Comparing risk behaviours of human papillomavirus-vaccinated and non-vaccinated women

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ABSTRACT

Background Since September 2008, a national vaccine programme in the UK has offered routine human papillomavirus (HPV) vaccination to young women aged 12–13 years. A catch-up programme also offered HPV vaccination to women born after 1 September 1990.

Aim To compare indicators of risk and preventive behaviours among young women attending genitourinary medicine (GUM) clinics who had, and had not, received at least one dose of HPV vaccine.

Methods Clinical histories and HPV vaccination status were obtained from 363 participants eligible for HPV vaccination (Cervarix®) in the UK vaccination programme (born after 1 September 1990) attending GUM clinics in the North West of England. Using logistic regression, markers of sexual and non-sexual risk behaviours were compared between vaccinated and unvaccinated women.

Results At least one dose of HPV vaccine had been received by 63.6% (*n*=231) of participants. Unvaccinated women demonstrated higher levels of risky behaviour than those who had undergone HPV vaccination. Unvaccinated women were significantly more likely to have had three or more partners in the last 6 months, attended the clinic with symptoms, not used a condom at first sexual intercourse, had anal intercourse with their last sexual contact, to have tested positive for *Chlamydia trachomatis* diagnosis at the clinic visit and to be a current smoker.

Conclusions In the UK, where vaccine coverage is high, failure to initiate HPV vaccination amongst GUM attendees is a marker of high-risk behaviours. As a result, HPV vaccination status should be ascertained as part of an individual's clinical history by sexual health services to ensure advice and counselling is provided to those at greatest risk of HPV-associated disease.

Key message points

- Unvaccinated women had higher levels of risky sexual behaviour than women who had received human papillomavirus (HPV) vaccination.
- Being a current smoker, number of recent partners, symptomatic attendance at clinic, *Chlamydia trachomatis* diagnosis and anal intercourse were associated with not receiving HPV vaccination.
- Assessing HPV vaccination status could be linked to the provision of relevant advice and counselling to reduce future risk of HPV-associated disease.

INTRODUCTION

A national vaccine programme in the UK offers routine human papillomavirus (HPV) vaccination to young women aged 12–13 years during their second year of secondary school. Women born on or after 1 September 1990 were also offered the opportunity to undergo HPV vaccination in a catch-up programme. Some research in the UK has suggested that the self-reported behaviour of genitourinary medicine (GUM) attendees was indicative of more sexual and non-sexual risk-taking than in the general population. In addition, amongst GUM attendees HPV-vaccine completion rates were lower in women who were non-white in ethnicity, those not in education or training, smokers and those who previously had *Chlamydia trachomatis*.[1] In contrast, other studies from the UK, the USA and Australia indicated no significant differences in health behaviours of HPV-vaccinated and unvaccinated women[2–4] and some suggest HPV-vaccinated women displayed higher levels of preventive behaviours and more positive attitudes towards sexual health than their unvaccinated peers.[5 6] Nevertheless, lifestyle risk factors are known to cluster

amongst adult populations,[7 8] and in adolescence an association of clustering with risky behaviours has been found.[9]

At the time the present study was conducted HPV vaccination data were not routinely collected by GUM clinics in the UK. Indeed there is little information to indicate the usefulness of reporting vaccination status, given that many unvaccinated women will have already been exposed to HPV infection. The purpose of this study was therefore to understand the behaviour associated with receipt and non-receipt of HPV vaccination. Lower vaccination uptake amongst GUM attendees who reported factors that increased their risk of HPV acquisition would be a concern as this behaviour puts them at greater risk of developing cervical cancer.

METHODS

Data collection took place between September 2010 and October 2011 in two hospital-based GUM clinics and two linked community outreach clinics in the North West of England. These clinics served the population of a small number of towns covered by two primary care trusts (PCTs) which, up until the end of March 2013, were the organisations responsible for health services in this geographical area.

Clinical data relating to sexual and non-sexual risk-taking behaviour were collected successively from women eligible for HPV vaccination in the national vaccine programme (born on or after 1 September 1990) attending GUM clinics. Repeat attendees were excluded from the study. The clinical history form used routinely by clinicians was standardised, together with the addition of questions about HPV vaccination. Socio-demographic information was already routinely collected by the clinics. Eligible women were identified by clinic reception staff and given an information sheet which explained, if they agreed to participate, that anonymised data collected during the clinic visit, including their test results, would be used in the research.

