Original Article

Risk-Factors and Awareness of HPV in Turkish people with Anogenital Warts in Bagcilar district: a Cross-Sectional Study

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Abstract

Background: Anogenital warts (AGWs) are epithelial tumors which develop as a result of *human papilloma virus* (HPV) infection. We aimed to assess the sociodemographic, sexual and other possible risk-factors, and awareness **of** the HPV infection among Turkish people with AGW in the Bagcilar district of Istanbul.

Methods: A cross-sectional study was conducted on 273 patients **(**183 men, 90 women) with AGW between October 2014 – March 2015. The patients' sociodemographics were recorded along with their possible risk-factors and clinical findings. The patients' answers to questions regarding HPV/AGW were checked for awareness. Data were analyzed by Chi-square test using SPSS (Statistical Package for the Social Sciences) version 15.0. The results were evaluated with $P < 0.05$ considered significant.

Results: The major parameters detected were 26–39 age-range (52.6%), self-employed (54.6%), primary school graduate (44,7%), low/middle income (91.2%), married (59.3%), heterosexual (98.9%), sexually active (93.8%), sex in previous 3 months (87,6%), multi-partners (53.5%), partners without AGW (60.8%), mixed location (32.2%), concomitant verruca on hands (26%), 3–6 month duration (38.8%), non-recurrent lesion (98.2%), tinea cruris [TC](25.3%) and smoking (54.2%). However, self-employed (70.5%), middle-income (47%), polygyny (71.6%), pubic-location (43.2%), long-duration (46.4%), concomitant TC (31.7%) diabetes mellitus (9.8%), and verruca on hands (33.3%) were mostly encountered in males, while housewife (57.7%), low-income (60%), monoandry (67.8%), perianal-location (48.9%), short-duration (58.9%), smoking (64.4%), concomitant candidiasis (15.6%) and depression (31.1%) were mostly found in females. Awareness of HPV hearing, HPV-AGW and HPV-cancer relationships, transmission-routes, risk-factors (each at 5.5%), and prevention methods (2.2%) was very low.

Conclusions: AGWs are seen in sexually-active, less-educated, married heterosexuals in Bagcilar. Self-employed, middle-income, polygyny, pubic-location, long-duration, concomitant TC and diabetes mellitus, and verruca on hands are mostly seen in males, while housewife, low-income, monoandry, perianal-location, short-duration, smoking, candidiasis and depression are more common in females. Awareness is very low.

Keywords: Genital warts, health knowledge, risk-factors, sexual behavior, sociodemographics

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Introduction

HPV infection is the most common cause of sexually transmitted diseases (STDs).[1] It is caused by *Papilloma virus* family, which includes more than 120 types of viruses.[2] HPVs are fundamental members of the mammalian healthy skin flora, and usually cause subclinical infections which can persist asymptomatically during lifetime.[3] More than 40 types of HPV can infect the genitourinary and anal tract. As HPV can infect the skin, oropharynx, uterine cervix, lower-genital and the anal region,[2] it can cause various clinical symptoms. AGW is one of the most-widely encountered clinical presentations of HPV.[3–5] Although AGWs are usually not medically harmful, they can lead to many negative psychosocial consequences such as anger, guilt, social-isolation,[6] sexual dysfunction, anxiety/depression,[7,8] fear/worries arising from the relationship between HPV and carcinogenesis,[1] financial burden on the health care systems due to preventive vaccination schedules, and also carcinogenic outcomes.[9] Epidemiological data on possible risk-factors and HPV awareness in patients with AGWs are limited.[7,8] Therefore, we aimed to assess sociodemographic, sexual and other possible risk-factors, and awareness of HPV infection among Turkish people with AGW in the Bagcilar district.

