

CLINICAL REPORT

Awareness of Human Papillomavirus Infection, Genitoanal Warts and Cancer in a Dermatological Outpatient Clinic Setting

Laura KUZNETSOV¹, Christina M. REITMAIER-WEBER², Thomas RUZICKA³ and Alexander V. KUZNETSOV^{1,4}

¹HIV/STI Prevention Research Group, Department of Dermatology & Allergology, Ludwig-Maximilian University, Munich ²Department of Dermatology & Venereology, Martin Luther University, Halle (Saale), ³Department of Dermatology & Allergology, Ludwig-Maximilian University, Munich, Germany and ⁴Cancer Research UK Cambridge Research Institute, University of Cambridge, Cambridge, United Kingdom

There has been little research into awareness of human papillomavirus (HPV) among dermatological outpatients, despite the fact that management of HPV infection causing genitoanal warts/cancer is part of the routine practice of dermato-venereologists. The aim of this study was to explore awareness of HPV among dermatological outpatients. A self-administered questionnaire was distributed to 360 consecutive attendees of a Munich dermatological outpatient clinic in November 2009. Of the total number of questionnaires, 77.2% were returned, and 69.7% ($n=251$, 51.8% females) were included in the analysis. 39.4% of the respondents had heard of HPV infection, and 23.9% of vaccination. Of those who had heard of HPV, 81.8% knew that HPV risk is associated with non-use of condoms, number of sexual partners (77.8%), smoking (8.1%), and that HPV causes genital warts (65.7%), anal warts (39.4%) and cervical cancer (57.6%). HPV ignorance (never having heard of HPV) was predicted by being male (adjusted odds ratio=2.23, 95% confidence interval=1.32–3.80) and being a parent (adjusted odds ratio=2.11, 95% confidence interval=1.24–3.59). We conclude that dermatological outpatients have insufficient knowledge of HPV, its sequelae and prevention. **Key words:** human papillomavirus; genitoanal region; cancer; warts; dermatology outpatients; knowledge.

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Laura Kuznetsov, HIV/STI Prevention Research Group, Department of Dermatology & Allergology, Ludwig-Maximilian University, Frauenlobstr. 9-11, DE-80337 Munich, Germany. E-mail: laura.kuznetsov@med.uni-muenchen.de

Human papillomavirus (HPV) causes the most common sexually transmitted infection (STI) (1), with prevalence ranging between 5% and 20% (2–4). In cases studied, oncogenic high-risk HPV types cause squamous cell carcinoma of the cervix in 99.7% (5), in the vulva in 40–51%, in the vagina in 40–64%, in the anus in 90–93%, in the penis in 36–40%, and in the oral cavity and pharynx in 12–63% (6), confirming the genito-oral transmission route (7). Low-risk HPV types are responsible for the

development of warts (5). In Germany, the highest annual incidence of genitoanal warts is found in people aged 15–40 years, with the peak in young females aged 20–24 years (627/100,000 population aged 10–79 years) and males aged 25–29 years (457/100,000) (8).

Previous international studies of awareness about HPV among outpatients have been designed in different settings, e.g. colposcopy (9, 10), obstetrics and gynaecology (11–13), primary or private medical care (14–16), emergency (17) and have revealed patients' limited knowledge of HPV and HPV vaccine. However, no surveys have been carried out into the awareness of sexually transmitted HPV infection, its tumourigenic sequelae and preventive measures among attendees of dermatological clinics. This is surprising, considering that the management of genitoanal neoplasms caused by HPV is part of routine dermato-venereological and dermatosurgical practice in most European countries (18–20); in Germany dermato-venereologists are the first-line doctors to diagnose genitoanal warts in men (in 44.8% of cases), followed by urologists (in 25.1% of cases) (8).

The aim of this study was therefore to determine dermatological outpatients' awareness of HPV infection, its causative role in genitoanal neoplasm, and HPV prevention. To the best of our knowledge this is the first such study to be performed in a dermatological setting. The study was carried out in Germany and included both genders.

