically did not plan in conjunction with other hospital systems, and there were mixed opinions about whether their individual emergency management plans would be carried out at the community level in an efficient manner.

Vaccination Although there was universal awareness that all pregnant women should receive pH1N1 vaccinations, providers noted some confusion, concerns, and barriers. Shortly before the focus groups, vaccine studies confirmed the need for only one injection instead of the two originally thought necessary to confer immunity. Some participants were not familiar with the final vaccination schedule.

Several structural barriers were noted, including inability to meet CDC guidelines for storage of the pH1N1 vaccine, difficulty in obtaining an initially limited supply of the vaccine, and an insufficient supply of thimerosal-free vaccine. Some providers were uncertain when and if they would receive any pH1N1 vaccine in their offices, or even in their communities due to supply issues. Interestingly, non-physician providers were more concerned about vaccine storage requirements while physician providers were primarily concerned about supply issues.

Providers knew that a pregnant woman is primarily motivated to protect the health of her unborn baby. Protecting herself is secondary. However, historically, few pregnant women have been vaccinated against seasonal influenza [14], and providers reported that some women did not see the need for any influenza vaccination even with the threat of severe complications from pH1N1. Some providers were uncomfortable about vaccinating during the first trimester of pregnancy, preferring to wait until the second trimester. Many providers indicated that they presented vaccination information to their patients in an unbiased manner, but a few providers with views contradictory to CDC's guidance shared their reservations with patients. Some providers mentioned encountering a few pharmacists who refused to vaccinate pregnant women.

Testing As more people became ill with pH1N1 infection, guidelines for when to test for the virus changed. At first, testing was recommended for patients suspected of

having pH1N1 infection. Samples for reverse transcriptase-polymerase chain reaction (rRT-PCR), a sophisticated test initially available only at CDC to confirm this novel influenza A (H1N1) virus infection, were sent to state laboratories and forwarded to CDC. It took several days to get results. As the pandemic spread and state health departments and other laboratories began to increase capacity for pH1N1 testing, the number of tests sent to CDC and state health laboratories grew to overcapacity, resulting in delays. During the time of the focus groups, most providers were requesting confirmatory testing on only the sickest people and treating patients immediately if they were symptomatic. However, some providers reported discomfort with treating sick pregnant women presumptively based on concerns about antiviral medication safety in pregnant women and their fetuses and were still relying on rapid flu tests which had low sensitivity or waiting for confirmatory test results, causing misdiagnoses and delays in treatment.

Antiviral Medications CDC issued guidelines for prophylaxis and treatment of pH1N1 infections, updating them as needed. Most providers were aware of the guidelines, but participants admitted to little or no experience prescribing antiviral prophylaxis for a pregnant woman after influenza exposure. Providers were more familiar with oseltamivir than zanamivir, but limited safety data for both antiviral medications in pregnant women resulted in hesitancy to prescribe them. Patient desires and barriers also factored into the decision to prescribe antiviral prophylaxis.

Most providers found the guidelines for treatment clear, but some expressed concern about immediately prescribing oseltamivir for pregnant women with mild symptoms. In general, providers agreed that they relied on clinical judgment in addition to CDC's guidelines. Threat appraisal was most influenced by personal and community experience with severe influenza complications in pregnant women in addition to messaging about pH1N1 from CDC and other professional organizations.

Providers noted that cost for and access to these medications were barriers to both prophylaxis and treatment. Additionally, several providers noted some pharmacists advised their pregnant patients that antiviral medications should not be taken during pregnancy even though the providers had prescribed them.

Trusted Sources and Information Pathways

ACOG and CDC were cited overwhelmingly as the most trusted sources of information. Obstetricians almost always reported that they received their information from ACOG. Non-physician providers also commented that their professional organizations were trusted and often primary sources of information. Some providers stated that they received CDC guidance documents directly from CDC, either actively by browsing the CDC web site or passively by receiving emails, faxes, or other communications. Other providers received CDC messages through intermediary channels, such as colleagues, hospital administrators, and state and local health departments. Providers who were not active information seekers or members of a professional organization seemed to rely on their institutional settings for guidance. WebMD was also mentioned as a credible source. Most providers preferred urgent information from their professional organizations or CDC pushed to them by email (46.4%), often accessed via mobile phone, and text message (32.1%). A unified message from reliable sources was important.

