Vaccine 33 (2015) 7211–7216

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Public opinion on childhood immunisations in Iceland

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ARTICLE INFO

Article history:
Received 6 September 2015
Received in revised form 18 October 2015
Accepted 28 October 2015
Available online 10 November 2015

Keywords:
Childhood immunisation
Immunisation coverage
Public opinion
Vaccine skepticism

ABSTRACT

Introduction: In recent years, vaccine preventable diseases such as measles and pertussis have been re-emerging in Western countries, maybe because of decreasing participation in childhood vaccination programs in some countries. There is clear evidence for vaccine efficacy and the risk of adverse effects is low. This needs to be communicated to the general public. The aim of the study was to evaluate the public opinion on childhood vaccinations in Iceland.
Materials and methods: An internet based study was used to evaluate the opinion on childhood immunisations in Iceland. The cohort was divided in three groups: (a) general public (b) employees of the University Hospital Iceland and (c) employees (teachers and staff) of the University of Iceland. The cohorts could be stratified according to age, gender, education, household income, parenthood and residency.
Results: Responses were received from 5584 individuals (53% response rate). When asked about childhood vaccinations in the first and second year of life, approximately 95% of participants were "positive" or "very positive", approximately 1% were "negative" or "very negative". When participants were asked whether they would have their child immunized according to the Icelandic childhood vaccination schedule, 96% were "positive" or "very positive", 1.2% were "negative" or "very negative". Similarly, 92% trust Icelandic Health authorities to decide on childhood vaccination schedule, 2.3% did not. In total, 9.3% "rather" or "strongly" agreed to the statement "I fear that vaccinations can cause severe adverse effects", 17.5% were undecided and 66.9% "disagreed" or "strongly disagreed". Individuals with higher education were more likely to disagree with this statement (OR = 1.45, CI95 = 1.29–1.64, $p < 0.001$) as did males (OR = 1.22, CI95 = 1.087–1.379, $p = 0.001$).
Conclusion: This study shows a very positive attitude towards vaccinations raising expectations for an ongoing success in preventing preventable communicable diseases in childhood in Iceland.

1. Introduction

The re-emergence of measles in Europe and US in recent years [1,2] and the increasing incidence of pertussis in Western countries [3–5] has raised serious questions about declining participation in childhood vaccination programs. It is hard to comprehend how severe, life threatening diseases which can be prevented can still persist in societies with good resources. An important aspect of this development is parent's opinion on the effect of childhood immunisations and fear of possible adverse reactions.

It is generally accepted that immunisations prevent diseases and save millions of lives each year [6–8]. Apart from access to clean water, no health intervention is as effective in reducing disease burden [8]. Currently, immunisations can prevent an increasing number of infectious diseases [7]. Despite this success, it is estimated that 2.5 million children die each year due to vaccine preventable diseases [7].

The decreasing incidence of vaccine preventable diseases due to the immunisations has resulted in people starting to question the severity of these diseases and the importance of vaccinations. Although most immunisations are very safe, adverse events are nevertheless well recognized [9] and with the waning burden of

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http://dx.doi.org/10.1016/j.vaccine.2015.10.125
0264-410X/

these diseases, people worry more about the possible side effects [10–14]. This has resulted in less participation in childhood vaccination in some countries [15].

The childhood immunisation program in Iceland consists of vaccinations against diphtheria, pertussis, tetanus, poliomyelitis, *Haemophilus influenzae* type b and pneumococcus at 3, 5 and 12 months, meningococcus C at 6 and 8 months and measles, mumps and rubella at 18 months of age. A booster with diphtheria, tetanus and pertussis is given at age four and again at fourteen years of age combined with poliomyelitis. A booster of measles, mumps and rubella is given at age twelve as well as human papilloma virus vaccine.

To maintain high vaccine coverage, prevent diseases and achieve adequate herd effect, it is important to provide parents with evidence based information on the success of immunisations as well as possible side effects [16–18]. It is our opinion that extensive vaccine uptake and subsequent effective results in reducing vaccine preventable diseases must be founded on good cooperation and mutual agreement between parents and health care professionals, built on sound, evidence based facts. In order to achieve this, knowledge on the general opinion on immunisation is mandatory.

Therefore, a study was conducted on a large cohort in Iceland, evaluating the public opinion on childhood immunisations.

2. Materials and methods

An internet based survey was conducted in Iceland during the winter 2013–2014 to evaluate the public opinion on childhood immunisations. The cohort was divided in three groups: (a) general public (b) employees of the University Hospital Iceland and (c) employees (teachers and staff) of the University of Iceland.