For analysis, vaccinated women were defined as having received at least one dose of HPV vaccine. Risk behaviours were compared between vaccinated and unvaccinated groups using logistic regression. Age, and the group in which women were invited to receive vaccination (vaccination cohort), were anticipated to be important confounders. These are closely related and as school year and vaccination cohort were considered to be more relevant than calendar age, vaccination cohort was included as a categorical variable within the logistic regression model. Significance levels are presented for each factor without adjustment for multiple testing.

This study received ethical approval from National Health Service (NHS) National Research Ethics Service North West 8 – Greater Manchester East (Reference 10/H1013/2).

RESULTS

Of eligible clinic attendees, 59.4% (n=363) were recruited to the study, 29.3% (n=179) declined to take part and the remainder (11.3%, n=69) were missed in the recruitment process. Of the study participants, 98.1% were White British, reflecting the ethnicity of the population in the area. The mean age of participants was 18 (range 14–20) years. The majority of participants had been vaccinated as part of the catch-up programme, which offered vaccination to women born after 1 September 1990 who had not been eligible for routine vaccination at the age of 12–13 years.

Vaccination uptake amongst participants was similar to that reported by the local PCTs with 63.6% (n=231) having received at least one dose of the HPV vaccine. Overall, unvaccinated women demonstrated riskier behaviours than vaccinated women who exhibited more preventive behaviours (Table 1).

Sexual behaviour showed some associations with vaccination status; however, these results would not be considered statistically significant if adjusted for the large number of questions asked. Five variables relating to sexual behaviour were significantly different between the two groups. Having more than three partners in the last 6 months, attending the clinic with symptoms, having anal intercourse with their last sexual contact and receiving a positive *C. trachomatis* diagnosis from the clinic visit were all positively associated with non-vaccination. Condom use at first intercourse, however, was positively associated with receiving vaccination. Being a current smoker was also positively associated with non-vaccination. No significant difference was detected in the alcohol use of the two groups.

DISCUSSION

As suggested by previous research, vaccinated women showed higher levels of preventive behaviours and attitudes compared to their unvaccinated peers[7 8] whereas non-vaccination clustered with risky sexual and non-sexual risk behaviours. The association of smoking with non-vaccination is highly relevant as smoking is an independent risk factor for cervical cancer. Unvaccinated women in this study were also nearly four times more likely to have had anal intercourse with their last sexual partner than vaccinated women. Whilst the numbers engaging in this behaviour in the study were low, HPV types 16 and 18 are found in approximately 75–80% of anal cancers and anal intercourse increases the risk of anal HPV infection. It has been reported that the bivalent vaccine has the potential to decrease HPV infections in the anus offering protection against anal cancer.[10]

Although this study goes further than previous research in investigating a wider range of behaviours and not relying on self-reported information, it nevertheless has a number of limitations. Participants were recruited from GUM clinics and so the results may not

Table 1 Differences in risk and preventive behaviours amongst human papillomavirus-vaccinated and unvaccinated women adjusted for vaccination cohort

