

Effects of a web based decision aid on parental attitudes to MMR vaccination: a before and after study

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Abstract

Objective To determine whether an evidence based decision aid on the measles, mumps, and rubella (MMR) vaccine changed parents' attitudes towards vaccination.

Design Before and after study.

Setting Website promoted through search engines and online parenting and health websites.

Participants 158 people completing online questions out of 1277 who accessed the website.

Intervention Evidence based decision aid with text and graphical representation of the possible outcomes of measles, mumps, and rubella diseases compared with MMR vaccination.

Main outcome measures Attitudes towards MMR vaccination.

Results Significantly more participants indicated they were "leaning towards" vaccination after using the decision aid (39% before *v* 55% after, $P < 0.001$). Compared with those who were undecided or "leaning away from" vaccination after using the decision aid, participants "leaning towards" it were more likely to strongly value its potential to protect their children from the serious side effects of disease (98% *v* 84%) and other children who could not be vaccinated for medical reasons (68% *v* 25%). Participants with an unfavourable attitude to vaccination were more likely to be very concerned about the rare side effects of vaccination (78% *v* 57%), have residual concerns about autism and bowel disease (78% *v* 27%), and anticipate guilt should their child have an adverse reaction (77% *v* 50%). Those with a positive attitude to vaccination after using the decision aid were also more likely to feel well informed (83% *v* 48%).

Conclusions A web based decision aid significantly improved parental attitudes to MMR vaccination. Residual concerns about autism and bowel disease and the rare chance of serious complications remained as attitudinal barriers to some parents.

Introduction

There have been concerted efforts to address concerns about the measles, mumps, and rubella (MMR) vaccine with brochures, fact sheets, and websites. Yet there is only limited evidence that providing didactic information has changed attitudes. Parents believe information to be inadequate, biased, or inaccurate and routinely request more information.¹⁻⁴

Decision aids are designed to help people understand their options and potential outcomes, consider possible benefits and harms, and increase consumer participation in decision making.⁵ They typically include probabilistic information in numerical and graphical format, information about the potential outcomes of each choice, and exercises to clarify values. Decision aids have been shown to reduce decisional conflict, improve knowledge, and change behaviours.⁵ However, few studies have applied them to immunisation, and none to MMR vaccination.

We report on a pilot study of an interactive, web based decision aid for parents questioning MMR vaccination. Our primary interest was whether the decision aid could improve attitudes to MMR immunisation. The internet provides a previously unexplored environment for assessing this. Firstly, it may capture those who do not usually approach their healthcare provider until the immunisation decision has been made. Secondly, parents navigating cyberspace routinely encounter competing, controversial, and emotive information on which to base their decisions. Finally, the online format allows the aid to be interactive and enables collection of data from respondents.

Methods

Decision aid development

This pilot MMR decision aid was designed to comply, as much as possible, with the criteria defined by the Cochrane Review of Decision Aids.^{5,6} The aid provided numerical and graphical evidence of the risks associated with the diseases, alongside the potential risks associated with the vaccine, and provided references for these estimates. We used Australian data where possible, supplemented with evidence from large international epidemiological studies, systematic reviews, and meta-analyses.

Frequently asked questions were addressed, including information about the alleged association between autism and MMR vaccination. The aid listed some key advantages and disadvantages of MMR vaccination, and users were asked to rate the importance of these on a three point scale ("Very important to me," "Slightly important to me," and "Not important to me"). Users were asked to rate their attitudes to MMR vaccination, both before using the decision aid and again afterwards, on a three point scale ("Leaning away from MMR vaccination," "Undecided," and "Leaning towards MMR vaccination"). After using the decision aid, users' information requirements for decision making were assessed.

We consulted a range of stakeholders about content, design, and layout. The aid was located via the website of the Australian National Centre for Immunisation Research and Surveillance at www.ncirs.usyd.edu.au/decisionaid (see bmj.com for sample screens).

Recruitment

The decision aid was advertised on a popular parenting website and a small number of government and parent-friendly websites, mainly in Australia and New Zealand. It went live on 20 April 2004, and data collection closed on 31 January 2005.

