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CLINICAL REPORT

Demographic and Behavioural Factors in Tanzanian and Norwegian Patients with Sexually Transmitted Infections

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To evaluate whether differences in demographic or behavioural factors might explain differences in reported or diagnosed sexually transmitted infections (STI), we have compared data from 1097 Tanzanian and Norwegian STI patients. Most demographic data were similar, whereas some behavioural data differed. Norwegian patients reported significantly higher numbers of sexual partners than Tanzanian. Thirty-three percent of Tanzanian patients tested positive for HIV antibodies, females more often (43%) than males (26%). Approximately one-third and two-thirds of the female HIV-positive Tanzanian STI patients had already seroconverted at the age of 25 and 30 years, respectively. The national differences encountered probably reflect cultural differences, different panoramas of STI and a lower accessibility to optimal health services in Tanzania. Lack of expected statistical associations between some of the data in the Tanzanian STI group might question the validity of the retrospectively collected data in this group, or indicate that questions not included in the questionnaire might be of importance. *Key words: sexually transmitted infections; demography; sexual behaviour; urban Tanzania; urban Norway.*

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Sexually transmitted infections (STI) are a serious and global health problem. The prevalence of such infections is increasing more on the African continent than in Europe (1). One would expect that demographic and/or behavioural differences between STI patients with different geographical and cultural background might influence patterns and pathways of these diseases. However, the situation in Africa seems rather complex, as behavioural data vary markedly between different regions and from one cohort to another (2–6). We have been interested particularly in the situation in Tanzania, and reported previously that the increasing prevalence of genital herpes in Africa also affects this country (7). Behavioural data from Tanzanian STI patients are scanty. Results from a youth (10–24 years) clinic (8) might not be fully representative for the patterns of disease, behaviour or age distribution of patients attending an STI clinic. Behavioural data from Norwegian STI patients are largely missing.

Since Tanzania and Norway are geographically far apart, and there are significant cultural and economic differences between the two countries, behavioural factors influencing STI were studied in Tanzanian and Norwegian cohorts. In a previous report the risk factors for contracting genital herpes (HSV-2) infection in the two countries were analysed. The present work focuses on the risk factors for acquiring STI in general in the two cohorts.

MATERIALS AND METHODS

Participants and data collection

In the period 1998–2000 we invited 753 consecutive Norwegian patients attending an outpatient clinic for STI at Haukeland University Hospital to participate in the study. At the Infectious Disease Clinic, Dar es Salaam, 500 consecutive STI patients were likewise invited. Consent was obtained in writing (Norwegian participants) or verbally (Tanzanian participants). The study was approved by Norwegian and Tanzanian ethical clearance committees.

All participants completed a questionnaire, including demographic data (age, gender, marital status, education, occupation, sexual preference) and behavioural characteristics (number of sexual partners in the last 12 months, 3 years and total; previous and/or present STI in the patients or their partners; coitarchal age and other circumstances concerning first intercourse). The Norwegian participants filled in the questionnaire in private at the clinic, whereas the staff at the collecting site interviewed the Tanzanian participants.

Sera were collected from all participants and frozen for later analyses.

Serological tests

Serological testing for syphilis and HIV was performed for Tanzanian participants only, as the prevalence of syphilis and HIV in Norwegian STI patients is < 1%.

Venereal Disease Research Laboratory (VDRL) test (VDRL cardiolipin carbon antigen, Behring Diagnostics GmbH, Marburg, Germany) was used to screen for syphilis, and positive sera were retested by *Treponema pallidum* particle agglutination (TPPA) assay (Serodia-TPPA, Eurodiagnostica, Malmö, Sweden). Syphilis was diagnosed only if a serum sample was positive by both tests. Due to cost implications we used this procedure for syphilis screening even if TPPA or an ELISA using total antibody detection would be the first choice.