MATERIALS AND METHODS

Study design and population

In November 2009, a cross-sectional survey was conducted with 360 consecutive German-speaking dermatological (non-HIV/STI, non-genitourinary medicine) attendees (18+ years old) presenting in the general outpatient clinic of Munich University, Germany. Every patient, regardless of his or her dermatological disorder, should register to see a general dermatologist; subsequently the patient can be referred to a specialized dermatological outpatient unit. During registration to see a general dermatologist, survey materials (a covering letter explaining the purpose of the study and that participation is voluntary and anonymous, and enclosing an anonymous self-administered questionnaire) were handed out. Patients could complete the questionnaire in the waiting room before seeing a physician, seal it in an envelope and put it into a box in the waiting area.

The questionnaire covered socio-demographics, attitude and knowledge of HPV, its causative role in genitoanal warts/cancer, HPV prevention by condom-use and vaccination, sources of information, and acceptance of HPV vaccine. Participants' knowledge was measured via questions with the following answer options: "yes", "no", and/or "do not know", the last being counted as incorrect. Participants' attitudes were measured on a 4–5-point ordinal scale. A pilot version of the anonymous questionnaire was tested on a group of 14 dermatological patients (50% females) and subsequently discussed with 10 of them, who withdrew their anonymity.

The survey was approved by the ethics committee of the Medical Faculty of Ludwig-Maximilian University.

Statistical analysis

Associations between socio-demographic determinants and knowledge prevalence regarding HPV infection/vaccination were analysed by Pearson's χ^2 and Fisher's exact tests. Kruskal–Wallis and Mann–Whitney *U* tests were used to detect significant differences between determinants. Multivariable logistic regressions (a stepwise variable selection algorithm) were conducted to explore the effect of socio-demographic variables on HPV knowledge. Adjusted odds ratios (AOR) were reported, together with their 95% confidence intervals (95% CI). A *p*-value < 0.05 was considered as significant and was Bonferroni-adjusted for multiple comparisons. Statistical analyses were performed using PASW 18 (SPSS Inc.).

RESULTS

Of the 360 questionnaires distributed, 278 (77.2%) were collected, and 251 (69.7%) of these were included in the analysis. Patients' median (mean \pm standard deviation) age was 44 years (45.6 \pm 17.0), age range 18–82 years. Socio-demographic characteristics of the study population are shown in Table I.

Knowledge of and attitude towards HPV infection, genitoanal warts and cancer

Patients' knowledge of HPV prevalence was limited: only 39.4% (*n* = 99; 64.6% of whom were female) had heard of HPV infection (Table I). Patients who had not heard of HPV were mostly male, those aged \geq 60 years (vs. 18–29 (*p* = 0.004) and 40–49 (*p* = 0.008) years), married (vs. cohabiting individuals (*p* = 0.006)), parents, retired (vs. employed (*p* = 0.001) and unemployed (*p* = 0.009)) or non-German nationalities.

Most patients (75.8% of *n* = 99) who had heard of HPV rated their subjective knowledge about HPV as less than good (Table II). Only 61.6% knew that HPV infection is common/very common, 53.5% were aware that

Table I. Socio-demographic characteristics of dermatological outpatients and knowledge prevalence of human papillomavirus (HPV) infection and vaccine, Munich 2009

