Risk profiles for sexually transmitted diseases among patients attending the venereal disease clinic at Alexandria Main University Hospital

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عوامل اختطار الأمراض المنقولة جنسياً بين المرضى المترددين على عيادة الأمراض التناسلية بالمستشفى الرئيسي الجامعي بالإسكندرية.

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خلاصة: أجريت دراسة لتقدير عوامل الخطر ذات الصلة بالأمراض المنقولة جنسياً، وذلك على 54 مريضاً ذكراً و36 مريضة من المترددين على عيادة للأمراض الجلدية والتناسلية. فتم جمع بيانات عن أحوالهم الاجتماعية والديمغرافية ومعلومات عن تاريخهم من حيث السلوك الجنسي والأمراض المنقولة جنسياً. وبعد فحص المرضى، أخذت منهم عينات للتشخيص المختبري. وأظهر تحليل الانحدار اللوجستي متعدد المتغيرات أن عوامل التكهن الجوهرية بالأمراض التناسلية بين المرضى الذكور هي: العزوبة، وتعدد قرناء الجنس، والتعرض لقرين لديه أعراض مرض جنسي، وتعدد الاتصالات الجنسية أسبوعياً، وتكرر نوبات الأمراض المنقولة جنسياً، وممارسة الجنس بين الفخذين. أما في المريضات الإناث، فقد كان هناك عاملان جوهريان للتكهن، هما التعرض لقرين جنسي لديه أعراض، وتواتر الاتصالات الجنسية في الأسبوع.

ABSTRACT Risk factors for sexually transmitted diseases (STDs) were assessed among 54 male and 36 female patients attending a venereal disease clinic. Sociodemographic data and information on sexual behaviour/STD history were collected. Patients were examined and specimens taken for laboratory diagnosis. Multivariate logistic regression analysis revealed that the significant predictors of genital infections among the male patients were: being unmarried, having multiple sexual partners, exposure to a symptomatic sexual partner, high frequency of intercourse per week, having repeated episode(s) of STDs and practising coitus interfemoris. In the female patients, exposure to a symptomatic sexual partner and high frequency of intercourse per week were the only significant predictors.

Profil des risques pour les maladies sexuellement transmissibles chez des patients venus en consultation dans le service de vénérologie de l'hôpital universitaire principal d'Alexandrie

RESUME Les facteurs de risque des maladies sexuellement transmissibles (MST) ont été évalués chez des patients (54 hommes et 36 femmes) venus consulter dans un service de vénérologie. Des données sociodémographiques et des informations ont été recueillies sur le comportement sexuel/les antécédents de MST. Les patients ont été examinés et des prélèvements ont été effectués pour le diagnostic biologique. L'analyse de régression logistique multivariée a révélé que les facteurs prédictifs significatifs des infections génitales chez les patients de sexe masculin étaient les suivants: le fait d'être célibataire, d'avoir des partenaires sexuels multiples, l'exposition suite à un contact avec un partenaire sexuel symptomatique, la fréquence élevée des rapports sexuels hebdomadairement, le fait d'avoir des épisodes répétés de MST et la pratique du *coitus interfemoris*. Chez les femmes, l'exposition suite à un contact avec un partenaire sexuel symptomatique et la fréquence élevée des rapports sexuels hebdomadairement étaient les seuls facteurs prédictifs significatifs.

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Received: 03/12/98; accepted: 21/02/99

Introduction

There are at present no reliable statistics on the true prevalence of sexually transmitted diseases (STDs) in developing countries. In industrialized countries, where reliable statistics are available, STDs are a major public health and social problem. The same is probably true for developing countries, where unfortunately facilities for correct diagnosis and treatment of these diseases are inadequate [*1,2*].

The need for the control of STDs has become more urgent since they have been recognized as independent risk factors for the acquisition of human immunodeficiency virus (HIV) [*3,4*]. In addition, STDs and their complications result in substantial morbidity and mortality independent of their role in HIV transmission. Failure to diagnose and treat infections such as gonorrhoea, chlamydia and syphilis can have a deleterious effect on pregnancy and the neonate (such as miscarriage, prematurity, congenital and neonatal infections and blindness). Other complications, particularly in women, such as pelvic inflammatory disease, ectopic pregnancy, cervical cancer, in addition to both male and female infertility, are major health and social problems [*5.6*]

Despite the extent of the STD problem and its consequences, few attempts have been made to identify the biological risk factors for STDs other than HIV [*4,7*]. Identification of the risk factors for STDs may enable more appropriate targeting of the limited resources available for their diagnosis and treatment and may help in the development of improved treatment algorithms [*4*].