Antibodies against HIV were detected using Behring *plus* HIV-1&2 ELISA (Behring Diagnostics GmbH), and those found to be positive were retested by Wellcozyme Recombinant HIV-1

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ELISA (Abbot/Murex, Wiesbaden-Delkenheim, Germany). HIV-1 seropositivity was diagnosed if a sample was positive in both ELISAs. All samples with discordant results in the two ELISAs were re-tested by Western blot, which gave the final result.

Statistical methods

Results for age at coitarche were categorized into one group below and another one above 15 years. Reported number of lifetime sexual partners in female and male STI patients, with or without a previous STI, were recorded for graphic visualization, as were accumulated HIV seropositives related to age intervals and gender. To test the hypothesis of no bivariate associations between demographic and behavioural variables, Fisher's exact test was applied. The bivariate analyses were carried out separately for each national group of STI patients. All statistical tests were performed at a significance level of 0.05.

Multiple logistic regression analyses with each behavioural and demographic factor as the dependent variable was then used to identify independent associations. The bivariately associated variables with a p-value below 0.10 were included in a backward stepwise selection analysis. Variables significant in the likelihood ratio test at the 0.05 level were retained in the final model. To adjust for age influence, age was incorporated into all calculations. Strength of associations was estimated by calculating the odds ratios (OR) with 95% confidence interval

Table I. Characteristics of the cohorts

	Tanzanian STI patients			Norwegian STI patients		
	All *n* = 500	F *n* = 203	M *n* = 297	All *n* =597	F *n*=242	M *n*=355
Age (years)						
Mean/median	28.6/27	26.9/26	29.8/28	26.9/25	24.3/23	28.7/26
Range	14–56	14–56	16–55	15–70	15–54	17–70
Marital status (%)						
Married/cohabitant	53	62	47	23	22	24
Single	41	29	49	70	72	68
Separated/divorced/widow	6	9	4	7	6	8
Education (%)						
None	2.6	5	1	0	0	0
Primary school only	71.4	74	69	11	14	8
Secondary school	22.6	19	25	42	47	39
College/university	3.4	2	5	47	39	52
Sexual preference (%)						
Heterosexual	92.8	95	92	95.4	96	95
Homo-/bisexual	7.2	5	8	4.6	4	5
Regular sexual partner? (%)						
Yes	74	84	67	51	55	49
No. of lifetime sexual partners						
Mean/median	7.2/5	4.5/3	9.1/7	18.1/9	11.6/7	22.7/10
Range	1–100	1–25	1–100	1–500	1–150	1–500
Previously STI? (%)						
Yes	52	36	64	42	42	41
Syphilis	17	11	20	0	0	0
Gonorrhoea	35	19	45	2	2	2
Previously HIV-tested? (%)						
Yes	11	13	9	65	64	67
Accept HIV-test at inclusion? (%)						
Yes	72	73	70	80	78	81
HIV positive (%)	33	43	26	nd	nd	nd
Syphilis seropositive (%)	3.6	4	3.4	nd	nd	nd
Coitarchal data:						
Age (years)						
Mean/median	17.1/17	16.8/16	17.2/17	17.0	16.4/16	17.4/17
Range	8–30	10–26	8–30	6–32	6–32	6–32
Partner (%)						
Casual	35	22	44	27	12	36
Friend	36	38	35	21	20	23
Lover	17	16	18	52	68	41
Spouse	11	24	3	0	0	0
Influenced by alcohol (%)						
Heavily	4	2	6	7	5	9
Slightly	3	2	4	30	26	33
Not	93	97	90	63	70	58
Prevention at coitarche (%)						
None	97	98	97	38	31	43
Coitus interruptus	0.2	0.5	0	10	11	10
Condom	2	1	3	44	53	37
"The pill"	0.2	0.5	0	8	5	10

nd: not done.