Characteristics	Participants, <i>n</i> (% of whole sample)				
	Whole sample	Heard of HPV	<i>p</i> ^c	Heard of HPV vaccine	<i>p</i> ^e
Gender	251 (100)	99 (39.4)	0.001	60 (23.9)	<0.001
Female	130 (51.8)	64 (49.2)		44 (34.9)	
Male	121 (48.2)	35 (28.9)		16 (13.4)	
Age (years)	251 (100)	99 (39.4)	0.033	60 (23.9)	0.002
18–29	54 (21.5)	26 (48.1)		18 (34.0)	
30–39	43 (17.1)	19 (44.2)		11 (26.8)	
40–49	54 (21.5)	25 (46.3)		20 (37.0)	
50–59	35 (13.9)	14 (40.0)		5 (14.3)	
\geq 60	65 (25.9)	15 (23.1)		6 (9.7)	
Marital status	251 (100)	99 (39.4)	0.009	60 (23.9)	0.039
Single ^a	97 (38.6)	44 (45.4)		26 (27.7)	
Married	115 (45.8)	34 (29.6)		20 (17.7)	
Cohabiting	39 (15.5)	21 (53.8)		14 (36.8)	
Parental status	249 (100)	98 (39.0)	0.003	60 (23.9)	0.038
Parents	131 (52.6)	40 (30.5)		25 (19.2)	
Non-parents	118 (47.4)	58 (49.2)		35 (30.7)	
Education	249 (100)	99 (39.4)	0.105	60 (23.9)	0.718
Incomplete/Primary school ^b	59 (23.7)	22 (37.3)		13 (24.1)	
Secondary school ^c	43 (17.3)	24 (55.8)		11 (25.6)	
College	78 (31.3)	26 (33.3)		16 (20.8)	
University	69 (27.7)	27 (39.1)		20 (29.0)	
Social status	248 (100)	99 (39.4)	0.010	60 (23.9)	0.045
Scholar or College/University Student	29 (11.7)	12 (41.4)		5 (17.9)	
Employee	146 (58.9)	66 (45.2)		44 (30.6)	
Unemployed ^d	25 (10.1)	12 (48.0)		6 (10.0)	
Retired	48 (19.4)	9 (18.8)		5 (8.3)	
Nationality	249 (100)	98 (39.0)	0.021	60 (23.9)	0.100 ^f
German	219 (88.0)	92 (42.0)		57 (26.5)	
Other	30 (12.0)	6 (20.0)		3 (10.7)	

^aGroup also includes divorced and widowed. ^bEducation duration: \leq 9–10 years. ^cEducation duration: 11–13 years. ^dGroup also includes housewife and househusband. ^ePearson's χ^2 test. ^fFisher's exact test.

Table II. Human papillomavirus (HPV)-specific knowledge and attitude (correct answers), Munich 2009

	Patients who had heard of HPV (<i>n</i> =99) <i>n</i> (%)	Whole sample (<i>n</i> =251) %
1. Subjective HPV knowledge	99 (100.0)	39.4
Very good	5 (5.0)	2.0
Good	19 (19.2)	7.6
Moderate	33 (33.3)	13.1
Poor	34 (34.4)	13.5
Absent	8 (8.1)	3.2
2. Occurrence of HPV	90 (90.1)	35.8
Very common (true)	8 (8.1)	3.2
Common (true)	53 (53.5)	21.1
Rare (false)	24 (24.2)	9.6
Very rare (false)	1 (1.0)	0.4
Do not know	4 (4.0)	1.6
3. Gender(s) affected by HPV	87 (87.9)	34.7
Both	53 (53.5)	21.1
Women	32 (32.3)	33.9
Men	2 (2.0)	21.9
4. HPV risk		
Non-use of condom (true)	81 (81.8)	32.3
Multiple sexual partners (true)	77 (77.8)	30.7
Early age at sexual debut (true)	32 (32.3)	12.7
Smoking (true)	8 (8.1)	3.2
Alcohol consume (false)	55 (55.6)	21.9
Early puberty (false)	38 (38.4)	15.1
5. HPV sequelae		
Genital warts (true)	65 (65.7)	25.9
Anal warts (true)	39 (39.4)	15.5
Cervical cancer (true)	57 (57.6)	22.7
Impotence (false)	32 (32.3)	12.7
6. HPV prevention measures		
Condom use (true)	77 (77.8)	30.7
Vaccination (true)	53 (53.5)	21.1
Washing genitals after intercourse (false)	37 (37.4)	14.7
Own sexual fidelity (false)	16 (16.2)	6.4
Not exist (false)	44 (44.4)	17.4
7. Heard of HPV vaccine	60 (60.6)	23.9
8. Danger of HPV vs. influenza vaccine	59 (59.6)	23.5
Much more dangerous	7 (11.9)	2.8
More dangerous	6 (10.2)	2.4
Equally dangerous	13 (22.0)	5.2
Less dangerous	12 (20.3)	4.8
Much less dangerous	2 (3.4)	0.8
Do not know	19 (32.2)	7.6

both genders could be affected, and 73.7% were informed about the availability of the HPV test. Most of the patients who had heard of HPV knew that risk of HPV is associated with non-use of condoms during intercourse (81.8% of 99) and with the number of sexual partners (77.8%), although only 32.3% mentioned early age of sexual debut and 8.1% mentioned smoking (Table II). With respect to the sequelae of HPV infection, genital warts were mentioned correctly by 65.7% (of 99), anal warts by 39.4%, and cervical cancer by 57.6%. In terms of HPV prevention strategies, 77.8% correctly indicated condom use and 53.5% HPV vaccination (Table II).

