Assessing Knowledge, Barriers, and Attitudes Regarding Pertussis Disease and Immunization

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ABSTRACT

Background: Pertussis is a contagious disease whose incidence is increasing. Although pertussis is preventable through vaccination, growing numbers of patients are not receiving the DTaP immunization. Typically DTaP is started during childhood and given in a physician office setting. However, community pharmacists are easily accessible to provide information regarding vaccinations as well as administer the vaccines. This study investigated awareness and knowledge of pertussis and the vaccine among adults in the Pittsburgh area. Current immunization rates and potential barriers to receiving the pertussis vaccine were also assessed.

Methods: This study utilized an educational intervention and survey methodology.

Results: A total of 139 surveys from adult participants at local pharmacies were completed. The majority of respondents were female (64.9%) with a mean age of 49.1 ± 17.6 years. The majority of respondents indicated awareness of the disease state (91.2%) and knowledge of its increase during the last couple years (76.3%). However, 54.1% of the respondents had indicated that they were either only immunized as a child, had not been immunized, or were unsure if they had been immunized.

Conclusions: Our study indicated that many participants in the Pittsburgh area were aware of pertussis, knew it was contagious, and had received the vaccine. Despite this, many lacked knowledge of the specifics of the pertussis disease and vaccine recommendations. Providing education to patients on this topic is an important opportunity for pharmacists in the region.
BACKGROUND:

Pertussis has been and still is a major cause of morbidity and mortality in young children throughout the world.¹ This disease is caused by the bacteria *Bordetella pertussis* and results in a number of symptoms in addition to the characteristic whooping cough associated with the disease. Other symptoms can include pneumonia, convulsions, apnea, and encephalopathy, which can be fatal.² Pertussis disease risk and severity are greatest in unimmunized infants. Guidelines established by the Advisory Committee on Immunization Practices (ACIP) recommend that infants receive a total of five doses of the pertussis immunization as part of the tetanus, diphtheria, and pertussis (DTaP) combination vaccine. Patients should also receive the pertussis immunization as part of the Tdap combination vaccine, which is given during adolescence, adulthood, and pregnancy.³

Recent data from the Centers for Disease Control and Prevention (CDC) shows a significant increase in the number of reported pertussis cases in the United States. In the early 2000’s the U.S. was successful at keeping the number of pertussis cases below 10,000 per year. However, the number of cases per year has risen more recently from 18,719 in 2011 to 48,277 in 2012.²

The literature provides evidence of parents’ belief in the importance of childhood vaccines as well as evidence of overall confidence in the efficacy and safety of vaccines for children.⁴,⁵ However, the literature also indicates many factors that may contribute to children not receiving the proper course of immunizations including the pertussis vaccine. One of these issues is parents’ belief that communication with their child’s physician is difficult.⁶ Another possible factor that has been cited is that some physicians have been found to refer children without medical insurance to public clinics for immunization services.⁵ Additionally, the
The literature supports a general lack of awareness and knowledge regarding immunizations, including pertussis. These gaps in knowledge have been related to parents’ misconceptions regarding vaccines, and parents’ lack of access and inability to obtain accurate information about immunizations. Even physicians have been cited as lacking adequate knowledge regarding childhood immunizations in general and the pertussis vaccine more specifically. Ultimately, this lack of knowledge on the part of parents and physicians may play an important role and contribute to children in the U.S. not obtaining the proper course of immunizations including the immunization to protect them from pertussis.

This gap provides a unique opportunity for pharmacists to not only increase immunization rates via education but also through direct patient care. Currently Pennsylvania pharmacists can champion adults age 18 years or older, including those who care for or are in direct contact with young children, to receive Tdap vaccinations. However, recent changes in Pennsylvania law have also lowered the age that pharmacists can provide the flu vaccine to nine years of age with parental consent - recognition of the pharmacist’s increasing role in providing immunizations to the public. It is possible that future changes to the Pennsylvania law may expand this opportunity to pertussis vaccination, allowing the pharmacist to directly immunize more at-risk individuals. In order to understand potential educational needs of patients and opportunities for pharmacists, this study aimed to: (1) investigate the knowledge of adults in the Pittsburgh area about pertussis; (2) assess barriers associated with parents having their children vaccinated properly against pertussis; (3) assess barriers associated with proper adult vaccination against pertussis; and (4) measure the rates of pertussis vaccination following a brief pharmacist educational session.
METHODS:

The study began on March 1, 2014. Written surveys were administered to adult participants at six retail pharmacies in Allegheny County, PA. These pharmacies were selected due to their proximity to the university conducting the study and their willingness to participate in the survey distribution. The primary researchers were two student pharmacists from Duquesne University Mylan School of Pharmacy who were aided by a clinical faculty member from the school. They administered surveys at the participating pharmacies weekly for a four to five hour timeframe (one pharmacy per week). Survey collection continued for a 4 month period. Participants had to be at least 18 years of age in order to complete the survey. No other inclusion or exclusion criteria were applied.

The survey consisted of three sections. The first section of the survey was designed to assess the participant’s general knowledge and awareness of pertussis. The purpose of the second section of the survey was to collect information regarding potential barriers to receiving the pertussis vaccine for the participant and/or their children. The third section of the survey collected demographic information such as education level, insurance status, and participants’ knowledge of their own personal pertussis vaccine history. If the participant responded in the survey that they or their children had not received the pertussis vaccine (or if they were unsure as to their immunization status), they were invited to participate in a brief pharmacist-led educational intervention. If they agreed, they were given a consent form to sign prior to the intervention. The consent form and survey were approved by the Duquesne University Institutional Review Board.

After agreeing to the pharmacist-led intervention, the student and faculty researchers then presented a short, 5-10 minute educational session on pertussis and the pertussis vaccine to the
participant. This educational session was presented at the pharmacy immediately after the patient completed the survey in order to not lose participants to follow-up. The presentation was in slide format and reviewed a background on pertussis, and the most common signs, symptoms, and complications of the disease. The recommended CDC vaccination schedule for children and adults was also reviewed. Lastly, the researchers answered any questions regarding pertussis or the pertussis immunization that the participant had.

The participants who consented and took part in the educational intervention were contacted via telephone at least one month following the intervention. The purpose of this telephone follow-up was to assess if the participant’s knowledge of pertussis had changed from their baseline score on the original survey and also whether they or their children had received the pertussis vaccine as a result of this intervention. During this follow-up call, the same questions from the original survey were asked to each participant verbally over the phone.

RESULTS:

A total of 139 surveys were collected from adult participants at the local pharmacies during the four-month collection period (March 1, 2014 through June 30, 2014). The majority of survey respondents were female (64.9%) with a mean age of 49.1 ± 17.6 years. The preponderance of respondents (57.2%) indicated having obtained at least a bachelor’s degree. Most participants indicated having private insurance for themselves (85.0%) and their child/children (78.7%). Furthermore, the majority of respondents indicated their insurance would cover the pertussis vaccine for themselves (53.8%) and provide coverage for their child/children (57.7%). Table 1 provides additional detail on participant characteristics.

Awareness and Knowledge:
The majority (91.2%) of the adult pharmacy participants indicated they had “heard” of pertussis. Physicians were the most commonly cited source that adults indicated they became aware of the disease. Overall, the top five sources adults reported becoming aware of pertussis included through their physician (36; 27.6%); television/media (17; 13.1%); nurse/other healthcare professional (11; 8.0%); pharmacist (10; 8.0%); and personal experience with having/friend having pertussis (10; 8.0%).

The majority of respondents (76.3%) indicated they knew that pertussis cases in the U.S. had increased over the last few years. Additionally, the preponderance (75.2%) of participants knew pertussis is a highly contagious disease. Respondents were asked to indicate their knowledge of who should receive both the DTaP and Tdap vaccines (Table 2). It should be noted that while the survey indicated that both DTaP and Tdap were vaccine combinations available to protect against pertussis, no further information on these vaccines was given.