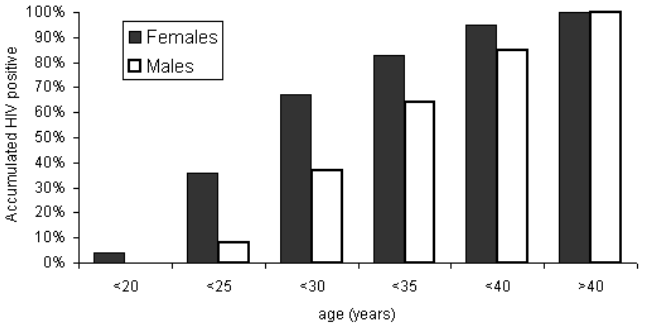

Fig. 1. Accumulated percentage of HIV-positive Tanzanian patients with sexually transmitted infections, age and gender.

(95% CI). Note that figures for strength show slight variations, depending on which factor is chosen as the dependent variable. Data analysis was performed using SPSS for Windows release 10.0 (SPSS Inc. Chicago, USA).

RESULTS

Six-hundred and one Norwegian STI patients volunteered to have a blood sample taken and were included in the study, and 597 of these (242 women and 355 men) also completed the questionnaire. One hundred and fifty-two Norwegian STI patients (20%) declined participation. The decliners did not differ from the participants regarding gender and age. Less than 1% of Tanzanian STI patients declined participation.

Table I summarizes demographic and behavioural data. Tanzanian STI patients were more likely to be married or cohabitant and to report a regular sexual partner than were their Norwegian counterparts. The number of reported lifetime sexual partners was significantly higher among the Norwegian than among the Tanzanian STI patients. Sixty-four percent of male and 36% of female Tanzanian STI patients reported a previous STI, mainly gonorrhoea or syphilis (or unspecified genital ulcer disease (GUD)), whereas 42% of the Norwegian STI patients (no gender differences) reported a previous STI, mainly chlamydia and/or human papilloma virus (HPV) infection. HIV antibodies were demonstrated in 33% (F 43%, M 26%) of the Tanzanian STI patients. Fig. 1 shows that approximately one-third (36%) and two-thirds (67%) of the HIV-infected female Tanzanian STI patients had seroconverted at the age of 25 and 30, respectively, as compared with 1/12 (8%) and one-third (37%) among their male counterparts.

Syphilis was diagnosed in 3.6% of the Tanzanian STI patients.

Coitarchal age did not differ between the two groups (Table I).

To elucidate patterns of present/recent sexual relationships, we analysed the numbers of sexual partners during the previous 12 months (Table II). The Tanzanian STI patients reported lower numbers of present/recent sexual partners (mean 1.86, F: 1.45, M: 2.15) than the Norwegian (mean 3.20, F: 2.87, M: 3.43). Only 1% (F) and 5.7% (M) of the Tanzanian STI patients reported ≥5 partners during the previous year, as compared with 17% and 19%, respectively, among the Norwegians. Forty-eight percent of married/cohabitant male Tanzanian STI patients reported ≤1 sexual partner the previous year, a lower proportion than reported by Norwegian married or cohabitant STI patients (≈63%) and by married/cohabitant female Tanzanian STI patients (70%). None of the Tanzanian separated, divorced or widowed STI patients reported ≥5 sexual partners the previous year, in contrast to 21% (F) and 30% (M) of the Norwegians.

The results of bivariate analysis of demographic and behavioural variables in Norwegian and Tanzanian STI patients are shown in Table III. Table IV summarizes age-adjusted independent associations (multiple logistic regression analysis) between demographic and behavioural variables. Consistent results in the bivariate and the regression analysis will be referred to in Table IV, only.

The two national groups differed concerning the association between gender and coitarchal age < 15 years, being separated, divorced or widowed, re-

Table II. *Recent sexual partners, gender and marital status*

Group	Gender	Tanzanian STI patients					Norwegian STI patients				
			% with n sexual partners					% with n sexual partners			
		Total*	≤1	2	≥3	≥5	Total*	≤1	2	≥3	≥5
All	F	202	65.9	25.7	8.4	1.0	241	32.3	27.4	40.2	16.9
	M	296	38.5	38.2	23.3	5.7	343	32.6	19.8	47.6	19.4
Married/cohabitant	F	123	69.9	25.2	4.9	0	53	64.2	24.5	11.3	1.9
	M	139	48.2	38.1	13.7	3.6	85	62.4	24.7	12.9	0
Single	F	59	57.6	23.7	18.7	3.4	171	22.2	28.7	49.1	11.3
	M	146	30.8	37.0	32.4	8.4	234	22.7	18.4	58.9	16.6
Separated, divorced, widowed	F	18	66.7	33.3	0	0	14	42.9	28.6	28.4	21.3
	M	11	18.2	54.5	27.3	0	23	21.7	17.4	60.9	30.4

