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Adolescent confidence in immunisation: Assessing and comparing attitudes of adolescents and adults

Bing Wang MPhil(Public Health)[a,b,c,d,*], Lynne Giles PhD[c], Hossein Haji Ali Afzali PhD[c], Michelle Clarke MPhil(Public Health)[d], Julie Ratcliffe PhD[e], Gang Chen PhD[f], Helen Marshall MD[a,b,c,d]

[a] The Robinson Research Institute, University of Adelaide, South Australia, Australia
[b] School of Medicine, University of Adelaide, South Australia, Australia
[c] School of Public Health, University of Adelaide, South Australia, Australia
[d] Vaccinology and Immunology Research Trials Unit (VIRTU), Women's and Children's Hospital, South Australia, Australia
[e] Flinders Health Economics Group, School of Medicine, Flinders University, South Australia, Australia
[f] Centre for Health Economics, Monash Business School, Monash University, Victoria, Australia

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ABSTRACT

Introduction: There is limited knowledge of adolescent views and attitudes towards immunisation. Our study investigated adolescent attitudes to immunisation and compared differences in vaccination attitudes between adolescents and adults.

Methods: This study was a cross-sectional, national online survey. Recruitment was stratified by state and gender to ensure findings were nationally representative. Regression analyses were performed to assess and compare adolescent and adult views on vaccine benefits, community protection, risks, side effects, sources of information, and decision-making preference.

Results: In 2013, 502 adolescents and 2003 adults completed the online survey. Lower levels of vaccine confidence were observed in adolescents with adolescents less likely to believe vaccines are beneficial and/or safe compared to adults ($p = 0.043$). Compared to females, males were less confident of vaccine benefits ($p < 0.05$) but less concern about vaccine side effects ($p < 0.05$). Adolescents were more concerned about vaccine side effects than adults for pain ($p < 0.001$), redness or swelling ($p < 0.001$), and fever ($p = 0.006$). Adolescents were less likely than adults to consider health professionals ($p < 0.001$) and the media (e.g. internet) ($p = 0.010$) as important sources of information, and were more likely to seek information from social networks ($p < 0.001$) including families and schools. Although 62.0% of adolescents agreed that parents should make the decision about vaccination for them, adolescents were more likely to prefer a joint decision with parents ($p < 0.001$) or by themselves ($p = 0.007$) compared with adults.

Conclusion: Adolescents have a lesser understanding of vaccine safety and benefits than adults and have higher concerns about potential vaccine reactions. Improving adolescent awareness and knowledge of the benefits and risks of vaccination through school-based educational programs may improve confidence in and uptake of vaccines for adolescents and increase vaccine confidence in the next generation of parents.

1. Introduction

Adolescent immunisation programs have expanded substantially in developed countries over the last decade with inclusion of publicly funded vaccines such as human papillomavirus (HPV), varicella, hepatitis B, pertussis, and meningococcal vaccines. The success of immunisation programs relies on high coverage rates to protect vaccinated individuals and the community [1]. In countries such as the United States of America (USA) and Australia, although 'fully immunised' coverage rates are high, these figures

Abbreviations: ANOVA, Analysis of Variance; CI, Confidence Interval; EU, European Union; GP, General Practitioner; HPV, Human Papillomavirus; OR, Odds Ratio; RRR, Relative Risk Ratio; SEIFA, Socio Economic Index for Areas; USA, United States America.

* Corresponding author at: Vaccinology and Immunology Research Trials Unit (VIRTU), Women's and Children's Hospital, South Australia, Australia.

E-mail addresses: bing.wang@adelaide.edu.au (B. Wang), lynne.giles@adelaide.edu.au (L. Giles), hossein.hajialiafzali@adelaide.edu.au (H.H.A. Afzali), michelle.clarke@adelaide.edu.au (M. Clarke), Julie.ratcliffe@health.sa.gov.au (J. Ratcliffe), gang.chen@monash.edu (G. Chen), helen.marshall@adelaide.edu.au (H. Marshall).

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obscure the lower vaccination rates in population sub-groups including adolescents with adolescent immunisation uptake considerably lower for publicly funded vaccines (40–80%) than childhood immunisations (90–95%) [2,3]. This may be because immunisation coverage for young children (e.g. children aged under 10 years) is strongly correlated to parental decisions, while evidence shows that adolescents are more likely to establish their vaccine-related attitudes independently of their parents and hence differ from their parent's attitudes [4–6]. As adolescents are a target group for current and future immunisation programs, evaluating their awareness and knowledge of vaccination is an important priority. Identifying perceived barriers can lead to the development of more effective adolescent immunisation policies aiming to improve uptake.