Good clinical care for patients with STDs must go beyond therapy and include help to avoid future infections [*3*]. Control activities should focus on the primary prevention of infection through safer sexual practices and greater condom use. Strategies for improving secondary prevention (healthcare-seeking behaviour and case management) should include identification of people at high risk of acquiring and transmitting infections and targeting them for intervention [*3,8*].

From a public health perspective, preventing infection in the people most likely to transmit the infection to others will have the greatest impact on reducing the incidence of STDs. The incidence of STDs in a community has been thought to be largely driven by the prevalence of infection in core groups containing large number of high-frequency transmitters [*9*]. If an intervention could reduce the prevalence of infection in the core group, it would have a disproportionally large effect on the prevalence rates of STDs in the community.

The aim of our study was to determine the sociodemographic and behavioural risk factors for STDs, other than hepatitis B and HIV infections, among attendees of the venereal disease clinic at Alexandria Main University Hospital.

Subjects and methods

A retrospective case–control study was conducted at the dermatovenereology (DV) clinic in Alexandria Main University Hospital, Alexandria University, during a 6-month period between October 1997 and March 1998. The purpose of the study and procedures to be performed were explained to participants to allay any concerns they might have and to increase interest and participation. Laboratory investigations were carried out at the Medical Microbiology Laboratory, Alexandria University.

Selection of cases and procedures

During the study period, all consecutive patients with genital tract complaints newly attending the DV clinic were asked to participate (n = 102). Complaints among the male patients included urethral discharge, dysuria, genital ulcers, genital warts, genital pruritus, dyspareunia or others. Additional complaints among the female patients included abnormal vaginal discharage (defined as increased amount, abnormal odour or yellow colour) and lower abdominal and/or back pain.

Of the 102 STD patients initially approached, 90 (88.2%) (54 males and 36 females) agreed to participate and were enrolled in the study. After obtaining informed consent, each participant was given an interview questionnaire to collect information on sociodemographic characteristics, sexual behaviour, history of past genital infections as well as the reproductive history of female patients. Characteristics of the 12 (11.8%) patients who refused to participate were not studied.

All male patients had a full clinical history taken and underwent a direct physical examination for genital infections, which included the determination of the presence of urethral discharge by milking of the urethra if necessary.

Female patients underwent a standardized pelvic examination (including speculum and bimanual examination), with specific attention given to inflammation of the vulva, vagina and cervix, characteristics of vaginal discharge (amount, colour and consistency) and abnormal cervical, uterine and adnexal tenderness. Vaginal, cervical and urethral swabs were taken.

Urethral swabs were taken from each male patient complaining of urethral discharge and/or dysuria for Gram stain and *Neisseria gonorrhoeae* culture. Specimens for gonorrhoea were inoculated directly onto Thayer–Martin culture medium plates at the clinic. The plates were transported to the laboratory on the same day and incubated at 36–37 °C. The oxidase test and Gram stain were used to identify positive *N. gonorrhoeae* cultures. A patient was diagnosed as having gonococcal urethritis if the Gram stain of the urethral discharge had Gram-negative intracellular diplococci or if the culture was positive. A patient was diagnosed as having nongonococcal urethritis when the above-mentioned diagnostic tests for gonorrhoea were negative, but at least five polymorphonuclear leukocytes were observed in a high-power field in the direct urethral smear [*10*].

Primary and secondary syphilis were diagnosed by dark field or phase-contrast examination of exudates of lesions and by either of the following serological tests: the Venereal Disease Research Laboratory (VDRL) test or the rapid plasma reagin (RPR) test. Positive tests were confirmed by *Treponema pallidum* haemagglutination (TPHA) test.

Diagnosis of mixed sores was made by isolation of both *Haemophilus ducreyi* and *T. pallidum* from exudates of lesions (on selective media for *H. ducreyi*, and by dark field or phase-contrast examination for *T. pallidum*).

Both male and female patients were routinely screened by microscopy for candidiasis, trichomoniasis, molluscum contagiosum and gonorrhoea, as well as for bacterial vaginosis in females. Cultures were taken for *Candida albicans* and *Trichomonas vaginalis*.

Anogenital warts, genital scabies, pediculosis pubis and genital herpes were diagnosed clinically. Diagnosis of genital warts was confirmed by an excision biopsy. Scabies was identified by recovering the mite from its burrow by scraping and microscopical examination. Pubic hair was

carefully and closely examined to check for an infestation with adult lice or nits. Genital herpes was clinically diagnosed by characteristic vesicular lesions, either with or without erosion or ulceration.

