



Vaccine confidence among mothers of young children, Slovenia, 2016

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ABSTRACT

Objectives: We conducted the first nationwide survey in Slovenia to measure and characterise vaccine confidence among mothers of young children. This survey measured confidence in routine vaccines for children <2 years of age and in the information sources about these vaccinations to provide baseline data for public health actions to maintain and improve vaccination coverage.

Methods: We randomly selected women giving birth in 2014–15 from the national perinatal information system (N = 39,497). Participants were asked to rate statements measuring vaccine confidence, including confidence in their child's paediatrician, the Slovenian healthcare system, and different paediatric vaccination information sources. We estimated vaccine confidence with 95% confidence intervals (CI), for seven socio-demographic characteristics for mothers with young children. Spearman's rank correlation coefficient was used to assess correlations between vaccine confidence and the confidence in the health system or child's paediatrician.

Results: We sent out 3854 questionnaires, the response rate was 44.4%. While 46.8% (95% CI: 44.4–49.2%) mothers were confident in vaccines, 34.2% (95% CI: 32.0–36.6%) were undecided. We found a correlation (Spearman's $\rho = 0.457$) between vaccine confidence and confidence in the child's paediatrician. Mothers that were confident in paediatrician were more likely to be confident in vaccines (odds ratio: 7.7; 95% CI: 5.3–11.3). Overall, the most frequently trusted information source were physicians (84.6%). In contrast, among mothers not at all confident in vaccines, 51.9% reported friends as the trusted information source.

Conclusion: More than half of mothers had low vaccine confidence or were undecided regarding their confidence. While vaccination coverage in Slovenia is high, these levels warrant public health intervention, particularly with the undecided mothers. Communication strategies should focus first on undecided parents and involve physicians, who for many are the most trusted vaccine information source. Different approaches will likely be required for those who are not at all confident in vaccines.

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1. Introduction

Vaccines are among the most effective public health interventions available to prevent diseases, sequelae and deaths from infectious diseases [1]. Their effectiveness, availability and affordability are critical, but there must also be parent confidence so that vaccines will be accepted and utilized by the population [2]. In the context of vaccination, confidence implies trust in the vaccine (the product), trust in the vaccinator or other health professional (the provider), and trust in those who make decisions about vaccine provisions (the policy-maker) [3,4].

A high level of public and parental confidence is an important factor for achieving and maintaining the high vaccination coverage

needed to sustain community-level protection against vaccine preventable diseases [4,5]. When confidence is low or lacking, parents are more likely to hesitate, and as such, decide to delay or forego recommended vaccinations [6].

The recognition of the need to support public confidence in vaccinations is growing and has become a focus for different national and international public health organizations and research groups [3,4,6]. H. Larson and colleagues have performed a multi-country survey of confidence in vaccines and immunisation programmes in five countries around the world and found that confidence issues were the primary driver of hesitancy [3]. The World Health Organization's Strategic Advisory Group of Experts on Immunization has called for better monitoring of vaccine confidence and hesitancy to enable the development of communication strategies and other interventions to address confidence gaps, sustain confidence in vaccines and immunization programs and avert the public health

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consequences of a confidence crises [6]. Quantifying vaccine confidence in different population groups, especially parents, is essential if tailored public health actions are to be proposed and appropriately evaluated to deal with a problem that is often country or even region specific [3,7].

Slovenia established a national vaccination program for all children and adolescents, including mandatory (against diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type b, measles, mumps, rubella and hepatitis B) and non-mandatory vaccinations (against human papillomavirus and pneumococcal infections) [8]. Current policy related to mandatory vaccination has been questioned by health care professionals [9], while those in opposition to vaccination among general public demand changes in legislation that would forgo mandatory vaccinations. The National Institute of Public Health (NIPH) is continuously assessing the national and regional childhood vaccination coverage through annual collection of aggregated data from public and private health care providers. High vaccination coverage, above 90–95% range, has been achieved for vaccines included in the national vaccination program in the past decade, with a gradual decline in the last few years. In the last ten years (2006–2015) the national vaccination coverage of Slovenian infants with the first dose of measles, mumps and rubella vaccine dropped from 96.1% to 93.5%, with the lowest coverage 89.6% being observed in the capital city and its surroundings in 2015 [8]. NIPH has observed that parents opposed to the vaccination of their children tend to enroll them in kindergartens and schools with alternative educational programs. This clustering provides pockets of under-immunized children increasing the risk of disease outbreaks [10].