Variable	*n*	Vaccinated % (*n*)	Unvaccinated % (*n*)	Adjusted OR* (95% CI)	*p*
Sexual behaviour					
Aged ≤15 years at first intercourse	336	61.8 (139/225)	53.2 (59/111)	0.98 (0.60–1.60)	0.93
Condom use at first intercourse	336	76.4 (172/225)	69.4 (77/111)	0.55 (0.32–0.96)	0.036
Condom use at last intercourse	298	25.9 (52/201)	22.7 (22/97)	0.85 (0.47–1.60)	0.61
Non-regular partner and no condom used at last intercourse	297	22.9 (46/201)	21.9 (21/96)	1.1 (0.57–2.08)	0.72
Last sexual contact included anal intercourse	322	2.3 (5/218)	8.7 (9/104)	4.34 (1.23–14.29)	0.022
Used drugs/alcohol at last intercourse	234	24.4 (38/156)	25.6 (20/78)	0.91 (0.47–7.75)	0.78
Last sexual contact regular partner	337	73.6 (167/227)	70.9 (78/110)	0.79 (0.46–1.35)	0.39
3+ partners in last 6 months	300	13.3 (27/203)	22.7 (22/97)	2.12 (1.08–4.17)	0.031
6+ lifetime partners	288	28.0 (54/193)	37.9 (36/95)	1.25 (0.71–2.17)	0.42
Emergency contraception use in last year	337	36.7 (83/226)	26.1 (29/111)	0.63 (0.37–1.10)	0.080
Emergency contraception use over lifetime	269	60.7 (111/183)	57.0 (49/86)	0.72 (0.41–1.28)	0.27
Had sex abroad	330	8.2 (18/220)	9.1 (10/110)	1.08 (0.46–2.56)	0.86
Clinical history/STI diagnosis					
Ever had termination	311	7.7 (16/207)	8.7 (9/104)	0.92 (0.38–2.22)	0.85
Received previous treatment for STI	345	21.6 (50/231)	28.1 (32/114)	1.18 (0.68–2.04)	0.55
Tested for *Chlamydia trachomatis* outside GUM	324	64.5 (140/217)	71.0 (76/107)	1.11 (0.63–1.96)	0.70
STI diagnosis from clinic visit	342	35.7 (82/230)	41.1 (46/112)	1.27 (0.78–2.07)	0.34
C. trachomatis test positive	270	9.5 (18/189)	19.8 (16/81)	2.30 (1.06–5.00)	0.035
Genital warts present	341	17.8 (41/230)	12.6 (14/111)	0.66 (0.34–1.31)	0.24
Symptomatic attendance at this clinic visit	342	51.3 (118/230)	63.4 (71/112)	1.78 (1.09–2.92)	0.021
Self-referral to clinic at this visit	333	83.9 (188/224)	78.9 (86/109)	0.60 (0.32–1.12)	0.11
Smoking					
Current smoker	341	42.4 (97/229)	57.1 (64/112)	1.83 (1.13–2.96)	0.013
Alcohol use					
Six alcoholic drinks on one occasion once a week or more	336	29.8 (67/225)	29.7 (33/111)	1.21 (0.72–2.03)	0.48
Consuming five or more drinks on a typical day of drinking	331	57.7 (127/220)	63.1 (70/111)	1.12 (0.68–1.85)	0.65
Drink alcohol twice a week or more	343	24.3 (56/230)	31.9 (36/113)	1.18 (0.70–2.0)	0.54

*Adjusted for vaccination cohort.
CI, confidence interval; GUM, genitourinary medicine; OR, odds ratio; STI, sexually transmitted infection.

apply to wider populations. As the study was performed in a single NHS Foundation Trust (covering two PCTs) the results need to be confirmed in larger populations. Using anonymised routinely collected data increased the willingness of patients to participate, and minimal additional data collection avoided interference with the delivery of clinical services. This did, however, limit the range and detail of data that could be collected. In some cases data that were not clinically relevant may have been omitted and for a few variables the amount of missing data limits interpretation. We have no information as to why these data were missing, and we have found no associations with patient characteristics or with other risk factors. We note that the variables with higher proportions of missing data were those for which we did not find an association with vaccination, and in these cases we cannot rule out the possibility of non-response biases masking associations. Vaccination status was assessed by patient recall; whilst there is no reason to suspect this is not accurate, there are no data to support this assumption. Most participants were vaccinated in the catch-up programme and the differences recorded here may not be apparent amongst the cohort offered routine vaccination at the age of 12–13 years, for whom vaccine uptake has been consistently above 85%. Parental consent is central to the vaccine decision at younger ages compared to older cohorts who generally decide for themselves. Older teenagers who are actively seeking to reduce their risk of HPV infection may have more protective attitudes than girls vaccinated in early adolescence whose initiation of vaccination was most likely decided by a parent/guardian.

Understanding that non-vaccination clusters with behaviour that exposes individuals to an increased risk of HPV-associated disease is important in clinical settings. Non-vaccination should be considered alongside sexual behaviour when providing advice and counselling to women about risk reduction. Reinforcing the importance of cervical screening, smoking cessation and knowledge of HPV-associated disease would be relevant for these women.

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