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Materials and Methods

Study design and subjects

The study was designed as a cross-sectional, descriptive and inquiry-based clinical research on Turkish patients with AGWs in the Bagcilar district in Istanbul. It was approved by our institute's Local Ethics Committee and was conducted in accordance with the "World Medical Association Declaration of Helsinki, ethical principles for medical research involving human subjects, 2008". After obtaining the written informed consents, AGW patients of both sexes who referred to our Dermatology outpatient clinic between October 2014 and March 2015 were included in the study. Any patients who were younger than 18, had any known immunological diseases, were undergoing immune suppressive

therapy, were taking oral corticosteroids, or other medication that could lead to local or systemic immune suppression, and did not give consent were excluded from the study. Sociodemographics (gender, age, profession, education, monthly income, marital status) and sexual characteristics (sexual preference and activity, sexual activity in the last three months, number of partners, presence of similar lesion in partner/s) of the patients were recorded. The lesions were diagnosed by clinical visual inspection and dermoscopic examination. Locations of the lesions such as corpus penis, glans penis, scrotum, pubis, perineum, vulva, perianal area, and mixed (more than one area) were recorded. The presence of other local lesions could be related with concomitant STDs such as *human immunodeficiency virus* (HIV) infection, candidiasis, *molluscum contagiosum* (MC) and *tinea cruris* (TC), and other comorbidities were examined and noted. The patients were also tested to assess whether they were carriers of other STDs such as syphilis, HIV infection, and hepatitis B and C infections. Other possible risk-factors such as presence of verruca on other body regions, duration and relapse of the lesions, smoking, and other comorbidities which can suppress the immune system were examined and recorded. Moreover, to determine the patients' awareness, answers to questions regarding HPV hearing, HPV-AGW relationship, HPV-cancer relationship, transmission routes, risk-factors, and prevention methods were recorded as either aware or unaware. The patients were treated with topical antiviral, cryotherapy (Cry), or cryotherapy plus trichloroacetic acid (TCA) according to the location, size, number and extensiveness of the lesions, and then were recommended to be vaccinated.

Statistical analysis

The data were analyzed using SPSS 15.0 (*Statistical Package for the Social Sciences,* Chicago, USA) software. Frequencies were presented as absolute values and percentages. Chi-square test was used to compare the frequencies of two parameters. A P value < 0.05 was accepted as significant.

Results

The study included 273 patients (183 [67%] male and 90 [33%] female) with AGW. Among the patients, 17 subjects did not answer about their partner's lesions, whereas 8 patients did not respond to the question about their sexual activity in the last 3 months. Sociodemographic and sexual characteristics of patients are shown in Table 1. Most men (129, 70.5%) were self-employed,

Table 1. Sociodemographic and sexual characteristics of patients by gender.

Parameters		Male	%	Female	%	Total	%	*P*
Age	<25	36	19.7	24	26.7	60	22.2	0.070
	26–39	93	50.8	51	56.7	144	52.6	
	40–64	48	26.2	15	16.6	63	23.0	
	>65	6	3.3	0	0.0	6	2.2	
Profession	Housewife	0	0.0	51	56.7	51	18.7	0.000
	Unemployed	3	1.6	0	0.0	3	1.1	
	Civilservant	25	13.7	10	11.1	35	12.8	
	Self-employed	129	70.5	20	22.2	149	54.6	
	Retired	7	3.8	1	1.1	8	2.9	
	Student	19	10.4	8	8.9	27	9.9	
Education	Illiterate	1	0.5	2	2.2	3	1.1	0.213
	Primary school	76	41.5	46	51.1	122	44.7	
	High school	66	36.1	24	26.7	90	33.0	
	University	40	21.9	18	20.0	58	21.2	
Monthly income	<USD 500	77	42.1	54	60.0	131	48.0	0.013
	USD 500–1000	86	47.0	32	35.6	118	43.2	
	>USD 1000	20	10.9	4	4.4	24	8.8	
Marital status	Married	107	58.5	55	61.1	162	59.3	0.023
	Single	73	39.9	28	31.1	101	37.0	
	Divorced	3	1.6	7	7.8	10	3.7	
Sexual preference	Heterosexual	180	98.4	90	100.0	270	98.9	0.222
	Homosexual	3	1.6	0	0.0	3	1.1	
Sexually Active	Yes	183	100.0	73	81.1	256	93.8	0.000
	No	0	0.0	17	18.9	17	6.2	
Sexual activity in last 3 months	Yes	172	94.0	67	74.4	239	87.6	0.000
	No	11	6.0	15	16.6	26	9.5	
	No response	0	0.0	8	8.9	8	2.9	
Number of Partners	More than one	131	71.6	15	16.7	146	53.5	0.000
	One	52	28.4	61	67.8	113	41.4	
	None	0	0.0	14	15.6	14	5.1	
Partner's lesion	Yes	57	31.1	33	36.7	90	33.0	0.000
	No	124	67.8	42	46.7	166	60.8	
	No response	2	1.1	15	16.7	17	6.2	

Table 2. Clinical features and other possible risk-factors of the patients according to sex.