*Note that 2 (F) Tanzanian and 4 (3F and 1M) Norwegian STI patients, reporting number of recent sexual partners, did not state their status as married/cohabitant, single or separated/divorced/widowed.

Table III. *Demographic and behavioural factors in Tanzanian (light grey frame) and Norwegian (dark grey frame) STI patients. Bivariate analysis. (p-value by Fisher's exact test; odds ratio and 95% confidence interval)*

NORWEGIAN STI-patients	Female gender	Separated/ divorced/ widowed	Lower education	Homo-/ bisexual preference	Coitarchal age <15 y	>30 life time sex partners	HIV sero-positive	Previously STI (other than HSV)	Previously genital HSV-inf.	Syphilis seropos.	HSV-2 sero-positive
Female gender		ns	ns‡	ns	0.012 1.67 (1.1–2.5)	< 0.001 0.33 (0.2–0.6)	nd	ns	ns	nd	ns‡
Separated/ divorced/ widowed	0.018 2.56 (1.2–5.5)		0.017 2.85 (1.3–6.1)	†	0.050 1.99 (1.0–4.0)	< 0.001 4.91 (2.2–11.2)	nd	ns	ns	nd	0.004 2.89 (1.5–5.8)
Lower education	0.017 1.68 (1.1–2.6)	ns		ns	0.001 2.71 (1.6–4.7)	ns	nd	ns	ns	nd	ns
Homo-/ bisexual preference	ns	†	0.005 0.36 (0.2–0.7)		ns	ns	nd	ns	ns	nd	0.056 2.38 (1.0–5.6)
Coitarchal age < 15 y.	ns‡	ns	ns	ns		< 0.001 3.95 (2.3–6.8)	nd	0.028 1.55 (1.1–2.3)	ns	nd	0.011 1.91 (1.2–3.1)
> 30 life time sex partners	†	†	†	†	†		nd	< 0.001 3.03 (1.8–5.3)	0.052 2.25 (1.1–4.8)	nd	ns
HIV sero-positive	< 0.001 2.16 (1.5–3.2)	0.004 3.07 (1.4–6.6)	ns	ns	ns	†		nd	nd	nd	nd
Prev. STI (other than HSV)	< 0.001 0.32 (0.2–0.5)	ns	ns	ns	ns	†	ns		0.017 2.05 (1.1–3.7)	nd	0.007 1.86 (1.2–2.9)
Previously genital HSV-inf.	ns	ns	ns	ns	ns	†	0.003 2.00 (1.3–3.1)	< 0.001 2.07 (1.3–3.2)		nd	< 0.001 10.23 (5.6–18.9)
Syphilis sero-positive	ns	ns	ns	ns	ns	†	ns	ns	ns		nd
HSV-2 sero-positive	0.012 1.71 (1.1–2.6)	0.005 6.03 (1.4–25.7)	ns	ns‡	ns	†	< 0.001 4.79 (2.8–8.2)	0.003 1.82 (1.2–2.7)	ns	ns	

TANZANIAN STI-patients	Female gender	Separated/ divorced/ widowed	Lower education	Homo-/ bisexual preference	Coitarchal age <15 y	> 30 life time sex partners	HIV sero-positive	Previously STI (other than HSV)	Previously genital HSV-inf.	Syphilis seropos.	HSV-2 sero-positive

†: too low numbers for statistical analysis
‡: approaching significant values (*p*-value by Fisher's exact test 0.05–0.10)
nd: not done
ns: not significant

porting high numbers of life time sexual partners and with reporting a previous STI. Female gender was an independent risk factor for HSV-2 seropositivity in both STI groups (Table IV), even if this association only approached significant values for the Norwegian group in the bivariate analysis (Table III).

