



Higher incidence and persistence of high-risk human papillomavirus infection in female sex workers compared with women attending family planning

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SUMMARY

Background: There are no data on the incidence and persistence of high-risk human papillomavirus (HR-HPV) infections in female sex workers (FSWs). We aimed to describe and compare the rates of incidence and persistence of HR-HPV infections in FSWs and women from the general population (WGP) who attended healthcare facilities between May 2003 and December 2006 in Alicante, Spain.

Methods: Women with an established HR-HPV infection at study entry were evaluated for the analysis of HR-HPV persistence, and those testing negative for HR-HPV infection at entry were evaluated for the analysis of incidence. HR-HPV infection was determined by the Digene HC2 HR HPV DNA Test.

Results: A total of 736 women – 592 WGP and 144 FSWs – were followed for a median of 16.8 months. Global incidence and persistence rates were 3.98 per 100 woman-years (95% confidence interval (CI) 2.91–5.45) and 26.81 per 100 woman-years (95% CI 20.08–35.79), respectively. In the multivariate analysis, only commercial sex work was associated with a statistically significant higher incidence (relative risk (RR) 4.72, 95% CI 2.45–9.09) and persistence (RR 1.93, 95% CI 1.08–3.46) of HR-HPV infection.

Conclusions: Our data show that FSWs have both a higher incidence and a higher persistence of HR-HPV than WGP and should be prioritized in HPV-related cancer screening programs.

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1. Introduction

Human papillomavirus (HPV) infection is the most frequent sexually transmitted infection (STI) worldwide. High-risk HPV (HR-HPV) is the main cause of cervical cancer.¹ Population groups with higher prevalences of infection, like women who are incarcerated or female sex workers (FSWs), usually have sexual risk behaviours.^{2–4} In women in the general population (WGP), over half clear the virus spontaneously within a year of contracting the infection. A higher risk of developing cervical cancer exists only in the small proportion of cases with persistent infection, and in the presence of other co-factors like oral contraceptive use, smoking, or high parity.⁵ Trottier et al. recently reported that infection with multiple HPV types is associated with longer persistence of HPV infection, but that this is not the case for either age or number of sexual partners.⁶ The prevalence of infection includes all those established cases that do not clear spontaneously, as well as all incident cases. Accordingly, HPV prevalence is

influenced by risk factors associated with both the incidence and the persistence of infection. In comparison to prevalence studies, fewer studies have been carried out on the incidence of HR-HPV infection in WGP and none in the population in Spain. To our knowledge, there have been no publications on the incidence and persistence of global HR-HPV infection in FSWs.

The aim of this study was to describe and compare the incidence and persistence of HR-HPV infections in FSWs and in WGP who attended a healthcare facility between May 2003 and December 2006 in the city of Alicante, Spain.

2. Methods

2.1. Study population

We conducted a prospective study with a cohort of WGP and FSWs recruited at two sites in the city of Alicante, Spain. WGP were recruited at a family planning clinic and FSWs at the Center for AIDS Information and Prevention (CIPS). Both health facilities are free of charge to all women, including immigrant women irrespective of their legal and administrative status. Women were invited to participate in the study between May 2003 and

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December 2004 and were followed annually or more frequently if clinically indicated, up to December 2006. Characteristics of each of the recruitment sites and baseline HR-HPV prevalence for WGP and FSWs have been described previously,^{3,7} and are also presented in Table 1. For the purpose of these analyses, only women who had at least two HR-HPV test results separated by a minimum of approximately 6 months were included. Some women made more visits to the clinic, but we only analyzed the incidence and persistence between the first two visits. Figure 1 shows the number of women participating in each of the analyses; women with an established HR-HPV infection at study entry were evaluated for the analysis of HR-HPV persistence, and those testing negative for HR-HPV infection at study entry were evaluated for the analysis of HR-HPV incidence. We considered incident infections as those occurring in women whose sample tested HR-HPV-positive following an initial sample that tested negative. We considered persistent infections as those occurring in women whose sample tested HR-HPV-positive following an initial sample that tested positive. Additional analyses were done to look for statistically significant differences in the socio-demographic characteristics, sexual behaviors, and HPV prevalence between

women who failed to return and those who were followed up, stratified by center.

The two dependent variables were incident and persistent HR-HPV infections determined by the Digene Hybrid Capture 2, High-Risk HPV DNA Test (HC2 HR HPV DNA Test; Qiagen, Germany). Detection of HR-HPV DNA in a woman who had a negative HR-HPV DNA test at study entry was considered to be an incident infection. Persistent infections were those cases that tested positive both at study entry and during follow-up. The main independent variable, being a FSW as compared to a WGP, was ascertained from the recruitment site; FSWs were recruited at a FSW opt-in specialist clinic with a long-standing tradition of treating FSWs, and WGP from a family planning center where they were not specifically asked whether they had ever exchanged sex for money. Most of the women from the general population in Alicante go to family planning centers for gynecological and routine exams. We also collected information on age at entry (≤ 25 , 26–35, ≥ 36 years, and unknown), age at first sexual intercourse (≤ 18 , ≥ 19 years, and unknown), area of origin (Spain, Latin America, Europe, and Africa/Asia; these last two were recoded as 'other' because of the small number of people from these regions), educational level (none,

