

Prevalence of *Chlamydia trachomatis*/*Neisseria gonorrhoeae* and Human Papilloma Virus among Women-at Risk in the Aegean Region of Turkey, and their knowledge about HIV/AIDS

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ABSTRACT

Background: The aim of this study was to determine the prevalence of selected sexually transmitted diseases (STDs) and the level of knowledge and attitudes regarding HIV/AIDS among Turkish brothel based sex-workers (SWs).

Subjects and Methods: A pre-designed questionnaire was administered to 199 SWs to obtain their sexual behaviours and their level of knowledge of HIV/AIDS. The specimens collected for *C trachomatis*/*N gonorrhoeae* and human papillomavirus (HPV) were tested using Gen-Probe PACE 2 and HPV-screening assays, respectively.

Result: Approximately sixty-seven per cent of the SWs knew that condoms afforded protection against HIV/AIDS and 62% reported continued use of condoms. Although most of the SWs had heard about HIV/AIDS, thorough knowledge of transmission and prevention was lacking. The overall estimated rates for *C trachomatis*/*N gonorrhoeae* and HPV were 18.6% and 9.7%, respectively.

CONCLUSION: There is a need for further studies to generate more data on the prevalence of STDs and the knowledge of STDs in this population.

Prevalencia de *Chlamydia trachomatis*/*Neisseria gonorrhoeae* y el Virus del Papiloma Humano entre las Mujeres en Riesgo, y sus Conocimientos Sobre la VIH/SIDA, en la Región egea de Turquía

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RESUMEN

Antecedentes: El objetivo de este estudio es determinar la prevalencia de las enfermedades de transmisión sexual (ETS) seleccionadas, y el nivel de conocimientos y actitudes en relación con el VIH/SIDA entre las trabajadoras sexuales (TS) en burdeles turcos.

Sujetos y Métodos: Se aplicó un cuestionario prediseñado a 199 trabajadoras sexuales a fin de revelar sus comportamientos sexuales y su nivel de conocimientos acerca del VIH/SIDA. Las muestras de *C trachomatis*/*N gonorrhoeae* y virus del papiloma humano (VPH) recogidas, fueron analizadas mediante la sonda genética conocida como Gen-Probe PACE 2 y ensayos de pesquiasaje de VPH, respectivamente.

Resultado: Aproximadamente sesenta y siete por ciento de las TS sabían que los condones daban protección contra el VIH/SIDA, y el 62% reportó uso continuado de condones. Aunque la mayor parte de las TS habían oído acerca del VIH/SIDA, les faltaban conocimientos cabales sobre la transmisión y prevención de ETS. Las tasas generales estimadas de *C trachomatis*/*N gonorrhoeae* y VPH fueron 18.6% y 9.7%, respectivamente.

Conclusión: Es necesario realizar estudios ulteriores a fin de generar más datos acerca de la prevalencia de las ETS y los conocimientos acerca de ellas en esta población.

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INTRODUCTION

Chlamydia trachomatis and *Neisseria gonorrhoeae* are two of the major causes of sexually transmitted diseases (STDs) worldwide. Accurate diagnosis of those infected is essential for effective treatment and control strategies (1).

An increased prevalence of chlamydia and gonorrhoeae has been reported among sex-workers in many countries but limited data are available concerning *C trachomatis/N gonorrhoeae* prevalence and, to the best of our knowledge, there are no studies on human papilloma virus prevalence among the Turkish brothel based sex-workers (2, 3). The importance of these sexually transmitted diseases increases with recent data showing their association with high transmission rate of HIV and increased gynaecological complications (4).

Data from observational studies suggest that individuals with multiple sexual partners such as sex-workers, the so-called "core group," are key to exacerbating and sustaining HIV epidemics (5). Therefore, preparation of relevant and effective prevention programmes for HIV/AIDS require better understanding of not only the epidemiology of STDs but also attitudes, behaviours and practices in the local community, particularly among high risk populations.

The aim of this study was to determine the prevalence of *C trachomatis/N gonorrhoeae* and HPV and to assess HIV/AIDS related knowledge, attitudes, behaviour and sexual practices among brothel based sex-workers in the Aegian region of Turkey. Furthermore, we hope that this information would help STD programme managers decide whether there is a need for more comprehensive educational programmes for this high risk group.