In the Norwegian STI group coitarchal age below 15 years was independently and positively associated with female gender, lower educational level, > 30 lifetime sexual partners and with HSV-2 seropositivity. This was in contrast to the Tanzanian group, where no independent associations with low coitarchal age were documented (Table IV).

Reporting >30 lifetime sexual partners was an independent risk factor for STI in the Norwegian STI group. Fig. 2 shows that the difference between median and mean number of lifetime sexual partners was significantly smaller for Tanzanian STI patients than for Norwegian.

In the Norwegian, but not in the Tanzanian STI group, reporting a previous genital HSV infection was, as expected, strongly associated with the presence of HSV-2 antibodies (Table IV). In both STI groups, reporting previous STI other than HSV was also bivariately associated with the presence of HSV-2 antibodies for both STI groups (Table III), however, significance was

Table IV. *Age-adjusted, independent associations between dermographic and behavioural factors*

	Norwegian STI patients			Tanzanian STI patients		
Dependant variable/ variables	*p*-value	Odds ratio	95% CI	*p*-value	Odds ratio	95% CI
Female gender, and						
Coitarchal age < 15 years	0.012	1.82	1.14–2.91	ns		
> 30 lifetime sexual partners	0.007	0.38	0.19–0.77	ns		
HSV-2 seropositivity	0.006	2.10	1.24–3.56	0.027	1.76	1.07–2.91
Separated, divorced or widowed	ns			0.013	3.15	1.27–7.83
HIV seropositivity	nd			< 0.001	2.62	1.65–4.16
Previously STI (excl. HSV)	ns			< 0.001	0.27	0.17–0.41
Separated, divorced or widowed, and						
> 30 lifetime sexual partners	0.002	4.25	1.70–10.64	†		
Female gender	ns			0.007	3.05	1.35–6.90
HSV-2 seropositivity	ns			0.029	5.14	1.18–22.40
Lower educational level (*), and						
Coitarchal age < 15 years	0.001	2.67	1.53–4.67	ns		
Female gender	0.016	2.01	1.14–3.55	ns		
Homo- or bisexual preference	ns			0.006	0.37	0.18–0.75
Homo- or bisexual preference, and						
HSV-2 seropositivity	ns			0.039	2.65	1.05–6.68
Coitarchal age < 15 years, and						
Female gender	0.012	1.83	1.14–2.91	ns		
Lower educational level	< 0.001	3.23	1.70–6.12	ns		
> 30 lifetime sexual partners	> 0.001	6.32	3.43–11.66	ns		
HSV-2 seropositivity	0.028	1.89	1.07–3.32	ns		
> 30 lifetime sexual partners, and				†		
Female gender	< 0.001	0.24	0.12–0.48			
Separated, divorced or widowed	0.001	4.84	1.87–12.58			
Coitarchal age < 15 years	< 0.001	4.85	2.61–9.03			
Previously STI (excl. HSV)	0.001	2.82	1.54–5.18			
HIV seropositivity, and	nd					
Female gender				< 0.001	2.50	1.61–3.86
Previously genital HSV infect.				0.002	2.16	1.33–3.49
HSV-2 seropositivity				< 0.001	4.31	2.47–7.53
Previously STI (excl. HSV), and						
Female gender	ns			< 0.001	0.28	0.19–0.41
Previously genital HSV infect.	ns			0.003	2.05	1.29–3.28
HSV-2 seropositivity	ns			< 0.001	2.28	1.49–3.49
> 30 lifetime sexual partners	0.003	2.43	1.37–4.31	ns		
Previously genital HSV infection, and						
HIV seropositivity	nd			0.005	1.91	1.22–2.99
Previously STI (excl. HSV)	ns			0.005	1.92	1.22–3.04
> 30 lifetime sexual partners	0.043	2.34	1.03–5.33	†		
HSV-2 seropositivity	< 0.001	8.96	4.74–16.94	ns		
HSV-2 seropositivity, and						
Female gender	0.009	2.02	1.20–3.42	0.012	1.88	1.15–3.07
Previously STI (excl. HSV)	ns			0.001	2.10	1.34–3.28
HIV seropositivity	nd			0.001	3.81	2.18–6.68
Homo- or bisexual preference	ns			0.052	2.57	0.99–6.68
Previously genital HSV infect.	< 0.001	7.94	4.17–15.11	ns		
Coitarchal age < 15 years	0.028	1.84	1.07–3.17	ns		
HIV seropositivity, and	nd					
Female gender				< 0.001	2.50	1.61–3.86
Previously genital HSV infect.				0.002	2.16	1.33–3.49
HSV-2 seropositivity				< 0.001	4.31	2.47–7.53