Previous research has focused on individual vaccines or parental views, showing that parental perception of disease susceptibility and severity, vaccine safety, side effects, lack of vaccine and disease knowledge, multiple injections at a single visit or being confused about the immunisation schedule, could influence parental decisions to accept, refuse or delay vaccination for their children [4,7–12]. Reasons for low uptake of adolescent routine immunisations are poorly described in the literature apart from HPV and influenza vaccines [4,5,8,13–21]. The aim of our study was to identify adolescent views about immunisation and how they differed from adults' views. We also aimed to identify the barriers and facilitators which may influence receipt of recommended vaccines in adolescents now and in the future as potential parents.

2. Methods

2.1. Study design and population

We undertook a national online survey which comprised a series of attitudinal statements relating to views about vaccination.

We aimed to enrol 500 adolescents and 2000 adults (50% with children aged <18 years) in Australia with state and gender stratification to ensure findings were nationally representative. Details of sample size determination and stratification were reported in a previous publication [22]. All participants were recruited through an online panel company, Pureprofile. Parents who registered on the Pureprofile database were contacted and study information was provided if their child was willing to complete the survey and parental consent and adolescent assent was obtained for them to participate in the study. Following parental consent, the parents were asked to turn the computer over to their adolescent child and the adolescent was then guided through the online survey. Independent Pureprofile account holders were approached to recruit potential adult participants and adolescent participants separately. Prior to survey commencement, a pilot study was completed in March 2013 and results were reviewed to assess questionnaire completion. Since no revisions to the questionnaire were required, the pilot data were included in the final analysis.

2.2. Survey tool

A series of survey questions relevant to vaccination (Fig. 1): (1) vaccine benefits, (2) herd immunity/community protection, (3) vaccine risks, (4) side effects, (5) sources of vaccination information, and (6) vaccination decision-making preferences were presented on-line and distributed to participants. For questions on vaccine benefits participants could nominate highly, moderately, slightly, none at all or uncertain. Concerns about vaccine side effects were measured on an eleven point scale, where 0 was no concern and 10 was extremely concerned. For the survey question regarding main sources of information, although participants were asked to rank sources in order, the top ranked source was considered as the primary source and therefore each source was re-coded into two categories: "Yes, the most important source" or "No, not the most important source". The frequency of the primary source was counted for the analysis.

2.3. Predictor variables

The variables were selected on the basis of prior research findings and a literature review of vaccination coverage and attitudinal studies [23–26]. Socio-demographic variables including age, gender, household size, socio-economic status and area of residence (rural or metropolitan) were obtained from participants. For the purpose of comparison, participant age was coded into two categories: 15–17 years (adolescents) and $\geqslant$18 years (adults). The levels of socio-economic status were measured by the Socio Economic Index for Areas (SEIFA) Index of Relative Socio-economic Disadvantage and categorised into tertiles: low (1st–33rd percentile), medium (34th–66th percentile) and high (67th–100th percentile) [27].

2.4. Data analysis

Descriptive results were reported according to socio-demographic characteristics with mean values and standard deviations for continuous variables and percentages for categorical variables. Student's *t*-tests, analysis of variance (ANOVA), and χ^2 tests were performed to assess differences in group means and proportions, as appropriate.

Ordinal logistic regression was used in analyses of vaccine benefits, community protection and vaccine risks, as these outcome measures were assessed on an ordinal scale (e.g. from "not at all/uncertain" to "high"). Since lower levels of vaccine confidence have been observed to be associated with higher levels of hesitancy [24,28–30], the first three survey questions were used to predict participants' vaccine hesitancy. If participants showed lack of vaccine confidence in at least two of three statements, for example, describing vaccines were slightly beneficial, denying vaccine benefits, believing vaccines were not important in protecting the community, reporting vaccines were moderately to highly risky or being uncertain, those participants were considered to be vaccine hesitant. Multivariable logistic regression was performed to assess overall vaccine hesitancy.

The responses to concerns about potential reactions to vaccination (on a 0–10 scale) were treated as continuous outcome variables. Relationships between predictor variables and the vaccine concern variables were investigated using multivariable linear regression. Adjusted regression coefficients (β) were reported from these linear regression analyses. β, the estimator of the slope coefficient, represents the average change in an outcome variable for every unit change in a predictor variable, holding all other variables constant. Each main source of information about vaccines was coded as a binary outcome variable and analysed in a separate multivariable logistic regression model. Predictor variables of vaccine decision-making preference were assessed using multinomial logistic regression. Predictor variables with a p-value < 0.2 in the univariate analysis were selected for multivariable models along with other variables of known research importance [31].

All statistical analyses were performed using Stata version 12 (Stata Corp, College Station, TX) [32]. Predictor variables with a p-value < 0.05 were considered statistically significant in final regression models.

This study was approved by the Women's and Children's Health Network Human Research Ethics Committee in Adelaide, South Australia, Australia.

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