SUBJECTS AND METHODS

The study was conducted among 250 brothel based SWs from June to November 2006 in Manisa and Izmir cities which are located in the Aegian region of Western Turkey. Face-to-face interviews were carried out with the SWs who agreed to participate in this study. The informed written consents were obtained from each subject after discussing confidentiality issues. The protocol of the study and questionnaire were reviewed and approved by the Local Ethics Committee and appropriate Health Authorities.

After the interviews, a standard pelvic examination was performed by a physician, during which both cervical and vaginal specimens were collected from all eligible subjects. The vaginal swab samples taken with synthetic tipped swabs were placed into a Stuart transport medium (Oxoid Limited, Hampshire, England) and sent to the Bacteriology Laboratory of the Medical Faculty of Celal Bayar University. Vaginal smears were then Gram stained and examined according to the criteria of Nugent *et al* for the following morphotypes; large gram positive rods (*Lactobacillus* morphotypes), small gram-variable and gram-negative rods (*Gardnerella* and *Bacteroides* morphotypes) and curved gram-variable rods (*Mobilincus* morphotypes). Each mor-

photype was quantified on a scale of 0 to 4+ and weighted to yield a score of 0 to 10. A vaginal smear with a score of ≥ 7 was defined as bacterial vaginosis and a score up to 3 was considered normal (6).

A second cotton swab inserted into the cervical canal was used for *C trachomatis/N gonorrhoeae* and for human papilloma virus testing. For the PACE 2 (Gen-Probe) and HPV-screening test kit (GenID GmbH, Germany), specimen collection, transport and testing were carried out in accordance with the manufacturer's specifications.

The PACE 2C procedure was performed by pipetting a 100- μ l aliquot from each GenProbe specimen into a clean tube and adding 100 μ l of probe reagent, followed by a 60-minute incubation at 60°C. After mixing with separation reagent, specimens were placed in the magnetic separation unit for five minutes. Each residual pellet was then washed with wash solution. Finally, after addition of the detection reagents, specimens were read on a luminometer. The PACE 2C test results were calculated on the basis of the difference between the response in relative light units (RLU) of the specimen and the mean of the three negative reference replicates.

HPV-screening test kit (GenID GmbH, Germany) enables detection of HPV and differentiation of high risk and low risk genotypes of HPV by polymerase chain reaction (PCR) and subsequent reverse dot blot hybridization with sequence-specific oligonucleotide probes. First, two PCRs are performed with DNA isolated from cervical scrape material. The amplified gene fragments (amplicons) were subsequently characterized by a hybridization reaction with sequence-specific oligonucleotide probes (SSOP) which represent particular HPV-genotypes, and were immobilized on nitrocellulose membrane. The band pattern can be analyzed using the template supplied.

Statistical analysis

Data were analyzed using SPSS version 10.0 for Windows (SPSS Inc., Chicago, IL). Values of $p < 0.05$ were considered statistically significant.

RESULTS

Of 250 sex-workers, a total of 199 were interviewed (Table 1). The mean age of the subjects was 39.8 (SD \pm 10.0, range 23-74) years. More than half of them had been working in this profession for more than 10 years and had very little education. They were either illiterate or primary-school graduates (77.9%). The median age of first intercourse was 16 years and the number of clients per day ranged from one to more than 30, with a median of 2. Sixty-two per cent of the women reported that they always used condom with clients. On the other hand, 29.1% of them used condoms frequently and only 8.5% occasionally used condoms. Subjects indicated that intercourse with a repeat/regular partner was the main reason for not using condom. Age or educational levels of SWs were not associated with use of condoms.

Table 1: Selected sociodemographic characteristics, sexual behaviours and general knowledge about STI (n = 199)

	n (%)
Age group (years)	
# 24	6 (3.0)
25–34	60 (30.2)
35–44	69 (34.7)
§ 45	64 (32.2)
Educational levels	
Illiterate	39 (19.6)
Primary	116 (58.3)
Secondary	24 (12.1)
High school	18 (9.0)
Higher education	2 (1.0)
Age of first sex (years) -median (range)	16 (11–28)
Duration as sex workers (years)	
< 5	31 (15.6)
5–9	40 (20.1)
10–14	41 (20.6)
15–19	28 (14.1)
§ 20	59 (29.6)
Number of clients per day	
1–9	79 (39.7)
10–19	60 (30.2)
20–29	34 (17.1)
§ 30	26 (13.1)
Condom use	
Always	124 (62.3)
Frequently	58 (29.1)
Occasionally	17 (8.5)
Never	0 (0.0)
Reasons for not using condom	
Repeat/regular clients	50 (25.1)
Clients refusal	23 (11.6)
Both	2 (1.0)
Drug use in the past	4 (2.0)
STI infection in the past	24 (12.1)