Parameters		Male	%	Female	%	Total	%	*P*
	Corpus penis	16	8.7	0	0.0	16	5.9	
	Glans Penis	6	3.3	0	0.0	6	2.2	
	Scrotum	2	1.1	0	0.0	2	0.7	
Location	**Pubis**	79	**43.2**	1	1.1	80	29.3	
of lesions	**Perineum**	15	8.2	5	5.6	20	7.3	
	Vulva	0	0.0	10	11.1	10	3.7	
	Perianal region	7	3.8	44	**48.9**	51	18.7	
	Mixed	58	31.7	30	33.3	88	**32.2**	**0.000**
	Feet	1	0.5	2	2.2	3	1.1	
	Lips	0	0.0	2	2.2	2	0.7	
Verruca in	**Hands**	61	**33.3**	10	**11.1**	71	**26.0**	
other region	**Hands and feet**	14	7.7	2	2.2	16	5.9	
	Hands and lips	5	2.7	1	1.1	6	2.2	
	Hands and face	0	0.0	3	3.3	3	1.1	
	Absent	102	**55.8**	70	**77.8**	172	**63.0**	**0.000**
	<1 Month	7	3.8	14	15.6	21	7.7	
Duration	**1-3 Months**	42	23.0	53	**58.9**	95	34.8	
	3-6 Months	85	**46.4**	21	23.3	106	**38.8**	
	>6 Months	49	26.8	2	2.2	51	18.7	**0.000**
Relapse	**Yes**	3	1.6	2	2.2	5	1.8	
	No	180	**98.4**	88	**97.8**	268	**98.2**	0.736
	HIV*	0	0.0	0	0.0	0	0.0	
	Candidiasis	2	1.1	14	**15.6**	16	5.9	
Concomitant	**MC****	2	1.1	1	1.1	3	1.1	
Local STDs	**TC*****	58	**31.7**	11	12.2	69	**25.3**	
	TC+Candidiasis	0	0.0	1	1.1	1	0.4	
	No	121	**66.1**	63	**70.0**	184	**67.3**	**0.000**
Test positivities -	**Syphilis**	0	0.0	0	0.0	0	0.0	
for Syphilis	**HIV+ Hepatitis C**	1	0.5	0	0.0	1	0.4	
HIV and Hepatitis	**Hepatitis B**	1	0.5	0	0.0	1	0.4	
	No	181	**99**	90	**100.0**	271	**99.2**	0.609
Smoking	**Yes**	90	**49.2**	58	**64.4**	**148**	**54.2**	
	No	93	50.8	32	35.6	125	45.8	**0.017**
	AIDS**+Hepatitis C**	1	0.5	0	0.0	1	0.4	
	Depression	5	2.7	28	**31.1**	33	**12.1**	
	Depression/Cirrhosis	0	0.0	1	1.1	1	0.4	
	Depression/Anxiety	0	0.0	1	1.1	1	0.4	
Comorbidities	**Depression/Thalassemia**	0	0.0	1	1.1	1	0.4	
	Diabetes mellitus	18	**9.8**	5	5.6	23	**8.4**	
	Hepatitis B carrier	2	1.1	0	0.0	2	0.7	
	Hypothyroidism	0	0.0	2	2.2	2	0.7	
	Asthma	3	1.6	0	0.0	3	1.1	
	Tuberculosis	1	0.5	0	0.0	1	0.4	
	No	153	**83.6**	52	**57.8**	205	**75.0**	**0.000**

$P < 0.05$; HIV* = Human Immunodefiency Virus; MC** = Molluscum contagiosum; TC*** = Tinea cruris; AIDS**** = Acquired immune deficiency syndrome.

