

Childhood swine flu vaccination uptake in a Welsh general practice:

a prospective study

Abstract

Background

Immunisation of infants is effective and benefits the health of the children immunised as well as the community where uptake is high. Any social inequality in uptake will worsen any social inequalities that already exist.

Aim

To investigate the demographic characteristics of families attending for swine flu vaccination.

Design and setting

A prospective study in a semi-rural general practice in South Wales.

Method

Data were collected by questionnaire, and logistic regression models were used to test for associations between potential risk factors (including family demographic characteristics and the child's previous vaccination history) and swine flu vaccination uptake.

Results

No evidence was found of any significant associations between potential risk factors and the outcome.

Conclusion

This suggests that social inequality did not affect vaccination uptake in this sample.

Keywords

case control studies; child; health promotion; humans; immunisation; infant; influenza; primary care; Wales.

INTRODUCTION

Vaccination scares in recent years have caused a decline in the uptake of some vaccinations, and social inequality has been linked to poor vaccination uptake.

Swine flu (H1N1) was defined as a pandemic on 11 June 2009. At the end of 2009, the vaccination programme was extended to include children aged 6 months to 5 years. However, by the beginning of 2010 the caseload attributable to swine flu had reduced considerably and the disease in the UK proved to be relatively mild.

Immunisation of infants is effective and benefits the health of the children immunised, as well as the community where uptake is high. Any social inequality in uptake will worsen any social inequalities that already exist.

Primary healthcare workers are very aware of the concerns of parents regarding the expanding vaccination programme, and their attitudes to vaccination safety, as reported in the media.¹ This study aimed to investigate the demographics of families who choose to attend or not attend for vaccination.

The setting was a semi-rural general practice in South Wales, with approximately 12 000 patients. There is a diverse economic population but it is of mainly white Caucasian ethnicity.

METHOD

A computer search was carried out to identify children in the age group defined (6 months to 5 years, inclusive), and letters were sent out to parents of all eligible

children inviting them to attend open-access clinics for the purpose of administering the influenza vaccination. At the clinic a questionnaire was given out to the parents to complete prior to the vaccination being given (a copy of the questionnaire is available on request from the first author).

Once all the clinics had finished, non-attenders were identified and a questionnaire posted to them for completion.

Postcodes of households included in the study were used in conjunction with the 2008 Welsh Index of Multiple Deprivation (WMID) to assign a WMID score for each household. The WMID 2008 is made up of eight different kinds of deprivation (income, employment, health, education, housing, access to services, environment, crime/fire). The higher the number, the more deprived the area. Data were sourced from the Welsh Assembly Government.²

Outcome

The outcome under investigation in this study was the vaccinated status of the child (vaccinated/unvaccinated), following an invitation to the parents to bring the child to an open clinic for the purposes of receiving a vaccine against swine flu.

Cases were defined as those children who were vaccinated. Controls were defined as those children who were not vaccinated.

Potential risk factors

Data relating to the potential risk factors

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How this fits in

Childhood vaccination programmes have improved the health of children. There is debate as to whether there is equality in access to health care, and other studies have shown that households with lower income were less likely to take up offers of services available. This study showed that even when vaccination uptake was low there was no difference in the demographic characteristics of those accessing the vaccinations.

detailed in Table 2 were collected from the questionnaire.

Statistical analysis

To assess whether a significant association existed between WIMD scores and the decision as to whether or not to vaccinate the child against swine flu, χ^2 analysis was used.

Potential risk factors were tested for association with vaccination status, using univariable logistic regression models. The statistical package Egret[®] was used for data analysis. All variables with a univariable *P*-value <0.2 were considered for inclusion in a multivariable model, which was built using the technique of backward elimination. Variables were retained in the model if they were shown to improve the fit of the model significantly, by assessing the change in deviance, (assuming the change in deviance follows a χ^2 distribution with *n* degrees of freedom, where *n* is the number of extra parameters fitted).

Power of the study

The study had 80% power to detect odds ratios of 3.0 or more, based on a 0.05 probability of a type 1 error (95% confidence interval), at the observed ratio of cases:controls, and assuming that 15% of controls were exposed to risk factors (Epi-Info[™] 6).

Statistical significance was set at *P*<0.05.

RESULTS

From the practice computer search, 707 children were identified as eligible for swine flu vaccination in January 2010. Of these, 239 (34%) attended for vaccination, and of those attending, 209 (87%) completed a questionnaire.

The remaining 468 children did not attend for vaccination. Parents of a random selection of 200 children were sent questionnaires and 58 returned completed questionnaires (29% response).

Investigation of the relationship between household WIMD 2008 scores and the decision as to whether or not to vaccinate was conducted using a χ^2 test of all households included in the study, and therefore included a larger sample of households whose children were not vaccinated (Table 1). No significant relationship between the two variables was found (*P*=0.32).