No significant differences in knowledge regarding genital warts, anal warts and cervical cancer as the long-term effects of HPV infection were found in relation to

patients' socio-demographic characteristics, except for parental status. Parents (12.7% of 79) were less knowledgeable about anal warts as an HPV health outcome compared with non-parents (36.7%; $p=0.015$).

Most patients (81.2% of 239) knew that genitoanal warts (which were asked about as a single term) could be sexually transmitted (with a significant difference between married and cohabiting respondents, $p=0.009$), but only 42.2% (of 240) were aware that genitoanal warts are caused by HPV (with significant differences between those aged 40–49 and ≥ 60 years, $p<0.001$ and between married and cohabiting respondents, $p=0.004$).

The results of logistic regression modelling ($n=246$) for non-knowledge of HPV (effect of gender, age group, education and parental status) showed that being male (AOR=2.23, 95% CI 1.32–3.80, $p=0.003$) and being a parent (AOR=2.11, 95% CI 1.24–3.59, $p=0.006$) were predictors. Modelling indicated no association of non-knowledge about: (i) HPV transmission risks (number of sexual partners, non-use of condoms, early sexual debut), (ii) HPV prevention by condom use, and (iii) HPV sequelae (genital, anal warts, cervical cancer) and socio-demographics.

Most of those who had heard of HPV referred to the following sources of information: the media (51.6% (of 91) newspapers/magazines, 24.2% television and 4.4% radio) followed by a gynaecologist (27.5%, 24 of 25 were female), friends/family members (19.8%) and the internet (9.9%). A dermatologist was the source of information for only 2 (2.2%) patients.

Knowledge of and attitude towards HPV vaccination

A total of 60 patients (23.9%, 44 females, 16 males) from our study sample ($n=251$) had heard of the HPV vaccine (Table I), with striking knowledge gaps in males, in those aged ≥ 60 years (vs. 18–29, $p=0.001$, and 40–49, $p<0.001$), married (vs. cohabiting, $p=0.015$), parents and retired (vs. employed, $p=0.008$). Half of the patients (51.8% of 251) wanted more information about the HPV vaccine.

Being a man (AOR=3.18, 95% CI 1.64–6.17, $p=0.001$, $n=242$), age 50–59 years (AOR=3.13, 95% CI 1.01–9.69, $p=0.048$) or ≥ 60 years (AOR=4.52, 95% CI 1.60–12.78, $p=0.004$) compared with those aged 18–29 years, presented an increased probability of ignorance about the existence of HPV vaccine.

The vast majority of patients who had heard of the HPV vaccine were aware of the fact that the vaccine can prevent genitoanal warts (82.4% of 51) and cervical cancer (89.5% of 57). Some respondents (22.1%) assessed the HPV vaccine as being (much) more dangerous than the influenza vaccine (Table II).

The most frequently mentioned sources of information about HPV vaccine were media (newspapers/

magazines (45.8% of 59), television (28.8%), radio (1.7%), gynaecologist (39.0%, all women), family/friends (22.1%), the internet (11.9%) and dermatologist ($n=3$, 5.1%). Most of the patients (70.2% of 57) knew that HPV vaccine is recommended (in Germany) for girls aged ≥ 12 years.

More patients had a very positive/positive (38.0% of 58) attitude towards HPV vaccine than a negative/very negative attitude (25.8%) or were ambivalent (32.8%).

DISCUSSION

The results of this pilot survey of dermatological outpatients of their awareness of sexually transmitted HPV, genitoanal warts, cancer, and vaccination suggest that these patients have a low level of knowledge of HPV prevalence; rarely even as much as one-third of the studied population.

