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Psychological factors associated with uptake of the childhood influenza vaccine and perception of post-vaccination side-effects: A cross-sectional survey in England

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ABSTRACT

Objectives: To identify predictors of: uptake of the childhood influenza vaccine in the 2015–2016 influenza season, parental perceptions of side-effects from the influenza vaccine and intention to vaccinate one's child for influenza in the 2016–2017 influenza season.
Design: Cross-sectional online survey.
Setting: Data were collected in England shortly after the end of the 2015–2016 immunization campaign.
Participants: 1001 parents or guardians of children aged between two and seven.
Main outcome measures: Self-reported uptake of the childhood influenza vaccine in the 2015–2016 influenza season, perception of side-effects from the influenza vaccine and intention to vaccinate one's child in the 2016–2017 influenza season.
Results: Self-reported uptake of the childhood influenza vaccine was 52.8%. Factors strongly positively associated with uptake included the child having previously been vaccinated against influenza, perceiving the vaccine to be effective and perceiving the child to be susceptible to flu. Factors strongly negatively associated with uptake included perceiving the vaccine to be unsafe, to cause short-term side-effects or long-term health problems and believing that yearly vaccination may overload the immune system. Predictors of intended vaccine uptake in 2016–2017 were similar. Participants who perceived side-effects after the 2015–2016 vaccination reported being less likely to vaccinate their child next year. Side-effects were more likely to be reported in first-born children, by participants who knew another child who had side-effects, those who thought that the vaccine would interact with medication that the child was currently taking, and those who believed the vaccine causes short-term side-effects.
Conclusions: Perceptions about the childhood influenza vaccine show strong associations with uptake, intended uptake and perception of side-effects. Attempts to improve uptake rates from their current low levels must address these perceptions.

1. Introduction

In 2012, the British Joint Committee on Vaccination and Immunisation (JCVI) recommended that the influenza vaccination programme be extended to include children aged two to sixteen, in an attempt to limit the number of children who suffer from complications of influenza and to reduce morbidity and mortality among adults who may contract influenza from children. In the first two influenza seasons that the vaccine was offered to children, uptake in those aged two to four was around 30–40% [1,2]. In the 2015–2016 flu season, the influenza vaccine was offered to all two to four year olds via their GP and five to seven year olds in school (school years one and two). Children were offered the nasal flu spray (live attenuated influenza vaccine, Fluenz Tetra); if contraindicated, children were offered an inactivated vaccine (injection) [3]. Initial yearly figures for the 2015–2016 influenza season indicate that uptake was 30.0–37.7% in children aged two to four, 54.4% in children in school year one, and 52.9% in children

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in school year two [4], falling short of the Public Health England target of 40–60% uptake in two to four year olds [3].

Factors associated with parental rejection of other vaccinations for their children include poorer parental socio-economic and employment status [5]; believing that the vaccine is unsafe [6] or ineffective [7], and that children are given too many vaccines [8]. Concerns that the vaccine causes side-effects are also commonly cited as reasons for not wanting to vaccinate one's child [7,9–11].

Although acute symptoms are common following many vaccinations, their causes are not always straightforward. While some may be directly attributable to vaccination, others may reflect pre-existing or coincidental symptoms that are misattributed to the vaccine, while still others may occur due to a 'nocebo' effect triggered by a self-fulfilling expectation of symptoms [12–14]. Expectations may be caused by seeing someone else experience symptoms after vaccination [15] or through exposure to information suggesting that side-effects are common.

We used a cross-sectional survey of parents whose child was eligible to receive the influenza vaccine in England during the 2015–2016 influenza season to test whether self-reported uptake of the vaccine and parental perception of side-effects were associated with attitudes towards influenza and the vaccine. We also tested whether these factors, together with parental perception of side-effects, were associated with intention to have their child vaccinated in the 2016–2017 season. Items assessing parental understanding of current messages about these issues were also included, in order to test the clarity of current communication about the risk of side-effects and the efficacy of the vaccine.

2. Method

2.1. The survey

We commissioned the market research company Ipsos MORI to conduct an online survey of parents or guardians of children aged between two and seven years on 31st August 2015 living in England. Data collection took place between 16th and 30th March 2016.