For female patients, a clinical diagnosis of pelvic inflammatory disease was made when moderate to severe cervical, uterine and/or adnexal tenderness was present, and cervical mucopus was seen [*11–14*]. A woman was considered infertile if she reported that she wanted more children, was trying to conceive and had had unprotected intercourse for 2 years or more [*14*].

Case management

At the initial visit, case management (initial treatment decision) was based upon commonly presenting signs and symptoms (syndromic approach). The doctor asked patients to return after a 7–10-day interval. At this follow-up visit, the syndromic diagnosis suggested was compared with the laboratory results (definitive diagnosis). When the laboratory test revealed an infection which had not been treated, the patient received the recommended treatment regimen at the follow-up visit.

Selection of controls

During the study period, an equal number of controls (matched by age and sex) were selected from patients attending the DV clinic for reasons other than genital tract complaints. Unmarried females were excluded. Informed consent of the patients was given.

All the males patients in the control group had a full clinical history taken and underwent a direct physical examination of external genitalia to exclude any genital infection. The female patients in the control group were interviewed and examined by a female physician.

Statistical analysis

Data analysis was performed using *SPSS*. The chi-squared test was used to assess associations of different variables with genital infections. The Mantel–Haenszel chi-squared ($MH_z\chi^2$) was also calculated in ordered categorical variables. Odds ratios (OR) were calculated with 95% confidence intervals (CI). Continuous variables were assessed using the Student *t*-test. Multivariate stepwise logistic regression analysis was used to control for confounding factors. The choice of variables in the model was based on the results of the univariate analyses.

Results

The study was conducted from October 1997 to March 1998 during which time 54 consecutive new male patients and 36 female patients attended the DV clinic. Equal numbers of male and female controls (matched by age) were also included.

Sociodemographic characteristics of patients with genital infections

For the male patients, the age range was 16–55 years (mean ± standard deviation = 34.94 ± 11.89 years; median = 37 years). There were 23 (42.6%) married men, 23 (42.6%) single, 3 (5.6%) divorced/separated and 5 (9.2%) were widowed. Of the 54 male patients, 49 (90.7%) were currently employed. Of these, 40.8% were manual/unskilled workers, 28.6% were semi-skilled/skilled workers and 30.6% were semiprofessionals/professionals. As regards educational level, 20 (37.1%) were illiterate, 9 (16.7%) had elementary education, 16 (29.5%) had secondary education and 9 (16.7%) were university graduates.

For the female patients, the age range was 20–55 years (mean ± standard devia-

tion = 32.69 ± 9.33 years; median = 31 years). All the women were married. The majority (83.3%) were unemployed/housewives; only 16.7% were manual/unskilled workers. In terms of educational levels, 9 (25.0%) of the women were illiterate, 14 (38.9%) had elementary education, 11 (30.5%) had secondary education and only 2 (5.6%) were university graduates.

Reason for clinic visit, and current genital infections

The reasons for visiting the clinic or chief presenting complaint, and the current genital infections are summarized in Tables 1 and 2 respectively.

Table 1 **Reason for clinic visit (main complaint)**

Main complaint[a]	No.	%
Males		
Genital sore or ulcer	33	61.1
Dysuria	17	31.5
Urethral discharge	16	29.6
Sexual dysfunction:		
premature ejaculation	9	16.7
painful intercourse	7	13.0
impotence	2	3.7
Genital itch	14	25.9
Frequent micturition	11	20.4
Testicular pain and swelling	3	5.6
Females		
Vulvar pruritus	28	77.8
Abnormal vaginal discharge[b]	23	63.9
External genital lesions	18	50.0
Dysuria	12	33.3
Painful intercourse	7	19.4
Lower abdominal/back pain	4	11.1
Frequent micturition	3	8.3

[a] *Patients might have one or more concurrent symptoms.*
[b] *Defined as increased amount, abnormal odour or yellow colour*

Table 2 **Current genital infections by sex**

Genital infection	Males (*n* = 54) No.	%	Females (*n* = 36) No.	%
Gonorrhoea	8	14.8	0	0
Non-gonococcal urethritis	7	13.0	0	0
Trichomoniasis	0	0	3	8.3
Candidosis	2	3.7	14	38.9
Genital herpes	4	7.4	3	8.3
Genital warts	13	24.1	4	11.1
Genital scabies	13	24.1	3	8.3
Syphilis	3	5.6	0	0
Molluscum-contagiosum	1	1.9	2	5.6
Bacterial vaginosis	–	–	3	8.3
Mixed vaginitis[a]	–	–	3	8.3
Pediculosis pubis	2	3.7	1	2.8
Mixed sores[b]	1	1.9	0	0