(*): none, or primary school only
†: too low figures for statistical analysis
ns: not significant
nd: not done

lost for the Norwegian group in the logistic regression analysis (Table IV).

A strong and independent association between HIV seropositivity and the presence of HSV-2 antibodies was found in the Tanzanian STI group.

DISCUSSION

As demographic data seem less likely than previous behavioural data to be objects of forgetfulness, active suppression or misinformation, we will discuss de-

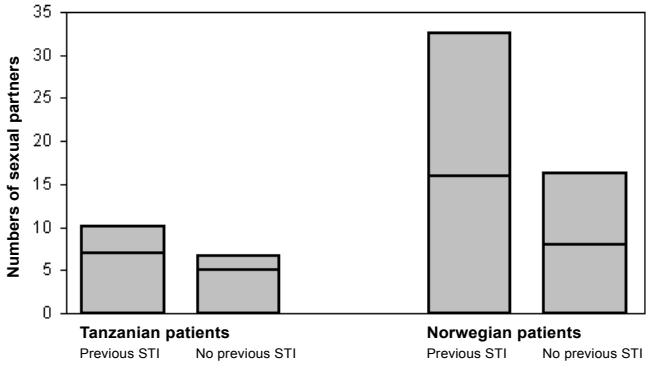

Fig. 2. Mean number of reported lifetime sexual partners in Tanzanian and Norwegian patients with sexually transmitted infections (STIs) with and without previous STI. Line inside the box indicates median value.

mographic and behavioural findings and associations separately. We have treated "gender" as a variable, since gender segregated analyses (not shown) for independent behavioural risk factors, specified in Table IV, did not have any profound bearing on the results.

Demographic data

One explanation for different marital status in the groups (Table I) could be that being married/cohabitant is of more vital importance for Tanzanian than for Norwegian women in order to meet their daily needs. Furthermore, Tanzanian females traditionally marry or enter a cohabitant status at an earlier age (2) than do Norwegians.

The participants could choose one of three alternatives for sexual preference: "heterosexual", "homosexual", "bisexual". The intention of grouping homo- and bisexual preference together was to include those who really identify themselves as homosexuals or bisexuals, as well as those having had some kind of same sex experience, without considering themselves as homo- or bisexuals. Nevertheless, some persons in the latter group might have selected the "heterosexual" alternative, regardless of nationality.

Similar proportions reporting homo-/bisexual preference in the two countries was slightly unexpected, since homosexuality is assumed to be more accepted in Europe than in Africa (9, 10).

Behavioural data

To avoid the potential risk of report bias, it would have been useful to repeat the questions about sexual behaviour on a later occasion. However, we considered it almost impossible to reach the same Tanzanian cohort or a representative selection thereof, a second time. Data on sexual behaviour have been shown to become less accurate with increasing time span into the past (11), and furthermore shown huge variations between study sites (6–8). Due to varying ability to read and write in the Tanzanian cohorts, face to face interviewing (in kiswahili) was used, whereas self-completion of questionnaires was used by the Norwegians. Self-completion might result in more valid results, as the respondents do not have to disclose censured information or behaviour to the interviewer (11). Some of the reported data in the present work might consequently be inaccurate. On the other hand, the somewhat unexpected high figures for homosexual identification or experience among the Tanzanian participants do not indicate reduced disclosure of censured behaviour, due to face to face interviewing.