whereas women were mostly housewives (51, 56.7%) ($P < 0.05$). The females' income was significantly lower than the males' ($P < 0.05$). Divorced females (7, 7.8%) were more common than the opposite sex (3, 1.6%) ($P < 0.05$). Sexually active patients (256, 93.8%), sexual activity in the last 3 months (239, 87.6 %), and having more than one partner (146, 53.5%) were significantly higher in males than females (each $P < 0.05$). The patients' clinical features and other possible risk-factors are shown in Table 2 by gender. The lesions were mostly located in the perianal (44, 48.9%) and pubic areas (79, 43.2%), in females and males, respectively ($P < 0.05$). Concomitant verruca on hands was higher in males (61, 33.3%) than females (10, 11.1%) ($P < 0.05$). Most males had longer lesion duration compared to females ($P < 0.05$). The most commonly detected concomitant STD lesion in men was TC (58, 31.7%), whereas it was candidiasis in women (14, 15.9%) ($P < 0.05$). Smoking was more common in females (58, 64.4%) than males (90, 49.2%) ($P < 0.05$). The most commonly detected comorbidity in men was diabetes mellitus (18, 9.8%), whereas it was depression in women (28, 31.1%) ($P < 0.05$). Awareness of disease and related conditions of patients by gender are shown in

Table 3. Awareness of patients about HPV/AGW and related conditions according to sex.

Parameters	Awareness	Male	%	Female	%	Total	%	*P*
HPV* hearing	Aware	7	3.8	8	8.9	15	5.5	0.084
	Unaware	176	96.2	82	91.1	258	94.5	
HPV-AGW** relationship	Aware	7	3.8	8	8.9	15	5.5	0.084
	Unaware	176	96.2	82	91.1	258	94.5	
HPV-Cancer relationship	Aware	7	3.8	8	8.9	15	5.5	0.084
	Unaware	176	96.2	82	91.1	258	94.5	
Transmission routes	Aware	7	3.8	8	8.9	15	5.5	0.084
	Unaware	176	96.2	82	91.1	258	94.5	
Risk factors for AGW	Aware	7	3.8	8	8.9	15	5.5	0.084
	Unaware	176	96.2	82	91.1	258	94.5	
Prevention methods	Aware	4	2.2	2	2.2	6	2.2	0.985
	Unaware	179	97.8	88	97.8	267	97.8	

HPV* = Human Papilloma Virus; AGW** = Anogenital verruca or Anogenital wart

Table 3. Awareness of HPV hearing, HPV-AGW and HPV-cancer relationships, transmission routes, risk factors (each at 15, 5.5%), and prevention methods (6, 2.2%) was very low for both genders although there was no significant difference (each at $P > 0.05$). Of our patients, 72.2% were treated with both CRY+TCA, 27.5% with just CRY, and only one patient with topical antiviral. A total of 148 patients (54.2%) agreed to be vaccinated, and were given 3 shots of HPV vaccine at 0., 1., and 6. months. A total of 66.7% of females accepted to be vaccinated, compared to 48.1% of males, which was significant.