STI = Sexually transmitted infection

Twelve per cent of subjects reported having at least one episode of STD. Use of illicit drugs in the past was rare (2%).

Overall knowledge on blood and sexual transmission of HIV/AIDS was high. On the other hand, only 50% of subjects were aware of other modes of transmission of AIDS such as vertical transmission and sharing various instruments with an infected person during, for instance, a dental appointment or a manicure session in a beauty saloon (Table 2). Significant differences between those who had and had not heard of HIV/AIDS were seen with regard to their knowledge about blood, sexual and vertical transmission of HIV. The former group significantly named these items as modes of transmission ($p = 0.00$, $p = 0.04$ and $p = 0.04$, respectively). Furthermore, those who heard of HIV/AIDS were aware that condom usage was effective for prevention of this

Table 2: The sex-workers knowledge of and attitudes towards AIDS/HIV (n = 199)

Knowledge of AIDS/HIV	Yes	n (%)	Don't Know
Heard about AIDS	170 (85.4)	29 (14.6)	–
AIDS/HIV can be contacted through:	164 (82.4)	21 (10.6)	14 (7.0)
Receiving blood from an infected person	174 (87.4)	8 (4.0)	17 (8.5)
Having sex with an infected person	86 (43.2)	87 (43.7)	26 (13.1)
Having a tooth extracted with the same devices after an infected person	88 (44.2)	87 (43.7)	24 (12.1)
Having manicure done with the same devices after an infected person	93 (46.7)	79 (39.7)	27 (13.6)
An infected pregnant woman infecting her unborn baby	59 (29.6)	109 (54.8)	31 (15.6)
Sharing public toilets with an infected person	51 (25.6)	118 (59.3)	30 (15.1)
Using an infected person's belongings such as clothes, underwear and towel	34 (17.1)	137 (68.8)	28 (14.1)
Touching an infected person such as shaking hands	43 (21.6)	126 (63.3)	30 (15.1)
Sharing the food utensils of an infected person			
AIDS/HIV can be prevented by condom	133 (66.8)	4 (2.0)	62 (31.2)
There is a active treatment for AIDS/HIV	56 (28.1)	107 (53.8)	36 (18.1)
There is a vaccine for AIDS/HIV	44 (22.1)	97 (48.7)	58 (29.1)
Can you distinguish AIDS/HIV patients from others by their appearance	47 (23.6)	131 (65.8)	21 (10.6)
Can you work in the same places with a person infected with AIDS/HIV	28 (14.1)	158 (79.4)	13 (6.5)

disease ($p = 0.02$). Misconception that HIV could be transmitted by sharing toilets with an infected person, using an infected person's clothing and shaking hands was not associated with age and education. The misconception that HIV could be transmitted by sharing food utensils with an infected person was more common among uneducated subjects ($p = 0.01$). A great percentage of the subjects, some 80%, expressed negative attitudes towards HIV/AIDS positive patients, stating that they would never work in the same places as them.

Along with corresponding interview data, results for *C trachomatis/N gonorrhoeae* were available for 187 subjects screened with Gen-Probe PACE 2 assay and for 124 subjects screened for HPV using HPV-screening test kit (GenID GmbH, Germany). The prevalence of *C trachomatis/N gonorrhoeae* and HPV among sex-workers were 18.6% (37/187) and 9.7% (12/124), respectively. Of the 187 subjects screened with Gram staining, 42 (21.1%) showed positive and 157 (78.9%) negative results for BV according to Nugent criteria. There were no significant differences between prevalence rates of *C trachomatis/N gonorrhoeae* and HPV among the subjects with or without BV. The prevalence of these STDs was not associated with demographic and behavioural characteristics of the subjects ($p > 0.05$).