To examine for potential response bias within the control (unvaccinated) group, practice records were used to compare the sex, maternal age, paternal age, and age of child of responders and non-responders. Older mothers (≥ 30 years) were significantly more likely to complete and return the questionnaire than younger mothers (χ^2 analysis, *P*=0.02); however, no other significant differences (*P*>0.20) were found between the two groups (data not shown).

Those who did attend raised concerns over vaccine safety, as did those who did not attend for vaccination. The most common reasons given by parents who stated why they had not elected to vaccinate their child were:

- vaccination safety: 18 out of 58 (31.0%);
- considered the vaccine to be unnecessary: 9 out of 58 (15.5%); and
- concerns about vaccination side effects: 6 out of 58 (10.3%).

The results of the univariable analysis (Table 2) provided no evidence of an

Table 1. Relationship between vaccination status and Welsh Index of Multiple Deprivation (WIMD) Score

WIMD score	Number (%) of cases (children who were vaccinated), <i>n</i> = 204	Number (%) of controls (children who were not vaccinated), <i>n</i> = 503
6.07–8.20 (least deprived)	49 (24.0)	104 (20.7)
8.21–8.80	48 (23.5)	121 (24.0)
8.81–10.50	36 (17.6)	112 (22.3)
10.51–17.00	38 (18.6)	106 (21.1)
17.01–38.00 (most deprived)	33 (16.2)	60 (11.9)

association between the potential risk factors and the outcome under investigation in this study. However, a trend was evident for children living in the areas of greatest deprivation (indicated by the highest WIMD 2008 values) to be more likely to be vaccinated against swine flu. In addition, a larger sample size might be warranted to investigate the effect of maternal and paternal age on swine flu vaccine uptake, as there was a trend for parents aged 30 years or more to be less likely to have their children vaccinated

against swine flu. A multivariable model could not be constructed, as two or more of the four variables with *P*-values <0.20 in the univariable analysis did not retain significance in a multivariable model.

DISCUSSION

Summary

Equal access to health care is imperative and is the aim of healthcare providers. Childhood immunisation is an effective healthcare activity, and uptake ideally should be high and equal between social

Table 2. Univariable logistic regression analysis of risk factors for 'swine flu uptake' for children aged 6 months to 5 years, in a Welsh general practice, 2010

Variable	Number (%) of cases (children who were vaccinated), <i>n</i> = 209	Number (%) of controls (children who were not vaccinated), <i>n</i> = 60	Odds ratio	95% CI	<i>P</i> -value
Fully vaccinated^a					
Yes ^b	206 (98.6)	59 (98.3)	1.00		
No	3 (1.4)	1 (1.7)	0.86	0.09 to 8.41	0.90
Contacted surgery with swine flu concerns in last 9 months					
Yes ^b	30 (14.4)	9 (15.0)	1.00		
No	179 (85.6)	51 (85.0)	1.05	0.47 to 2.36	0.90
Family member received swine flu vaccination?					
Yes ^b	80 (38.8)	17 (28.3)	1.00		
No	126 (61.2)	43 (71.7)	0.62	0.33 to 1.17	0.14
Paternal age					
<30 years ^b	36 (17.6)	5 (8.3)	1.00		
≥30 years	168 (82.4)	55 (91.7)	0.42	0.16 to 1.13	0.09
Maternal age					
<30 years ^b	56 (26.9)	9 (15.0)	1.00		
≥30 years	152 (73.1)	51 (85.0)	0.48	0.22 to 1.04	0.06
Marital status					
Married/cohabiting ^b	187 (89.5)	57 (95.0)	1.00		
Separated/divorced/single	22 (10.5)	3 (5.0)	2.24	0.65 to 7.74	0.20
Income					
<£25 000 ^b	32 (17.3)	7 (13.2)	1.00		
£25 000–45 000	65 (35.1)	15 (28.3)	0.95	0.35 to 2.56	
>£45 000	88 (47.6)	31 (58.5)	0.62	0.25 to 1.55	0.38
Sex					
Male ^b	101 (48.3)	25 (48.1)	1.00		
Female	108 (51.7)	27 (51.9)	0.99	0.54 to 1.82	0.97
Welsh index of multiple deprivation^c					
6.50–8.20	51 (24.9)	9 (19.1)	1.00		
8.21–8.80	48 (23.4)	17 (36.2)	1.87	0.59 to 5.96	
8.81–10.50	36 (17.6)	11 (23.4)	1.01	0.31 to 3.30	
10.51–17.00	38 (18.5)	8 (17.0)	1.26	0.33 to 4.74	
17.01–38.00	32 (15.6)	2 (4.3)	0.47	0.10 to 2.34	0.50
Welsh index of multiple deprivation^b					
6.50–17.00	173 (84.4)	45 (95.7)	1.00		
17.01–38.00	32 (15.6)	2 (4.3)	4.16	0.96 to 18.02	0.06
Age categories, months					
<21 ^b	44 (21.1)	10 (19.2)	1.00		
21–30	42 (20.1)	9 (17.3)	1.06	0.39 to 2.87	
31–40	40 (19.1)	10 (19.2)	0.91	0.34 to 2.41	
41–50	31 (14.8)	10 (19.2)	0.70	0.26 to 1.90	
51–61	52 (24.9)	13 (25.0)	0.91	0.36 to 2.27	0.95
Age (continuous variable)			0.998	0.98 to 1.02	0.85

^aFully vaccinated: the child had received all other routine non-swine flu vaccinations. ^bReference category. ^cWelsh index of multiple deprivation (WIMD). Some missing data existed, hence fewer cases and controls were available for analysis of this variable.

groups. Previous studies have shown the existence of social inequalities in immunisation uptake,³ where uptake is lower in deprived areas compared to more affluent areas. The present study aimed to investigate this in the authors' area by introducing a new vaccine.