Ipsos MORI recruited participants from an existing panel of people willing to take part in internet surveys (n = 160,000 in England). Quotas based on parent age and gender (combined), location, working status, gender of child and age of child were set to reflect the known demographic profile of parents of children in England [16]. We intended to recruit 1000 participants to provide us with a sample error of about plus or minus 3%. Panel participants typically receive points for every survey they complete: for our survey, participants received points worth 75p. The study was approved by the King's College London Psychiatry, Nursing and Midwifery Research Ethics subcommittee (reference number HR-15/16-2132).

2.1.1. Selection of index child

Where participants had two or more eligible children, the survey software chose one child for them to think about when answering questions, based on the need to fill quotas for child age. If parents had two children of the same age, they were asked to choose one to think about for the duration of the survey.

2.1.2. Vaccine uptake, perception of side-effects and intended vaccine uptake

Participants were asked whether their child had received the influenza vaccination "this winter (2015/16)" and to state their main reasons for vaccinating or not vaccinating their child. Participants whose child had been vaccinated were asked whether the child had experienced any out of a list of 23 symptoms "because of the child flu vaccine." We included symptoms listed as vaccine side-effects by the manufacturer, common symptoms taken from the Patient Health Questionnaire (PHQ-15 [17]) and other symptoms suggested by the literature [18] or by parents during our piloting. Participants who reported symptoms were asked how severe, overall, the symptoms had been and how worried they had been about them. Two items, based on those used by Payaprom et al. [19], asked participants to rate on a five point scale whether they wanted or intended the child to be vaccinated for influenza next year.

2.1.3. Personal characteristics and perceptions and attitudes about influenza and the vaccination

We asked participants to report personal characteristics (see Table 1). Participants also rated 19 statements relating to the participant's perceptions of influenza and vaccination (see Table 2), adapted from previous work [20] on a 5-point Likert scale from "strongly agree," to "strongly disagree."

2.1.4. Terminology used in vaccine communications

Understanding of current communications regarding the effectiveness of the vaccine was assessed by one item asking participants to imagine that the childhood influenza vaccine was "50% effective." Participants endorsed one of five options for what this means, including the correct answer "if a child had a 50% chance of catching flu before being vaccinated, they now have half that chance (i.e. 25%)."

We included four items to assess understanding of terms used to communicate the incidence of acute side-effects. The four items described side-effects that were "very common" (runny or stuffy nose), "common" (fever), "uncommon" (rash) and "very rare" (severe allergic reaction) as indicated by the patient information leaflet [21]. These terms are recommended for use in patient information leaflets by European Commission guidelines and are intended to reflect side-effects that affect more than one in ten patients (very common), up to one in ten (common), up to one in 100 (uncommon) and up to one in 10,000 (very rare) [22]. Items stated, for example, that "the patient information leaflet mentions that fever is a common side-effect" and asked participants to estimate how many out of 10,000 vaccinated children would develop the specified symptom. The patient information leaflet does not describe any "rare" side-effects, so participants' understanding of this term was not assessed.

2.2. Analysis

Where relevant, we excluded data from participants who did not know or could not remember if their child had been vaccinated or had experienced side-effects. Scores for the two items assessing intention to vaccinate in 2016–2017 were combined to produce an intention score from 2 to 10 [19], with a higher score indicating a stronger intention. If participants had answered "don't know" to one or both intention questions they were excluded from the intention analysis. We defined a score of six or lower as indicating a low intention to vaccinate again in the next year, and a score of seven or more as high intention.

We recoded perceptions and attitudes about influenza and the vaccine as "agree" or "disagree". Responses of "don't know" and "neither agree nor disagree" were treated as missing data. Binary logistic regressions were used to calculate univariate associations between perceptions, personal characteristics and outcomes. Multivariate logistic regressions were used to calculate the same associations adjusting for personal characteristics. Associations between personal characteristics, perceptions and side-effect reporting, side-effect severity and side-effect worry with the outcome 'intended vaccination' were calculated using linear