[a] *Infection with* Trichomanas vaginalis *and* Candida albicans
[b] *Coinfection with* Haemophilus ducreyi *and* Treponema pallidum

Associated conditions and/or complications of patients with genital infections

Of the 31 ever-married male patients, 9 (29.5%) were infertile. Of the 54 male patients, 15 (27.8%) had sexual disorders (such as premature ejaculation, painful intercourse or impotence), 3 (5.6%) had epididymitis, 5 (9.3%) reported alcohol use and 2 (3.7%) reported drug abuse.

Of the 36 female patients, 15 (41.7%) did not use any form of contraception, 13 (36.1%) used an intrauterine device (IUD), 7 (19.4%) used oral contraceptive pills; only one woman's (2.8%) husband used condoms. Pelvic inflammatory disease was diagnosed in 3 (8.3%) women, 4 (11.1%)

were infertile, 5 (13.9%) had a history of ectopic pregnancy or cervical ectopy and 9 (25.0%) had a history of spontaneous abortion. One women (2.8%) had had a hysterectomy.

Risk assessment among the male patients

Results of the univariate associations of potential risk factors with genital infections are shown in Table 3. Genital infections were significantly associated with: being unmarried (OR = 2.41, 95% CI = 1.10–5.25), teenaged (16–19 years) at first sexual intercourse (OR = 2.94, 95% CI = 1.22–7.05), later age at marriage (MH_{χ} χ^2 = 7.0949, P = 0.0077), history of repeated epsiode(s) of STDs (OR = 2.90, 95% CL = 1.17–7.19), and having vaginal intercourse more than 3 times per week (χ^2 = 17.188, P = 0.0042). A significant association with practising coitus interfemoris (nonpenetrative sex between the thighs) was also observed (OR = 3.22, 95% CI = 1.40–7.40).

Multiple sexual partners in the preceding year, 5 years or during lifetime carried a risk for the acquisition of genital infection (MH_{χ} χ^2 = 6.938, 15.981 and 15.229 respectively and P = 0.0084, 0.00006 and 0.0001 respectively). On the other hand, having a single sexual partner either in the past year (OR = 0.27, 95% CI = 0.10–0.73), past 5 years (OR = 0.14, 95% CI = 0.06–0.36) or during lifetime (OR = 0.03, 95% CI = 0.004–0.230) were all significant protective factors against the acquisition of genital infections.

Condoms were never used by a considerable proportion of patients with STDs (61.1%); only 38.9 % reported occasional (irregular) condom use, while none reported regular condom use. No significant association could be found between condom use and genital infections (OR = 0.73, 95% CI = 0.33–1.62).

Other variables investigated, none of which was significant, included educational level, occupation and exposure to a symptomatic sexual partner.

Based on the findings of the univariate analyses, nine variables were selected to enter a multivariate stepwise logistic regression model (Table 4). An additional tenth variable (symptomatic sexual partner) was also entered as it was positively associated with the acquisition of genital infections and was of marginal significance in the univariate analysis. The variables related to number of sexual partners either in the preceding year, past 5 years or lifetime partners were stratified into > 1 sexual partner (code = 1) and ≤ 1 sexual partner (code = 0). All the male patients studied reported having more than one sexual partner in the previous year, 5 years or during lifetime. Hence, these three variables were constant for all cases and were removed from the analysis.

The significant predictors of genital infections among the male patients were: being unmarried, practising coitus interfemoris, exposure to a symptomatic sexual partner, vaginal intercourse more than 3 times per week, and having a history of repeated episode(s) of genital infections.

Risk assessment among the female patients

Table 5 presents the univariate analyses of the associations of potential risk factors with the presence or absence of genital infection among all the female patients studied. Because unmarried women were excluded from the study, and because few of the women were currently pregnant and few used condoms, we were not able to examine the component categories of these variables separately.