Discussion

The exact prevalence of AGWs is not established because reporting HPV infection to public health authorities is not mandatory.[10] In the U.S, an estimated 79 million persons are infected, and an estimated 14 million new HPV infections occur every year among persons aged 15–59.[11] Approximately, half of new HPV infections are diagnosed in persons aged 15–24 years,[9] and mainly sexually active adolescents/young adults are susceptible to primary HPV infection.[12] Soori *et al.* stated that AGWs are most commonly found in the 20–30 age range, but equally in both sexes.[13] Lin *et al.* reported that 82% of their patients were males, 31.5% of them were >50 and 28.8% were between 18 and 30.[5] A study by Patel *et al.* showed that AGWs were diagnosed more in males than females, and their incidence peaked before 24 years of age in females, and 25–29 age range among males.[14] Most of our subjects were males and in the 26–39 age range, which compatible with the literature. Similar to Patel *et al*.'s results, the majority of our subjects <25 were females and >40 were males. We thought that the reason for this might be related to the earlier marriage age of women than men in Turkey. The main documented risk-factors for HPV infection are early onset of sexual activity, multiple sexual partners, previous STDs, and early age of first pregnancy.[2] Soori *et al.* reported that the risk-factors were heterosexuals, married persons, those married before 20, patients who started having sex before 15, highly-educated persons, and having 2-4 lifetime sexual partners.[13] We found the lesions more frequently in low-educated persons whose monthly incomes was <USD1000 in both sexes. Due to the fact that our hospital is a governmental institute and our patient population is composed of rural and lower-income earners, we thought that the results might be related to the general economic status of the subjects in the district. The majority of the patients were married. However, housewife, monoandric females, and, self-employed polygynic males were relatively high. These results suggested that the likelihood of developing AGWs rose with uncontrolled sex due to increasing number of partners in males, whereas females' AGWs are thought to stem from their partners. AGWs are mostly found in the perianal region.[10,12] Although in the majority of the patients, lesions had mixed location, due to the dominance of perianal and pubic areas in females and males respectively, we thought that the locations could be related to most exposed locations during sexual intercourse. HPVs exhibit a trophism on both cutaneous and mucosal epithelium, and may be transmitted through skin-to-skin/mucosa-to-mucosa contaminations[2,15] or horizontal transmission routes such as manipulation, bathing or towels.[3] We also found verrucas in other sites of the body in 37% of our patients, and the concomitant lesions were mostly located on hands of both sexes (71, 26%) with a male dominance (61, 33.3%). Many patients stated that their AGWs developed some time after the other verruca lesions appeared. This condition supported the importance of manipulation in horizontal transmission. Due to the fact that the lesion durations in males were longer than females, we thought that females noticed their diseases earlier or were more sensitive about their genital health than males. Candidiasis was the most encountered concomitant STD in females, whereas it was TC in males. These genital infections might be associated with perianal and pubic locations of AGWs as they can be suitable for viral inoculations. Tobacco use has been described as another risk factor for AGWs in the literature.[2] Among our patients, more than half were smokers, however, the majority of them were women. Safe sex, monogamy, condom-use, anti-smoking strategies, establishing and implementing governmental cost-effective HPV vaccination schedules, and raising the awareness among the society regarding risky sexual behaviors have been described as preventive measures against AGWs.[16] Piñeros *et al.* reported that <50% of their 261 participants knew that HPV could be transmitted through non-penetrant sexual intercourse, and only two thirds acknowledged HPV vaccine as a preventive measure against HPV infection.[17] In their three-nation study, Marlow *et al.* reported that the overall HPV awareness and general knowledge of 2,409 participants was 61.1%, women were more likely to have heard of HPV than men, and HPV awareness among men (64%) was lower than women (88%). Male gender and lower educational level were associated with lower HPV awareness in these three countries and overall awareness of HPV vaccine

(79.1%) was higher in women than men.[18] A study from Turkey which examined the knowledge levels of university students about HPV infection, vaccination, and HPV-cervical cancer relationship, demonstrated that students' knowledge was generally low although their awareness level increased in accordance with their academic grades.[25] In our study, a great majority (258, 94.5%) of the patients were unaware of HPV, HPV-AGW and HPV-cancer relationships, transmission routes and risk factors for AGW, and, an even higher number (267, 97.8%) for prevention methods. There was no significant difference between the sexes for any of the parameters (each at $P > 0.05$). Moreover, they did not know that their lesions could be an STD and cause severe consequences. Most of them had misperceptions about their lesions, and they defined their lesions as nevi, pimples, protuberances, blemishes or wounds. This study is not without limitations. A relatively low number of patients from a single dermatology clinic can raise concerns regarding the validity of our findings. However, our hospital is a general station hospital as it caters to approximately 4.5 million inhabitants from a total of 10 districts in Istanbul. Furthermore, our patient population has generally migrated from different rural areas of the country which is why we believe that our patients represent diverse regional characteristics of Turkish people. Additionally, the patient counts of the sexes and each age group were not equal. Seventeen patients chose not to give us information about whether their partner had any AGWs, and eight did not respond about their sexual activity in the last three months. Moreover, the information that patients provided about their partners, could not be verified with the partners. However, we think that our results are important because not enough studies have been conducted regarding this topic in our country or in other countries.[10,18] We also believe that conducting population-based studies on AGWs with large sample size can be difficult due to the sensitive nature of the problem. Future studies are needed to better understand the epidemiological status of AGWs.

In conclusion, AGWs are mostly seen in sexually-active ages, self-employees, less-educated, low/middle income, married heterosexual Turkish people in the Bagcilar district. Self-employed, middle-income, polygyny, pubic location, long-duration, tinea cruris and diabetes mellitus are mostly encountered in males, while housewife, low-income, monoandry, perianal-location, short-duration, smoking, candidiasis and depression in females. Awareness of the patients about HPV/AGW and related conditions is very low.

Conflict of interests

All authors declare that they have no conflict of interests.

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