The general public cohort was collected and approached by The Social Science Research Institute of The University of Iceland and was based on a well-defined cohort of almost 5000 individuals in Iceland. The participants were older than 18 years of age, randomly selected from the National Register of Iceland, who had accepted to participate in surveys conducted by The Social Science Research Institute on a regular basis. The composition of this cohort was monitored for gender, age distribution, residency (urban vs. rural), education and household income. Given the very high internet usage in Iceland and the probabilistic nature of the recruitment, the online panel was representative of the population in Iceland and its validity has been repeatedly tested and evaluated [19].

The survey (LimeSurvey®) sent out to employees of the University Hospital and University of Iceland was addressed to all individuals employed at these institutions at the time of the study.

The internet based survey was sent to all these individuals with e-mails and followed up twice for those who had not responded. Questions on immunisation were graded into five categories (very negative, negative, undecided (neither positive nor negative), positive and very positive as well as don't know (unsure) or no answer). The questionnaire consisted of 11 questions on childhood immunisations and trust in the Icelandic health authorities and a few questions to gather background and demographic information. The questions presented in this study are shown in Table 1. Individuals at the University Hospital were also asked about their occupation at the hospital and the department or service where they were employed. Participants at the University of Iceland were asked about their school or faculty within the university and when employed at the School of Health Sciences they were further asked about the faculty (faculty of medicine, nursing etc.).

All answers were anonymous and in our calculation all groups comprising less than 20 individuals weren't evaluated or analysed further.

Table 1
Questions evaluating the public opinion towards childhood immunisations in Iceland. Answers to the questions How positive or negative are you towards the following? were graded into the five categories; very negative, negative, undecided (neither positive nor negative), positive and very positive as well as don't know (unsure) or no answer. For the questions Do you agree or disagree with the following? The answers were similarly graded into the categories strongly agree, agree, undecided, disagree or strongly disagree as well as don't know (unsure) or no answer.

How positive or negative are you towards the following?
-Childhood immunisations in the first year of life according to the Icelandic schedule (diphtheria, pertussis, poliomyelitis and the bacteria *Haemophilus influenzae*, pneumococcus and meningocuccus C)
-Childhood immunisations in the second year of life according to the Icelandic schedule (measles, mumps and rubella)
Do you agree or disagree with the following?
-I would have my child vaccinated according to the Icelandic schedule.
-I trust Icelandic health authorities to decide on the vaccination schedule
-I fear that vaccinations can cause severe adverse effects
-I believe that naturally acquired infections provide better protection against infections than vaccinations

Statistical calculations were done in SPSS (Version 20) using binary multivariable logistic regression to evaluate which variables were associated with the participants' opinion. This method was also used to compare the opinion of different professions within the University Hospital i.e. doctors, nurses and midwifes. Similarly, this method was used to compare different schools within the university. As little difference was established between these groups, the answers were pooled together for statistical calculations in addition to analysing the separate groups.

The study was approved by The National Bioethics Committee (VSNb2014010002/03.11), the authorities of The University Hospital and The University of Iceland and a notification was sent to the Data Protection Authorities in Iceland.

3. Results

The survey was sent out to a total of 10,544 individuals, responses were received from 5584 (53%). The demographics of the participating individuals are described in Table 2

Approximately 95% of participants were "positive" or "very positive" towards childhood vaccinations in the first or second years of life whereas approximately 1% were "negative" or "very negative" (Fig. 1). Males responded more often "very positive" to this question (OR = 1.48, CI95 = 1.23–1.77, $p < 0.001$) as did individuals married or living together (OR = 1.44, CI95 = 1.18–1.76, $p < 0.001$). Being a parent had no significant association with attitudes towards childhood vaccinations in our study.

Compared to the general public, University Hospital employees were more likely to be "very positive" (OR = 3.60, CI95 = 2.78–4.67, $p < 0.001$) as were University of Iceland employees (OR = 2.05, CI95 = 1.45–2.98, $p < 0.001$). Individuals in the general public cohort with household income above the average were also more likely to answer "Very positive" (OR = 1.54, CI95 = 1.12–2.13, $p = 0.008$).

In the three cohorts, 62 individuals of the 5584 responders (1.1%) were "negative" or "very negative" towards vaccinations in the first two years of life. These individuals were more likely to distrust health authorities, feared vaccinations and did not believe that vaccinations prevented infections. This small group was otherwise not distinguishable from the whole cohort in terms of background variables.

When participants were asked whether they would have their child immunized according to the Icelandic childhood vaccination schedule, 95.3% were "positive" or "very positive", 1.2% were "negative" or "very negative" and 3.4% were neither positive nor negative, unsure or did not answer (Fig. 2). Similarly, 92% trust Icelandic