Respondents were also asked to indicate whether the following statement “a one-time Tdap booster should replace the Td immunization in adults over 19 years of age” was true. While almost half of the respondents (n= 62 of 136; 45.6%) indicated the statement was “True,” a similar number (n= 58 of 136; 42.6%) also indicated they “did not know.” When asked to indicate their knowledge of complications related to the pertussis disease from a list of 10 possible complications, respondents identified pneumonia (108; 77.7%), apnea (88; 63.3%), and death (86; 61.9%) most commonly (Table 3).

Barriers and Patient Motivations Associated with Pertussis Vaccination:

Participants were asked to respond with which factors most correlated with their decision to have themselves and/or their children vaccinated. Results show that the seriousness of the pertussis disease and the likelihood of getting the disease were the highest ranked factors (Table
4). Cost of receiving the vaccine, as well as side effects of the vaccine, ranked lower for both adults and their children.

**Immunization Rates:**

Ninety-nine participants responded that they had been vaccinated against pertussis. Of these, the majority (71 or 71.7%) indicated their children had received the pertussis immunization. There were 24 (24.2%) participants that did not know if their children had been immunized and 4 (4.0%) indicated their children had not been immunized. The immunization status of the adult participants was more varied as compared to children. While 61 (45.9%) of the adults indicated they had received pertussis immunizations as both adults and children, 27 (20.3%) reported being immunized as children only. Additionally, 33 (24.8%) of the adults did not know if they had been immunized and 12 (9.0%) reported they had not been vaccinated against pertussis.

**Results of One-Month Follow-Up:**

There were 72 participants who indicated on the survey that they were immunized as a child only, had not been immunized, or were unsure whether or not they had been immunized and these individuals were asked to participate in the pharmacist-led educational intervention. Of these eligible for the intervention, 34 agreed to participate in the pharmacist-led intervention and nine were reached for follow-up one month after the intervention. At the time of follow-up, four (44.4%) indicated they had received the pertussis vaccine and four (44.4%) stated they had not received the pertussis vaccine but were planning to get the vaccination. One participant reported they had not received the vaccine and had no plans to receive the pertussis vaccine. During this follow-up call, participants were re-asked to identify the complications of pertussis to assess any knowledge gain as a result of the pharmacist-led educational intervention. Participants identified
the same top three complications of the disease (pneumonia, apnea and death) as they did in the earlier survey (Table 3).

DISCUSSION:

This study set out to determine whether the recent increase in the pertussis disease could be attributed to lack of patient awareness, knowledge, or certain barriers to receiving the vaccination. The findings from the study show that most people are aware of the seriousness of the disease and the increases in the incidence of the disease. These results indicated a lack of awareness regarding pertussis did not impact the increasing incidence. The specifics of pertussis and the immunization proved to be the section of the study where most knowledge was lacking. For example, many participants did not know that they should receive a one time Tdap booster at the age of 19 or older. Participants also had trouble determining who should receive the DTaP and Tdap vaccines, and the majority of participants did not know the main complications that can result from the disease.

Some barriers (e.g. vaccine cost/co-pay, concern over immunization-related side effects) assessed in the study were not cited as having a large impact on immunization decisions. In fact, participants said that the consequences of the disease and the likelihood of their child getting the disease greatly impacted parents’ likelihood to immunize their children. However, even the barriers with lower impact offer opportunities for pharmacists to educate patients about pertussis vaccination.

The study also looked into pertussis immunization rates among the participants of the study. While most participants had indicated that their children were immunized, about a quarter admitted that they did not know if they had immunized their child. The immunization statuses of
the adults were even more scattered showing that the majority of adults, while they may or may not have received their immunization as a child, did not receive their booster after 19 years of age.

**LIMITATIONS:**

Limitations to the study are consistent with survey methodology and the sampling methods employed, such as response bias. The cross-sectional nature of this study rules out identifying cause and effect relationships.

**CONCLUSIONS:**

Despite limitations with this exploratory study, our results helped open a new window for further investigation into the factors behind the increasing incidence of pertussis. The study also provided insight on patient’s knowledge gaps relating to the disease and the importance of receiving the immunization as well as potential educational opportunities for pharmacists.

**REFERENCES:**