Study design and outcomes

Respondents had open access to the decision aid, which was designed for sequential movement through its 21 screens but with the option to move to any



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section via a menu. Respondents completed online questions in a stepwise fashion using radio buttons and free text but could proceed without completing questions if they chose. At the end of the aid, respondents were asked to complete demographic details. Using a before and after design, the primary outcome was change in attitude towards the MMR vaccine.

Data analysis

Respondents' attitudes were coded as 1 for "leaning away from," 0 for "undecided," and 1 for "leaning towards" vaccination. We calculated respondents' mean score before and after they viewed the aid, and assessed whether the change in these scores was significant. We identified the number of people who were less favourably or more favourably disposed to the MMR vaccine after using the aid, and the number whose opinion was unaltered.

We dichotomised respondents' perceived importance of the advantages and disadvantages of MMR vaccination as "very important" or other ("slightly important" and "not important" combined). We compared ratings for each advantage and disadvantage with respect to whether respondents were leaning towards MMR vaccination, staying undecided or leaning away from vaccination after viewing the decision aid. We measured whether people with favourable and unfavourable attitudes to MMR vaccine perceived that their information needs had been met.

Results

Respondents' characteristics

A total of 1277 people accessed the site, with 158 completing the aid by providing responses to set questions. Of these, 62 (39%) supplied demographic information: 55 were parents, 52 with children aged less than 5 years; 53 were aged between 25 and 44 years; and 39 had a university degree. In addition, 42 were from Australia, with the remainder from New Zealand, the US, UK, Canada, Europe, and Asia.

Attitudes to MMR before and after decision aid

The table shows that 48 respondents shifted in a positive direction towards MMR vaccination after using the decision aid, and the proportion "leaning towards" MMR vaccination increased significantly from 61 (39%) before using the aid to 87 (55%) afterwards ($P < 0.0001$).

Beliefs about MMR vaccination

Participants with a positive attitude towards MMR vaccination were more likely to perceive all of the listed advantages of MMR as important to them than those who remained "undecided" or were "leaning away from" vaccination. They were also less likely to perceive rare but serious side effects of vaccination as being important and were less likely to have residual concerns about autism and bowel disease (see bmj.com).

The most important perceived advantage of MMR vaccination among those with a positive attitude was protection against the serious symptoms of measles, mumps, and rubella (98% rated this as "very important," compared with 84% of those with a negative or undecided attitude). Other advantages they considered very important were the protection of other children who could not be vaccinated for medical reasons (68%, versus 25% of those with negative or undecided attitudes) and protection against common symptoms of measles, mumps, and rubella (63%, *v* 30%).

Changes in attitudes to MMR vaccination among 158 respondents after use of a web based MMR decision aid. Values are numbers of respondents

Attitudes to vaccination before using decision aid	Attitudes to vaccination after using decision aid*		
	"Leaning away from" (n=30)	"Undecided" (n=41)	"Leaning towards" (n=87)
"Leaning away from" (n=42)	22†	15‡	5‡
"Undecided" (n=55)	5§	22†	28‡
"Leaning towards" (n=61)	3§	4§	54†

*Wilcoxon's matched pairs signed ranking test for change in preference was significant ($Z = -4.07$, $P < 0.0001$).

†Participants whose opinion remained unaltered (n=98).

‡Participants more favourably disposed to MMR vaccination after using the decision aid (n=48).

§Participants less favourably disposed to MMR vaccination after using the decision aid (n=12).

Participants who remained undecided or "leaning away from" vaccination after using the aid were more likely to consider the disadvantages of MMR vaccination as very important, particularly the chance of rare but serious complications (78%, *v* 57% of those "leaning towards" vaccination), residual concerns about autism and bowel disease (78%, *v* 27%), and fear of feeling guilty or responsible should their child have an adverse reaction (77%, *v* 50%). Other reasons included concern over mercury in vaccines, interest in alternative types of disease prevention, family experience of serious complications (including autism and inflammatory bowel disorders), and previous adverse reactions.