STDs were significantly related to only two factors: exposure to a symptomatic

Table 3 **Univariate analysis of the associations of potential risk factors with genital infection among male patients**

Potential risk factors	Male cases (n = 54) No.[a] (%)	Male controls (n = 54) No.[a] (%)	Univariate OR (95% CI)	χ^2 (P-value)
Sociodemographic				
Marital status				
Unmarried	31/54 (57.4)	20/54 (37.0)	2.41* (1.10–5.25)	4.9939* (0.0254)
Married	23/54 (42.6)	34/54 (63.0)		
Education				
None	20/54 (37.0)	12/54 (22.3)	0.49 (0.21–1.13)	1.007 (0.3155)
Elementary	9/54 (16.7)	16/54 (29.6)		
Secondary/university	25/54 (46.3)	26/54 (48.1)		
Occupation				
Manual/unskilled	20/49 (40.8)	20/48 (41.7)		0.1421 (0.7062)
Semiskilled/skilled	14/49 (28.6)	15/48 (31.3)		
Semiprofessional/professional	15/49 (30.6)	13/48 (27.0)		
Sexual/STD history				
Age at coitarche (years)				
16–19	24/50 (48.0)	11/46 (23.9)	2.94* (1.22–7.05)	6.0002* (0.0143)
20–30	26/50 (52.0)	35/46 (76.1)		
Age at marriage (years)				
18–19	0/31 (0.0)	2/40 (5.0)		7.0949* (0.0077)
20–29	18/31 (58.0)	28/40 (70.0)		
30–36	13/31 (41.9)	10/40 (25.0)		
Sexual partner symptomatic				
Yes	17/54 (31.5)	7/44 (15.9)	2.43 (0.90–6.54)	3.1794 (0.0746)
No	37/54 (68.5)	37/44 (84.1)		
Past history of STDs				
Yes	22/54 (40.7)	9/47 (19.1)	2.90* (1.17–7.19)	5.5072* (0.0189)
No	32/54 (59.3)	38/47 (80.9)		
Frequency of vaginal intercourse per week				
0	13/48 (27.1)	9/46 (19.6)		17.188* (0.0042)
1–3	27/48 (56.2)	34/46 (73.9)		
>3	8/48 (16.7)	3/46 (6.5)		
Coitus interfemoris				
Ever practised	31/53 (58.5)	14/46 (30.4)	3.22* (1.40–7.40)	7.8182* (0.0052)
Never practised	22/53 (41.5)	32/46 (69.6)		
No. of sexual partners in the past year				
0	2/49 (4.1)	0/45 (0.0)		
1	28/49 (57.2)	38/45 (84.4)	0.27* (0.10–0.73)	6.938* (0.0084)
2	10/49 (20.4)	7/45 (15.6)		
3–5	8/49 (16.3)	0/45 (0.0)		
>5	1/49 (2.0)	0/45 (0.0)		

Table 3 *(continued)*

Potential risk factors	Male cases (*n* = 54) No.[a] (%)	Male controls (*n* = 54) No.[a] (%)	Univariate OR (95% CI)	χ^2 (*P*-value)
No. of sexual partners in the past 5 years				
1	13/48 (27.1)	33/46 (71.7)	0.14* (0.06–0.36)	15.981* (0.00006)
2	14/48 (29.2)	9/46 (19.6)		
3–5	16/48 (33.3)	4/46 (8.7)		
>5	5/48 (10.4)	0/46 (0.0)		
No. of sexual partners during lifetime				
1	1/48 (2.1)	19/45 (42.2)	0.03* (0.004–0.23)	15.229* (0.0001)
2–5	39/48 (81.3)	26/45 (57.8)		
6–10	4/48 (8.4)	0/45 (0.0)		
>10	4/48 (8.4)	0/45 (0.0)		
Condom use				
Ever used	21/54 (38.9)	21/45 (46.7)	0.73 (0.33–1.62)	0.6079 (0.4356)
Never used	33/54 (61.1)	24/45 (53.3)		

[a]*Number equals 54 or less owing to missing or nonapplicable data*
**Statistically significant*
Dependent variable genital infection (present = 1, absent = 0)
OR = odds ratio CI = confidence intervals STD = sexually transmitted disease

sexual partner ($\chi^2 = 4.189$, $P = 0.0407$), and a higher frequency of vaginal intercourse per week ($MH_z\ \chi^2 = 6.041$, $P = 0.0141$). Other variables investigated, none of which was significant, are shown in Table 5.

Exposure to a symptomatic sexual partner and a higher frequency of vaginal intercourse per week were the only two variables entered in the multivariate logistic regression model (Table 6). Both proved to be significant predictors of genital infections among the female patients.

Discussion

This study emphasises the many risks for STDs. Previous studies on demography, reproductive behaviour and sexual behaviour have concentrated on one or two STDs rather than the whole range of common diseases, and only about half of the non-HIV studies reviewed employed multivariate analysis to eliminate confounding variables [*2,7,15,16*].