The results of this study provided no evidence for an association between social deprivation and swine flu vaccine uptake among the children of families included in this study.

The study is encouraging for those seeking to reduce inequalities in health. It shows that the invitation for vaccination and the health promotion campaign surrounding the vaccination programme made some impact on all demographic groups and encouraged a similar, but low, proportion of all groups to attend for vaccination.

Strengths and limitations

The study was limited by sample size and hence the power of the study. It would be useful to expand on this by looking at a larger population with greater ethnic diversity. It was also restricted to only one practice, which limits the generalisability of the study. The strengths of the study are that a self-completed questionnaire was used, with no interviewer bias, and that a high response rate was achieved within the group of patients attending for vaccination. Practice records were used to test for response bias due to the low response rate within the non-attenders.

Comparison with existing literature

This study does not support other findings where wealth and ethnicity were linked to attendance at health promotion and screening appointments.⁴ It is possible that the study sample was not large enough to detect these differences, and further studies would be useful.

The concerns raised by parents not attending for vaccination were similar to

those identified in other recent surveys published on NHS websites. Vaccination safety and concerns regarding side effects are common worries for parents, as highlighted by the many vaccine scares in the past 15 years, including measles mumps and rubella (MMR)⁵ and thiomersal⁶ components in vaccines.

The vaccination decision is primarily a function of parental assessments of the relative acceptability and likelihood of possible outcomes. While GPs are trusted sources of information, this is limited, and a qualitative study in Durham has shown that practitioners need to use collaborative approaches to aid information exchange, aiming to transform rather than supplant existing parental knowledge as part of an ongoing learning process, to improve vaccination uptake.⁷ Communicating risk effectively is an important part of general practice, and is much more than providing the best information. It is a matter of involving the patient or family in decision making and negotiating.⁸

Implications for practice and research

It is reassuring that this vaccination programme reached all sections of the population, but the uptake of the vaccine was only 34% of eligible children (this is higher than the national average of 27% across Wales). It is worth considering how the uptake could have been improved. At the individual level, efforts to persuade parents who have deep-seated objections are generally unsuccessful.⁹ At the population level, sociological research has highlighted that organised parental groups find empowerment from taking personal responsibility for health and decision making.¹⁰ Using collaborative approaches and strategies to communicate risk effectively, and targeting these strategies to the different groups of people who contribute to low immunisation coverage, will achieve the best possible control of vaccine-preventable diseases.

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Ethical approval

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Provenance

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Competing interests

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REFERENCES

1. NHS Choices. *Swine flu vaccine uptake*. www.nhs.uk/news/2009/11November/Pages/Swine-flu-vaccine-uptake.aspx [accessed 9 Jun 2011].
2. Welsh Assembly Government. *Welsh Index of Multiple Deprivation 2008*. <http://wales.gov.uk/topics/statistics/theme/wimd/2008/?lang=en> [accessed 9 Jun 2011].
3. Reading R, Colver A, Openshaw S, Jarvis S. Do interventions that improve immunisation uptake also reduce social inequalities in uptake? *BMJ* 1994; **308(6937)**: 1142.
4. BMJ Group. *Wealth and ethnicity linked to whether women have breast and cervical screening*. <http://group.bmj.com/group/media/press-release-archive-files/BMJ/bmj-2009/BMJ-17%20Jun-2009.pdf> [accessed 9 Jun 2011].
5. The Lancet. Time to look beyond MMR in autism research. (editorial). *Lancet* 2002; **359(9307)**: 637.
6. Henderson D. Mercury in vaccines — reassuring news. *Lancet* 2002; **360(9347)**: 1737–1741.
7. McMurray R, Cheater FM, Weighall A, *et al*. Managing controversy through consultation: a qualitative study of communication and trust around MMR vaccination decisions. *Br J Gen Pract* 2004; **54(504)**: 493–494.
8. Edwards A. Have parents behaved irrationally towards MMR? (editorial). *BMJ* 2003; **327**: 725–728.
9. McIntyre P, Leask J. Improving uptake of MMR vaccine. *BMJ* 2008; **336(7646)**: 729.
10. Hobson-West P. Trusting blindly can be the biggest risk of all; organised resistance to childhood vaccination in the UK. *Sociol Health Illn* 2007; **29(2)**: 198–215.