In the last decade, no research has been done in Slovenia to study the attitudes of parents with young children on vaccines and vaccination. Therefore, we have no baseline data to assess the potential impact that changes in the Slovenian vaccination policy could have on vaccination coverage. Considering also the declining trend in vaccination coverage, knowledge on the status of vaccine confidence in Slovenia would offer important insights for public health action [8]. We performed a survey to examine vaccine confidence among mothers of young children in Slovenia.

Nowadays the parents of young children are using different information sources to obtain information about vaccination. While traditionally one of the most important sources for health information was their doctor, the use of other sources for health information, such as Internet, has increased. Government agencies and professional organizations also play an important roles as information sources [5]. Assessing the trust in information sources about vaccinations among parents is needed while planning communication strategies to address vaccine confidence gaps.

We conducted the first nationwide survey to measure and characterize vaccine confidence among mothers of children <2 years old in Slovenia to assess (1) vaccine confidence; (2) socio-demographic correlates of vaccine confidence; and (3) the relationship vaccine confidence has with confidence in different sources of information about paediatric vaccinations. Together, these assessments provide the baseline data needed to guide tailored public health actions aimed at maintaining and improving vaccination coverage.

2. Methods

2.1. Study population

We conducted a cross-sectional survey among women registered in the Perinatal Information System of the Republic of Slovenia database (a medical register collecting data on all deliveries and births in Slovenia), who gave birth during the years 2014–15

($N = 39,497$). Exclusion criteria were having a stillborn child, giving birth several times during the defined timeframe, citing a place of residence recorded outside Slovenia or not having a recorded place of residence. We calculated the sample size so that we could estimate the overall proportion of vaccine confidence with 2.5% absolute accuracy within 95% confidence interval with the expected proportion of vaccine confidence of 50%, and adjusted the sample size for study response of 35% and excluded women of 5%. Women were selected for the sample by simple random sampling.

2.2. Data collection

Data for the current analysis were collected from April 2016 to June 2016 as a part of a large interdisciplinary study project about vaccination scepticism in Slovenia. In April 2016, invites and questionnaires were sent out by mail, offering the possibility to anonymously reply by prepaid envelope or online by web created questionnaire. A reminder was sent to all addresses after one week. We developed the questionnaire after reviewing the literature and discussing the questionnaire with an interdisciplinary group of experts within the project group. Using qualitative interviews with 10 women fulfilling the inclusion criteria we pilot-tested the questionnaire for clarity, length and face validity. Participants were asked the extent to which they agreed with three statements “I have complete confidence in vaccination and vaccines”, “I have complete confidence in the Slovenian health system” and “I have complete confidence in my child’s pediatrician”. Responses were scored on with a five-point scale: completely disagree, mostly disagree, neither disagree nor agree, mostly agree and completely agree. To assess their trust in different sources of information about pediatric vaccinations (physician, nurse, preschool teacher, teacher, TV or radio, friends or acquaintances, websites, online forums, social networks, NIPH and Ministry of health) each participant was asked to rate their confidence on a five-point scale (not confident at all, mostly not confident, neither not confident nor confident, mostly confident, completely confident). In addition to those responses, individual participant’s age, number of children, marital status, education level, social class, region of residence and size of residence place were recorded.

2.3. Statistical analysis

Statistical analyses were performed using the STATA package version 12.1 (Stata Statistical Software: release 12.1 College Station, TX: Stata Corporation) and R (A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria). We estimated the overall proportion of vaccine confidence with 95% confidence intervals (CI). For examining associations between vaccine confidence and collected explanatory variables (socio-demographic factors or specific information sources about pediatric vaccinations) the responses to statement on confidence in vaccination and vaccines were dichotomized so that participants who completely agreed or mostly agree were coded as confident (“1”) and participants who neither disagree nor agree, mostly disagree or completely disagree, were coded not confident (“0”) in order to compare participants with positive sentiment toward vaccines against participants with no positive sentiment. The responses to statements about trust in specific information sources about paediatric vaccination were dichotomized into confident (completely confident, mostly confident) versus not confident (not at all confident, mostly not confident, neither not confident nor confident) respectively. Possible associations between vaccine confidence and collected explanatory variables were explored in univariate analyses by calculating odds ratios (OR) with 95% CI estimates, Pearson’s chi-square tests and *t*-test for significance. Spearman’s correlation coefficient was used

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