With respect to the different study settings, caution is required in comparing the results of the present survey with those of other outpatient clinics. However, prevalence of knowledge about the existence of HPV was lowest in the dermatological outpatients (39.4%) compared with those from the family physician's office (67%) (14) or emergency department (63%) (17) in the USA, but higher than in private outpatients in Canada (15%) (16). Among those who had heard of HPV, dermatology clinic attendees were better informed about its transmission via sexual intercourse (81.8%, without a condom) compared with patients visiting family physicians (72%) (14) or emergency departments (61%) (17). In contrast, a population-based study in the USA showed that over 90% of participants had heard of HPV and 74% of them knew that it is sexually transmitted (21).

The positive answers to the question about the protective role of condoms against HPV were counted as correct because regular condom use (for all instances of vaginal intercourse) reduces HPV acquisition risk by 70% vs. non-regular use (<5% instances of intercourse) (22). Condom use is one possible HPV preventive measure (excluding sexual abstinence) for those who do not belong to the focus group for the vaccination. It can also protect against many other high- and low-risk HPV types that are not covered by the vaccine. However, condoms as a physical barrier can only provide HPV protection for those areas of the genitoanal region where this barrier is actually applied.

Misconceptions regarding HPV infection risks, such as alcohol consumption or early puberty, may be explained by the fact that alcohol use and early puberty may be equated with risky sexual behaviour. Obviously, with regard to genitoanal warts, neither of these factors, nor the use of public humid dwellings (e.g. showers, saunas and dressingrooms) (23), increase viral infectivity and pathogenicity; and thus they do not increase HPV infection risk. The other common misconception was

that of linking HPV prevention with personal sexual fidelity, which in fact does not imply a partner's sexual fidelity.

Dermatological outpatients had a higher level of knowledge of genital warts as a sequela of HPV (65.7%), of HPV prevention by condom use (77.8%), and of increased HPV risk with multiple sexual partners (77.8%) compared with those visiting a family physician (38%, 61% and 69%, respectively) (14). However, dermatological outpatients were less aware of the causal relationship between HPV and cervical cancer (57.6%) compared with the emergency department patients (82%) (17). In an Australian study of the general population, 66% of participants were aware that HPV is associated with cervical cancer and 44.5% that HPV causes warts (24). A survey of the US-American general population demonstrated that 84% of respondents knew that HPV causes cervical cancer, and 37% of Afro-Americans and 52% of white Americans knew that HPV causes genital warts (21).

According to an English study (25), the incidence of genitoanal cancers increases strongly after the age of 34 years for cervix (a 5-fold higher incidence in age group 35–44 years vs. <35 years) and after age of 44 years vs. <35 years for vulva (a 16-fold higher incidence in age group 45–54 years), anus (a 39-fold higher incidence in women and 48-fold in men), and penis (a 23-fold higher incidence) (modified from (25)). Taking into account these epidemiological data, and that our findings reveal that males or older outpatients have never heard of HPV, and that the whole sample were less aware of HPV's causative role in cervical cancer, an educational message about HPV and its role in the development of genitoanal cancers should be promoted in these groups.

Some potential limitations of this study must be mentioned. One limitation is the relatively small sample size, which might affect generalization of the results. Due to the cross-sectional study design, we investigated associations and not a causal relationship between outcomes and different factors. The study was monocentric, based on a university hospital setting and, due to self-reported data, recall bias could not be excluded. Privately insured patients were not included in the sample because they represent a highly selective minority (only approximately 11% of the German population have private health insurance) (26). No information regarding history of sexually transmitted infections (STIs) other than HPV was asked about, so we do not know if some of the participants had previous experience of STIs which might account for their higher level of knowledge of sexual transmission of HPV; and the history of STIs was not surveyed in patients in the other settings mentioned. Thus, the cohort of dermatological outpatients in this study may be non-representative of the adult population in Germany, and hence caution must be exercised in extrapolation of these results to the general population.

In conclusion, this study reports initial findings about awareness in dermatological outpatients of sexually transmitted HPV, genitoanal warts, cervical cancer and HPV vaccine, following the introduction of the HPV vaccine. The results reveal a lack of knowledge regarding HPV and its vaccination among these patients and a high level of need for health education about sexual transmission of HPV, with particular focus on its causative role in genitoanal neoplasms, including cancer, and its possible prevention by immunization.

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