Number of sexual partners

For evaluating risk factors for STI, the number of sexual encounters might be more useful than the number of sexual partners. However, recalling encounters seems to be less accurate than remembering number of sexual partners (12). Consequently, we used partners in this study.

The female Tanzanian STI patients in particular – but also the males – report lower numbers of lifetime (Table I) and recent (Table II) sexual partners than do Norwegian counterparts. As expected, marital status also clearly influences the number of reported sexual partners (Table II). Tanzanian girls marry at an earlier age than Tanzanian men (2) (1.8 vs. 6.1 years after coitarche), and at a younger age than Norwegians, and this could explain the lower numbers of reported lifetime and recent sexual partners. Lower age at onset of reproduction among Tanzanians (19.1 years) (13) might have an additional influence. Furthermore, reporting of partnerships by female Tanzanian might also be an expression of "social desirability bias" (11). Consistent with this assumption, Carael et al. (3) and Buve et al. (14) found that African women are much less likely to report non-marital sex than men. Higher numbers of sexual partners for males than for females have also been documented in a non-STI cohort in North-Western Tanzania (2). Compared with the latter study and others (7), mean and median numbers of lifetime sexual partners of 9.1 and 7 (male and female) in our study seem unexpectedly low. Assuming that the data of the former two studies (2, 7) are not influenced by "swaggering males" (15), also our male Tanzanian STI patients could have under-reported the number of sexual partners. In line with these reservations, by the use of different data collection methods, Plummer et al. (5) have recently documented that self-reported data on sexual behaviour in Northern-Tanzania were fraught with inconsistencies. In another recent study (6), investigating influence of ethnicity on sexual behaviour, male and female African non-STI patients reported a median of 9 and 4.8 lifetime sexual partners, respectively. These figures are very similar to our findings among Tanzanian STI patients, furthermore indicating under-reporting.

The larger difference between mean and median number of lifetime sexual partners (Fig. 2) among Norwegian than among Tanzanian indicate that a relatively low number of Norwegian STI patients have very high numbers of sexual partners, and – as discussed by many authors (16–18) – might be "super-spreaders" of STIs. However, the lower numbers of potential "super spreaders" are in contrast to the higher prevalence of STI in Tanzania. Again, this could indicate that the partner numbers reported by the Tanzanians are an understatement.

Previous STIs

Previous STIs (Table I) reported by the Tanzanian participants are mainly syphilis, gonorrhoea and GUD, whereas in Norwegian STI patients, chlamydia infections and/or HPV dominate. Chlamydia and/or HPV infections are usually not diagnosed in Tanzania, where syndromic diagnosis and treatment is the commonly used approach for STI. Interpretation of demographic/behavioural data and associations with previous STI in the two groups consequently must be done with reservations. A statistically significant difference between 52% and 42% in the Tanzanian and Norwegian STI cohorts, respectively, is solely due to the higher prevalence among Tanzanian males than females (64% vs. 36%). It is generally accepted that increasing numbers of sexual partners is associated with increasing risk for STI. Nevertheless, the male Tanzanian STI patients reported more previous STI, even if the reported numbers of sexual partners are lower. Different patterns of multiple sexual partnerships might contribute to this disparity. It has been observed (reviewed in ref 19) that both African men and women often have concurrent partnerships overlapping for a long time. This is somewhat in contrast to patterns of multiple sexual partnerships encountered elsewhere. By mathematical modelling Morris & Kretschmar (20) have shown that long-term concurrent sexual partnerships increase the likelihood of spreading HIV as compared with serial monogamy. One would also expect a similar effect on traditional STI. On the other hand, in a recent study of nearly 10,000 adults in sub-Saharan Africa, Lagarde et al. (21) did not find evidence for concurrent partnerships being a major determinant of spread of HIV.