DISCUSSION

In this study, we present the data acquired from a sample of 199 brothel based SWs in the Aegean region of Turkey on the prevalence rates of *C trachomatis*/*N gonorrhoeae* and HPV as well as their sexual practices, level of knowledge and attitudes with regard to HIV/AIDS.

Our results show that despite the educational seminars, the overall knowledge of SWs on HIV/AIDS was insufficient and their misconceptions regarding transmission and prevention persisted. Even though Health Authorities and physicians in charge of brothels conduct regular talks, as part of the educational and behavioural intervention programmes to all brothel-based sex-workers to promote constant condom use with clients, we found that only 60% of SWs used condoms regularly. In contrast to our finding, these programmes, were found to be effective in increasing constant use of condom, with a consequent decline in STDs among brothel based SWs in some countries (7). Absence of regular use of condoms is a cause for concern regarding safe sex practice and indicates the need for education among sex-workers in Turkey. As such, conducting more qualitative studies on sex-workers in order to understand better the socio-economic and cultural context of their work and their reasons for not using condoms would be instrumental in preparation of educational programmes.

C trachomatis is a common sexually transmitted infection that can have serious consequences (8). Many developed countries have implemented screening programmes in recent years to identify *C trachomatis* infections while many others are still in the process of considering the best way to implement chlamydia screening programmes (9). Implementation of screening programmes has not been fully achieved in Turkey yet and the true prevalence of *C trachomatis* among Turkish women, especially high risk groups such as sex-workers is yet to be determined. Previous studies which focussed on Turkish sex-workers have reported 12.0% and 25.4% prevalence rates of *C trachomatis* among registered and 14.4% among unregistered sex-workers (3, 10). In this study, we found that approximately a fifth of all sex-workers examined in our region were infected with *N gonorrhoeae*/*C trachomatis*. Infection rate for *N gonorrhoeae*/*C trachomatis* (18.6%) calculated in this study is similar to that previously reported among Turkish sex-workers (3, 10). On the other hand, when compared with the results of a study carried out in Turkish family planning clinics, at which a lower risk population is registered, the prevalence of STDs among SWs was higher (11). No *N gonorrhoeae* cases were identified among some 600 women registered with these family planning clinics and the prevalence of *C trachomatis* was found to be 1.9%, reflecting the distinct nature of study groups.

Different epidemiological studies reveal that the prevalence of the human papillomavirus (HPV) depends largely on age and sexual practices and that it shows major differences across geographic areas (12–14). In Turkey, HPV had

not been investigated in a population of sex-workers previously. However, two studies have found HPV-DNA in 4.9% and 6.1% of women who attended Obstetrics and Gynaecology clinics (15, 16). In comparison with these earlier studies, we found a relatively high prevalence of HPV (9.7%) in sex-workers but future studies are necessary to determine the significance of HPV in this population.

Several studies have demonstrated that bacterial vaginosis (BV) is associated with sexual behaviour risk factors similar to those for other sexually transmitted diseases (17, 18). Others have demonstrated that women with BV, as compared with normal vaginal flora, were more likely to be positive for *N gonorrhoeae* and for *C trachomatis* (19, 20). An association between BV and gonococcal/chlamydial cervicitis has been demonstrated in a prospective cohort study of female SWs in Kenya (21). Similarly Moi (22), in a study of 2128 women attending a sexually transmitted disease clinic, found BV to be associated with gonococcal/chlamydial infection. In the index study, by Nugent's criteria, BV was less common in SWs, compared to the experience of others studying similar populations and the association between this condition and *N gonorrhoeae*/*C trachomatis* rate as well as between BV and sexual behaviours of SWs were not found (23, 24).

In conclusion, the level of knowledge of SWs on HIV/AIDS in the present study was deficient with most SWs showing negative attitudes towards HIV/AIDS positive patients. Taking these findings into account, the authorities should implement more educational programmes in order to improve knowledge and sexual behaviours of the SWs in Turkey. We are fully aware of the fact that our data is based only on the prevalence of *N gonorrhoeae*/*C trachomatis* and HPV and that it does not represent the real status of STDs among SWs in Turkey. However, these results would definitely provide a better understanding of sexual behaviours, knowledge and attitudes of SWs and practical benefits with regard to preparation of educational strategies.

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