The risk factors studied varied in importance between the different STDs. Although some trends emerged for all STDs, such as positive associations with variables relating to sexual behaviour, other risk factors varied between STDs and in some cases showed opposite associations [*4*]. Because of the small number of STD patients, we could not study the associations of different risk factors with different types of genital infection separately.

Despite the known association with low socioeconomic class (which may have to do with sexual behaviour and standards of hygiene), the acquisition of genital infec-

Table 4 **Significant predictors of genital infections in male patients**

Variables in the equation	Multivariate OR	P-value
Past history of STDs (yes = 1, no = 0)	3.3882*	0.0406
Sexual partner symptomatic (yes = 1, no = 0)	8.2287*	0.0069
Frequency of vaginal intercourse per week (> 3 = 1, 0–3 = 0)	4.9315*	0.0240
Coitus interfemoris (ever practised = 1, never practised = 0)	9.9083*	0.0006
Marital status (unmarried = 1, married = 0)	12.8295*	0.0003
Constant		0.0001

**Statistically significant*
Model χ^2 = 41.684, P = 0.0000
Dependent variable: genital infection (present = 1, absent = 0)
OR = odds ratio
STD = sexually transmitted disease

hygiene), the acquisition of genital infections was not significantly related to educational level or occupation (as indicators of social class) in both the male and female patients in our study. Gertig et al. studied the association between education and occupation and different STDs separately [*4*]. They found inconsistent associations with different STDs studied. Such differences between STDs may be because of different core groups for STD transmission [*17*] or a variety of complex behavioural, biological and ecologicl factors, possibly including STD treatment, that influence the rate of spread and distribution of STDs [*18*].

The most significant predictors of genital infections in the male patients in both the univariate and multivariate analyses were: being unmarried, greater number of sexual partners, exposure to a symptomatic sexual partner, a high frequency (> 3) of sexual intercourse per week, a history of repeated episode(s) of STDs and practising coitus interfemoris. Our findings are consistent with the results of previous studies [*1,2,3,9,15,18,19*].

We found that having a greater number of sexual partners was consistently associated with an increased risk of genital infection. When this variable was stratified by number(>1 versus ≤1), it was removed from the multiple regression model as all the men reported having multiple sexual partners either in the past year, past 5 years or during lifetime. Although reporting of sexual partners has a number of limitations, and even if the numbers are not precise, the trend is probably real suggesting the increased risk of STDs with multiple partners [*4,13,19,20*].

The association between genital infections and marital status provides further evidence of the protective effect of being married. The significant associations with exposure to a symptomatic sexual partner, higher frequency of sexual intercourse per week and having a history of repeated episodes of STDs may reflect rates of acquisition, non-recognition of symptoms and a failure to seek treatment. Despite the fact that 40.7% of the male patients reported having repeated episodes of STDs, many of them claimed not to have recognized the significance of their symptoms and the importance of seeking health care once symptoms develop.

We found that practising coitus interfemoris carried a risk for the acquisition of STDs. Minor abrasion or local injury to the genital epithelium is known to predispose to infection [*11*].

Despite the cultural and religious taboos existing in Egypt regarding premarital and

Table 5 **Univariate analysis of the associations of potential risk factors with genital infections among female patients**

Potential risk factors	Female cases (n = 36) No.[a] (%)	Female controls (n = 36) No.[a] (%)	Univariate OR (95% CI)	χ^2 (P-value)
Sociodemographic				
Education				
None	9/36 (25.0)	8/36 (22.2)	1.17 (0.39–3.47)	0.077 (0.7814)
Elementary	14/36 (38.9)	18/36 (50.0)		
Secondary/university	13/36 (36.1)	10/36 (27.8)		
Sexual/STD history				
Age at menarche (years)				
11–12	21/36 (58.3)	23/36 (63.9)	0.79 (0.31–2.05)	0.2338 (0.6287)
13–14	15/36 (41.7)	13/36 (36.1)		
Age at marriage (years)[b]				
17–19	7/36 (19.4)	5/36 (13.9)	1.50 (0.43–5.25)	0.4 (0.5271)
20–28	29/36 (80.6)	31/36 (86.1)		
Age at first pregnancy (years)				
19	3/29 (10.3)	1/30 (3.3)		2.0093 (0.3662)
20–24	20/29 (69.0)	19/30 (63.3)		
25–29	6/29 (20.7)	10/30 (33.4)		
No. of lifetime pregnancies				
0	7/36 (19.5)	5/36 (13.9)		0.4154 (0.8125)
1–3	21/36 (58.3)	22/36 (61.1)		
>3	8/36 (22.2)	9/36 (25.0)		
Currently pregnant				
Yes	2/36 (5.6)	5/36 (13.9)	0.37 (0.07–2.02)	1.424 (0.2327)
No	34/36 (94.4)	31/36 (86.1)		
Current IUD use				
Yes	13/36 (36.1)	10/36 (27.8)	1.47 (0.54–3.98)	0.575 (0.4483)
No	23/36 (63.9)	26/36 (72.2)		
Current oral contraceptive use				
Yes	7/36 (19.5)	6/36 (16.7)	1.21 (0.36–4.02)	0.0939 (0.7593)
No	29/36 (80.6)	30/36 (83.3)		
Sexual partner symptomatic				
Yes	15/36 (41.7)	7/36 (19.4)	2.96* (1.03–8.53)	4.189* (0.0407)
No	21/36 (58.3)	29/36 (80.6)		
Past history of STDs				
Yes	21/36 (58.3)	17/36 (47.2)	1.57 (0.62–3.97)	0.8916 (0.3450)
No	15/36 (41.7)	19/36 (52.8)		