Geographical differences regarding condom use could also explain the reported number of previous STI. Regrettably, condom use was not asked about in the questionnaire. The literature indicates that condoms are rarely used in African cohorts (2, 3, 22–24), although the reported numbers varies considerably. In Norway, about 60% of the STI patients never or only infrequently use condoms (Nilsen A, unpublished observation). Consequently, we do not think that differences between Tanzanians and Norwegians regarding previous STI can be explained by differences in condom use.

A higher prevalence of STI among Tanzanian than Norwegian males (Table I) would be expected if sexual services from prostitutes are used more frequently by the former group. However, reliable data favouring this assumption are lacking. Sexual services from Norwegian prostitutes are not well documented, and the overall figures from Africa are similar to those from other global regions. Nevertheless, the higher prevalence of STI in Tanzania increases the risk that a casual partner would be infectious. Consequently, lower numbers of sexual partners among Tanzanian STI patients may not necessarily contradict the higher prevalence of reported STI.

Coitarchal data

Low coitarchal age is generally accepted as a predictor for later acquisition of STIs (17). In the bivariate analysis, such association was found for the Norwegian, but not for the Tanzanian STI patients (Table III). If there is a true difference between Tanzanian and Norwegian STI patients, the reason for this is not clear. However, the findings indicate at least that early coitarche does not have the same implications in Tanzania as in Norway. A report by Meekers & Calves (25) suggests that other factors could be of greater predictive importance for STI in Africa, specifically premarital sexual relations with the aim of economical support, even surviving, despite being aware of the high risk for STI. Our questionnaire did not include such topics.

HIV infection

As reported by many others (4, 24, 26), our data (Table I and Fig. 1) show that HIV infection is a serious problem in Tanzania. It is alarming that one-third of all Tanzanian female HIV-positive STI patients has already been infected at the age of 25, and two-thirds by the age of 30 years (Fig. 1). Our HIV data for young African women are consistent with other reports, showing a significant incidence increase during the 1990s (26), a female/male ratio of 6 in 15–19-year-old Zambians (27), and very high prevalence figures in young women (7, 28). In these studies behavioural factors were not found fully to explain the gender differences. In our study, the HIV seropositivity was associated with increasing age (Fig. 1), female gender and the presence of HSV-2 antibodies (Table IV). We did not ask for injectable drug use, and potential differences between the two cohorts concerning the use of unclean syringes might have influenced the HIV data. The proportions of the study population accepting HIV testing at inclusion (Table I) were similar in the two STI groups, indicating that reluctance, or fear of knowing the HIV

status, is not different among Tanzanian and Norwegian STI patients.

Syphilis

Serological findings consistent with active syphilis among 3–4% of the Tanzanian STI patients were less than initially expected.

Since the VDRL test might be reactive only in 60–80% of cases within primary syphilis, and in 90–100% in secondary syphilis, the true prevalence of syphilis could be marginally higher than reported. However, similar figures have been found by others (7), and in a study of genital ulcers among STI patients in Dar es Salaam (Nilsen A et al., unpublished), *T. pallidum* was identified by PCR in only 4.6% of the participants. Our findings are in line with others indicating a changing trend in the profile of GUD in Africa (29).

CONCLUSION

Tanzanian STI patients are more often married or cohabiting than Norwegian counterparts, and report lower numbers of recent and lifetime sexual partners. Furthermore, Tanzanian STI patients are much more likely to be HIV infected. Some of the differences regarding present or reported STI might be explained by different panoramas of STI between the two countries, lower access to laboratory diagnosis in Tanzania, different patterns of multiple sexual relationships and possibly also differences in condom use. Reported behavioural factors do not explain the higher prevalence of STI in Tanzania as compared with Norway. However, whereas most of the independent associations between behavioural or demographic factors encountered in the Norwegian STI patients were expected, the frequent lack of expected associations in the Tanzanian STI patients might question the validity of the reported data in this group. The interpretation of identical questions might be different in cohorts from culturally and socially different cohorts. Furthermore, factors not asked for in this study could potentially also be of importance. Comparing data from STI groups from different cultures should consequently be done with caution.

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