Participants discussed some barriers regarding communication issues. Respondents said that the understandably evolving pH1N1 guidance made it difficult for providers to stay up-to-date on current recommendations. They also expressed difficulty in navigating CDC's web site. Providers mentioned that their patients generally looked to the news media for information about pH1N1, but media sensationalism caused hysteria among some patients.

Discussion

Several providers questioned whether pH1N1 was a "real" pandemic. Those respondents acknowledged that the pH1N1 outbreak could develop into a pandemic, but, in the meantime, certain actions, such as prophylaxis with antivirals, could be delayed. Other providers believed pH1N1 influenza to be no more severe than seasonal flu. Pandemic influenza planning that took place before pH1N1 dealt with worst case scenarios, perhaps resulting in providers perceiving this outbreak as not a true pandemic. Also, there was no actual experience among providers as to what a pandemic might look like. It was felt that providers were asked to change practice patterns not necessarily based on their personal experience. Those providers who did have personal or community experience with severe complications from pH1N1 in pregnancy appraised the threat differently. They were highly concerned about the potential impact of pH1N1.

Despite awareness of the need to vaccinate, providers expressed some confusion about the need for one injection instead of the two injections originally thought necessary, uncertainty about vaccine supply, delivery and storage as well as concern about push back from pharmacists. Some issues were beyond CDC's control to change, such as vaccine availability. The change in number of injections of vaccine needed to confer immunity was a result of studies done as quickly as possible and could not have been

rushed. However, other interventions were possible. Results of this study were used to make timely clarifications to CDC's web site and guidance documents. For example, the web site landing pages were revised to improve navigation of the CDC H1N1 web site.

As a result of the information gathered regarding some pharmacists advising pregnant women not to be vaccinated or take the antiviral medications, CDC and its partners developed and disseminated education targeting pharmacists about pH1N1 prevention and treatment.

Information gathered from the pre-focus group questionnaire indicated that offering vaccination at point of care might be expected to increase vaccination rates. Several providers who had not previously offered influenza vaccine in their offices reported intentions to offer vaccinations in future years. Because multiple studies have confirmed that women trust advice from their providers, offering influenza vaccinations at point of care could be seen by patients as an implicit recommendation for the vaccine. Since vaccination is the cornerstone of mitigation strategies, that change in practice certainly should be encouraged and supported through messages and guidelines from professional, state, and federal organizations.

Many providers stated that they prescribed antiviral medications to women with mild symptoms, something they had been reluctant to do in the past.

Limitations

Results of focus group studies are designed to provide a direction for further research. This study was conducted in a three distinct areas of the country with a limited number and type of providers during a restricted time period. As such, it is not considered generalizable to the broad provider population.

Responses to the pre-focus group questionnaires and some focus group discussion questions were based on estimates by the providers and are less reliable than actual numbers.

Conclusions

Listening to audiences is essential to understand the motivators, concerns and barriers that facilitate behavior change; identify information gaps; and improve communication. Health care providers play an important role in influencing pregnant women to prevent influenza infection and to seek care early for suspected influenza illness. Through formative research, we can give prenatal providers messaging and other strategies needed to support seasonal and pandemic influenza prevention and treatment efforts. Further research, including national surveys and evaluation of prevention and treatment efforts, can expand our knowledge.

Provider perceptions of disease severity appeared to influence their decision making about prevention and treatment. Keeping providers informed about the rapidly changing landscape of a pandemic and its consequences is vital. Increasing provider awareness and knowledge is important so that they can make informed recommendations to their patients. Getting a unified message from several trusted sources helps to dispel confusion among providers, and using preferred methods of communication, such as email or text message, facilitates getting urgent information to them quickly.

The researchers gained a better understanding of vaccination in pregnancy issues and plan to use that knowledge to help providers address barriers to seasonal influenza vaccination during pregnancy.

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