Table 5 *(continued)*

Potential risk factors	Female cases (*n* = 36) No.[a] (%)	Female controls (*n* = 36) No.[a] (%)	Univariate OR (95% CI)	χ^2 (*P*-value)
Frequency of vaginal intercourse per week				
0	3/36 (8.3)	9/36 (25.0)		6.041* (0.0141)
1–3	27/36 (75.0)	23/36 (63.9)		
>3	6/36 (16.7)	4/36 (11.1)		
Vaginal douching				
Ever used	21/36 (58.3)	17/36 (47.2)	1.57 (0.62–3.97)	0.288 (0.5919)
Never used	15/36 (41.7)	19/36 (52.8)		

[a]*Number equals 36 or less owing to missing or nonapplicable data*
[b]*Age at marriage was similar to age at coitarche among all women studied. They had their first experience of sexual intercourse only after marriage. All women reported a single sexual partner (the husband).*
**Statistically significant*
Dependent variable: genital infection (present = 1, absent = 0)
OR = odds ratio CI = confidence intervals IUD = intrauterine device STD = sexually transmitted disease

Table 6 Significant predictors of genital infections in the female patients

Variables in the equation	Multivariate OR	*P*-value
Sexual partner symptomatic (yes = 1, no = 0)	3.2573*	0.0359
Frequency of vaginal intercourse per week	1.6025*	0.0161
Constant		0.0103

**Statistically significant*
Model $\chi^2 = 11.240$, P = 0.0036
Dependent variable: genital infection (present = 1, absent = 0)
OR = odds ratio

extramarital sex, a considerable proportion of male patients (48%) had their first experience of sexual intercourse, and thus their first exposure to the risk of contracting an STD, between 16 years and 19 years, compared with only 23.9% of the controls. The mean age at coitarche ± standard deviation was significantly lower among the male patients with STDs than among controls (21.04 ± 3.94 years compared with 22.65 ± 3.31 years) (t = 2.16, P = 0.033). Early age at coitarche was significantly associated with genital infections in the univariate analysis. On the other hand, older age at marriage was also significantly associated with genital infections in the univariate analysis. The mean age at marriage ± standard deviation among male patients was significantly higher than that among controls (29.25 ± 3.93 years compared with 26.63 ± 4.00 years) (t = 2.79, P = 0.007). Although earlier age at coitarche and later age at marriage were eliminated as significant predictors in the multivariate analysis, the trend suggests increased risk with these variables. Social and economic issues which delay the age at marriage for men and consequently predispose them to premarital sex need to be addressed [*21*].

Condom use was low among the male patients, with only 38.9% reporting occasional (irregular) condom use compared

with 40.0% among controls. None of the male patients with STDs used condoms regularly compared with 6.7% of controls. Although there was a suggestion of an inverse association of condom use with genital infections, no conclusions could be drawn because of the absence of regular condom users among the male patients.

With regards to women, multivariate analysis showed that exposure to a symptomatic sexual partner and higher frequency of vaginal intercourse per week were independent risk factors for genital infections. Previous studies from other countries have demonstrated that in women who are the only wife or have few partners, it is primarily the behaviour of the male sex partner that puts the woman at risk of STDs [*12,22,23*].