Among all respondents, perceived disadvantages of MMR vaccination included the unproved link between MMR vaccination, bowel disease, and autism (50% considered it "very important") and the potential for feelings of guilt or responsibility if harm occurs as a result of MMR vaccination (62% "very important").

Information needs for decision making

Respondents who were "leaning towards" MMR vaccination after using the decision aid were more likely to feel that they knew their options and that they had enough information to make a decision. Of those who remained undecided or were leaning away from vaccination, most (78%) said that they knew their options, but 52% still felt that they didn't have enough information to make a decision or remained unsure. Among all respondents, 32/147 (22%) remained negative towards vaccination despite feeling well informed.

Discussion

This pilot study shows that an evidence based decision aid significantly improved parental attitudes towards MMR vaccination. Respondents who remained undecided or negative towards vaccination were more likely to have concerns about adverse reactions to the vaccine and residual concerns about autism and bowel disease despite a balanced presentation of the evidence. Valuing protection against the common symptoms of measles, mumps, and rubella and feeling well informed were factors in having positive beliefs about MMR vaccination.

Internet based recruitment makes it difficult to estimate how representative our respondents were of the general population of those questioning MMR. However, 61% of those stating their initial preferences were either "leaning away from" or "undecided about" MMR vaccination, indicating that the aid was successful in attracting the target audience. The large number of respondents from other countries where the site was not promoted and the high hit rate show the potential impact of the decision aid.

What is already known on this topic

Some parents have strong concerns over an unsupported link between MMR vaccine and autism

Interventions to address parental concerns are largely didactic, and few studies have examined their effectiveness

What this study adds

An online interactive decision aid improved parents' attitudes to MMR vaccination

Decision aids have the potential for wider application in providing advice about immunisation

The findings indicate that many users had attitudes inconsistent with the best available evidence, even after completing the decision aid. This supports previous findings that parents can be more strongly influenced by perceived responsibility and anticipatory regret than by a numerical assessment of the risks and benefits of immunisation.^{7 8} It also supports findings that parents withhold vaccinations because a risk from a known disease may be more acceptable than a smaller risk of ambiguous or unknown consequences.⁹

Limitations of study

Users were not compelled to provide their demographic details so there is potential for selection bias from the low response rate. This may also have arisen from the length of the aid. In addition, only 52 of the respondents reported having children of vaccination age, limiting the generalisability of our results. Online data collection still has promise if loss to follow-up can be minimised.

Future work

The aid could be adapted to be more interactive, with more in depth evidence layered according to parents' information needs. A randomised controlled trial might then allow methodological limitations to be addressed, and see whether the aid reduced decisional conflict and improved the timeliness and completion of MMR vaccination.

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Promotion to hospital consultant: regression analysis using NHS administrative data

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Abstract

Objectives To examine factors influencing promotion to hospital consultant.

Design Multivariate logistic regression analysis of NHS administrative data between 1991 and 2000.

Setting Hospitals in NHS Scotland.

Population All registrars, senior registrars, and specialist registrars in Scotland.

Main outcome measure The proportion of doctors promoted to NHS consultant.

Results Compared with doctors who graduated in Scotland, graduates from the rest of the United Kingdom and from overseas were less likely to be promoted to consultant (odds ratio 0.65, 95% confidence interval 0.52 to 0.82; and 0.37, 0.28 to 0.50, respectively). Promotion and holding an honorary contract before promotion were positively associated (1.37, 1.03 to 1.83); and the number of

years since graduation (5.98 per year, 4.94 to 7.23). Women were less likely to be promoted (0.73, 0.60 to 0.90), as were doctors who worked part time (0.27, 0.17 to 0.42). Probabilities of promotion did not have a clear time trend between 1993 and 2000, and NHS boards in non-metropolitan areas of Scotland were more likely to offer promotions than NHS boards in metropolitan areas, presumably reflecting a higher gap between demand and supply in these boards. **Conclusion** As the proportion of women in hospital medicine increases, government targets for the recruitment of consultants are unlikely to be met unless the promotion process is examined. It is unclear whether more recent reforms of the medical career structure will deal with these issues.

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