Table 1
Characteristics of study subjects at baseline and follow-up

	WGP			FSWs			Total		
	Baseline n (%)	Follow-up n (%)	p-Value	Baseline n (%)	Follow-up n (%)	p-Value	Baseline n (%)	Follow-up n (%)	p-Value
	(n=1011)	(n=592)		(n=549)	(n=144)		(n=1560)	(n=736)	
Age			0.0222			0.4799			0.0039
≤ 25 years	274 (27.1)	123 (20.8)		185 (33.7)	47 (32.6)		459 (29.4)	170 (23.1)	
26–35 years	367 (36.3)	217 (36.7)		228 (41.5)	63 (43.8)		595 (38.1)	280 (38.0)	
≥ 36 years	366 (36.2)	250 (42.2)		134 (24.4)	32 (22.2)		500 (32.1)	282 (38.3)	
Unknown	4 (0.4)	2 (0.3)		2 (0.4)	2 (1.4)		6 (0.4)	4 (0.5)	
Area of origin			0.8964			0.0134			0.0000
Spain	841 (83.2)	501 (84.6)		87 (15.8)	21 (14.6)		928 (59.5)	522 (70.9)	
Latin America	122 (12.1)	66 (11.1)		303 (55.2)	76 (52.8)		425 (27.2)	142 (19.3)	
Europe	32 (3.2)	17 (2.9)		91 (16.6)	15 (10.4)		123 (7.9)	32 (4.3)	
Africa/Asia	16 (1.6)	8 (1.4)		68 (12.4)	32 (22.2)		84 (5.4)	40 (5.4)	
Educational level			0.0572			0.0000			0.0000
None	62 (6.1)	33 (5.6)		38 (6.9)	14 (9.7)		100 (6.4)	47 (6.4)	
Primary education	344 (34.0)	195 (32.9)		419 (76.3)	44 (30.6)		763 (48.9)	239 (32.5)	
High school	604 (59.7)	358 (60.5)		50 (9.1)	73 (50.7)		654 (41.9)	431 (58.6)	
Unknown	1 (0.1)	6 (1.0)		42 (7.7)	13 (9.0)		43 (2.8)	19 (2.6)	
Number of lifetime sex partners			0.9284			0.4314			0.0001
≤ 5	903 (89.3)	528 (89.2)		235 (42.8)	56 (38.9)		1138 (72.9)	584 (79.3)	
> 5	107 (10.6)	63 (10.6)		19 (3.5)	3 (2.1)		126 (8.1)	66 (9.0)	
Unknown	1 (0.1)	1 (0.2)		295 (53.7)	85 (59.0)		296 (19.0)	86 (11.7)	
Marital status			0.2208			0.8443			0.0001
Single	370 (36.6)	196 (33.1)		300 (54.6)	75 (52.1)		670 (42.9)	271 (36.8)	
Married	464 (45.9)	301 (50.8)		54 (9.8)	17 (11.8)		518 (33.2)	318 (43.2)	
Lives with partner	101 (10.0)	49 (8.3)		63 (11.5)	17 (11.8)		164 (10.5)	66 (9.0)	
Separated/divorced/widow	76 (7.5)	46 (7.8)		129 (23.5)	35 (24.3)		205 (13.1)	81 (11.0)	
Unknown	0	0		3 (0.5)	0		3 (0.2)	0	
Age at first sexual intercourse, median (range)	18 (17–20)	18 (17–20)	-	17 (15–18)	16 (14–17)	-	18 (16–19)	18 (16–19)	-
Unknown	1	0		62	15		63	15	
Smoking in last year			0.7484			0.0074			0.0002
No	516 (51.0)	312 (52.7)		268 (48.8)	69 (47.9)		784 (50.3)	381 (51.8)	
Yes	494 (48.9)	279 (47.1)		242 (44.1)	61 (42.4)		736 (47.2)	340 (46.2)	
Unknown	1 (0.1)	1 (0.2)		39 (7.1)	14 (9.7)		40 (2.6)	15 (2.0)	
HIV result			0.0894			0.1095			0.1870
Negative	448 (44.3)	271 (45.8)		293 (53.4)	69 (47.9)		741 (47.5)	340 (46.2)	
Positive	3 (0.3)	2 (0.3)		16 (2.9)	1 (0.7)		19 (1.2)	3 (0.4)	
Unknown	560 (55.4)	319 (53.9)		240 (43.7)	74 (51.4)		800 (51.3)	393 (53.4)	
Duration of follow-up (months), median (range)	17.7 (14–26)			14.2 (11.5–16.7)			16.8 (13.4–23.2)		

WGP, women from the general population; FSWs, female sex workers.

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