We found 58.3% of the sample women reported past exposure to genital tract infections with or without health care being sought. The stigma of having an STD often prevents women seeking care at designated STD clinics. Thus women may bear silently the symptoms of genital infections without seeking any health care. [*12*]. These findings emphasize the importance of tracing the contacts of patients with STDs, and also the integration of STD control services into health facilities that women use. These include general hospital outpatient departments, primary health care centres, maternal and child health facilities, family planning clinics and private practice [*21*]. In such facilities, a broader concern for reproductive tract infections may be preferable to the more narrow focus on STDs, because the former creates less of a stigma and reflects a more comprehensive approach to women's needs for reproductive health services [*12*].

Our study revealed several non-significant associations between other risk factors studied and the acquisition of genital infections among women. Some findings may be due to chance or a low prevalence of high-risk behaviours. Associations inconsistent with prior hypotheses should be interpreted carefully. For example, condom use has been shown to provide good protection against most STDs for men, but the data for women are equivocal, particularly in countries where the prevalence of condom use is generally very low [*4*]. Because the number of regular condom users in our study was extremely low, we could draw no conclusions. Similarly, we were unable to assess the effects of IUD and oral contraceptive use on STD transmission.

Kirkman and Chantler found that contraceptive methods alter in various ways the risk of acquiring STDs but assessment of the odds ratio is difficult because of the many confounding factors [*24*]. Spermicides have been reported to kill a wide range of bacteria and viruses *in vitro*, including HIV, and *in vivo* to protect from infection by gonorrhoea, chlamydia and pelvic inflammatory disease (organisms unspecified). Spermicides will not cure pre-existing infections. Condoms and diaphragms protect against bacterial and viral infections in all parts of the genital tract to some extent. Hormonal contraception gives protect to the upper genital tract but not to the cervix. There is an increased risk of lower genital tract infections (such as trichomaniasis and syphilis) in IUD users; there may be a biological explanation, such as the facilitation of infection by mechanical means [*24*]. Evans et al. pointed to the protective effect of IUDs against chlamydial infection by enhancing local immunity against a foreign body or by accelerating squamous metaplasia of columnar epithelium, thus reducing the epithelial surface susceptible to infection [*11*].

In communities where it is relatively acceptable for women to have extramarital partners, there is a strong association between earlier coitarche and the acquisition of genital infections among recent generations of young women [*11*]. In Egypt, cultural and religious taboos exist regarding premarital and extramarital sex and it is completely unacceptable for women. They become sexually active only after marriage. In our study, the mean age at menarche ± standard deviation was 12.35 ± 0.94 years, the mean age at marriage (similar to age at coitarche) was 21.67 ± 2.66 years and the mean age at first pregnancy was 22.83 ± 2.62 years. These three variables were eliminated as risk factors for genital infections among women.

Vaginal discharge and vulvovaginal irritation were the chief presenting complaints among the women. Adler reported that these symptoms are not discriminating as they are so common, non-specific and have many possible non-sexually acquired etiologies [*21*]. Ryan et al. considered that the symptoms of vaginal discharge, vulvovaginal irritation or lower abdominal pain may or may not reflect sexually transmitted infections as genital tract infections can have three types of etiology. These are: sexually transmitted infections (including gonorrhoea, chlamydia, syphilis, trichomoniasis and HIV infection); endogenous infections (vulvovaginal candidiasis and bacterial vaginosis); and iatrogenic infections (associated with medical procedures, such as abortion or IUD insertion, or with child birth). All the three types can cause serious morbidity and mortality and should be considered in the evaluation of cases. Poor standards of hygiene, particularly among the lower socioeconomic classes, could be another possible non-sexually-acquired etiology of some STDs, such as trichomoniasis, candidosis, pediculosis, scabies and genital warts [*1*].

To improve STD control in developing countries, the following suggestions were proposed by Osoba [*1*].

- a change of attitude of health administrators to recognize that STDs and their complications are a serious problem and require active control measures;
- improvement of the budgetary allocations for health in general and STDs in particular;
- provision of basic facilities for diagnosis, treatment, and contact tracing of patients with STDs;
- health education of health authorities, medical personnel and the general public and in particular encouragement of patients to seek treatment early and avoid self-medication;
- training programmes for the provision of necessary health personnel to operate a reasonable STD control service.

Planning for and implementation of the aforementioned proposals should be considered in our community. Control programmes for STDs must prevent the acquisition of STDs, their complications and sequelae and reduce transmission. Such programmes should place emphasis on health education, condom usage, altering health-seeking behaviour and case management. The syndromic approach is currently the most realistic and cost-effective way to treat patients [*12,21,25*].

Acknowledgement

The authors thank Dr Safaa Salah El-Din Mohamed, Faculty of Medicine, University of Alexandria for providing technical assistance in carrying out the laboratory investigations needed for this study.

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