ORIGINAL ARTICLE

The sexual health of pupils in years 4 to 6 of primary schools in rural Tanzania

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Background/objectives: There is an urgent need for effective interventions to improve the sexual and reproductive health of adolescents. Reliable data on the sexual health of adolescents are needed to guide the development of such interventions. The aim was to describe the sexual health of pupils in years 4 to 6 of 121 rural primary schools in north western Tanzania, before the implementation of an innovative sexual health intervention in 58 of the schools.

Methods: A cross sectional survey of primary school pupils in rural Tanzania was carried out. The study population comprised pupils registered in years 4 to 6 of 121 primary schools in 20 rural communities in 1998. Basic demographic information was collected from all pupils seen. Those born before 1 January 1985 (aged approximately 14 years and over) were invited to participate in the survey, and asked about their knowledge and attitudes towards sexual health issues, and their sexual health experience. A urine specimen was requested and tested for HIV, *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG) and, for females, pregnancy.

Results: 9283 pupils born before 1 January 1985 were enrolled and provided demographic information and a urine sample. Male pupils were significantly older than females (mean age 15.5 years v 14.8 years, $p < 0.001$), but all other demographic characteristics were similar between the sexes. 14 (0.2%) of the enrolled pupils (four male and 10 female) were HIV positive, 83 (0.9%) were positive for CT, and 12 (0.1%) for NG. 32 female pupils (0.8%) were positive by pregnancy test. Sexual experience was reported by one fifth of primary school girls, and by almost half of boys. Only 45/114 (39%) girls with biological markers of sexual activity reported having had sex.

Conclusions: HIV, CT, NG, and pregnancy were present though at relatively low levels among pupils in years 4 to 6 of primary school. A high proportion of pupils with a biological marker of sexual activity denied ever having had sex. Alternative ways of collecting sensitive data about the sexual behaviour of school pupils should be explored.

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Worldwide there are more than 36 million people living with HIV, with half of all new infections estimated to occur in young people aged between 15 and 24 years of age.^{1,2} The International Conference on Population and Development in Cairo recommended action to improve the provision of sexual and reproductive health services and information appropriate to the needs of adolescents.³ Interventions accessible to adolescents have focused on sexual and reproductive health education (both in school and out of school), raising community awareness and targeted condom promotion.⁴ Primary school based interventions may enable the delivery of sexual and reproductive health messages before sexual debut. However, interventions must be relevant to the experiences and needs of primary school children, and few studies have collected reliable data on the sexual health, knowledge, attitudes, and behaviour of children.⁵

The prevalences of HIV and other sexually transmitted infections (STI) are high among adolescents in sub-Saharan Africa. For example, HIV prevalence was 23% among urban South African girls aged 15–19 years⁶ and 5% in rural, Tanzanian 19 year old women.⁷ Among Nigerian girls aged 17–19 years the prevalence of *Chlamydia trachomatis* (CT) was 8%, and 44% had evidence of a reproductive tract infection.⁸ In many African countries, there is a growing gap between first sexual intercourse and marriage,⁹ and in Uganda the peak incidence for casual sex occurred before the age of 25.¹⁰ In Kenyan truck stops, 90% of adolescents, aged 15–19 years,

reported having had sexual intercourse and 50% of the girls reported having had a sexually transmitted infection.¹¹ A study in 26 schools in Transkei, South Africa, found that 90% of boys and 76% of girls reported having had sex, with a mean age at first sexual intercourse of 13.4 years for boys and 14.9 years for girls.¹² In Sierra Leone, 64% of high school pupils aged 14 years or older reported sexual intercourse.¹³ In contrast, two studies in secondary schools, in South Africa and Zimbabwe, found that only 17% of pupils reported sexual intercourse.^{14,15}

In developing countries, few studies have evaluated the effectiveness of sexual and reproductive health interventions among adolescents. Most studies have only evaluated changes in reported sexual behaviour, though the results have not been universally encouraging.¹⁶ In Brazil, sexual and reproductive health education through a workshop for adolescents produced no significant changes in reported behaviour among males, but a reduction in unprotected sex was reported by females.¹⁷ Among secondary school pupils in Namibia, an after school intervention delayed reported sexual debut among those not sexually active, but had no significant effect on the behaviour of sexually experienced youths.¹⁸ A primary school intervention in Tanzania showed no significant change in current sexual behaviour, but some effects on future intentions.¹⁹ The evaluation of a school based AIDS education programme in Masaka, Uganda, showed no significant increase in seven out of nine knowledge questions.²⁰ While many have argued that sex education in

schools may help adolescents make better informed choices about their sexual behaviour,²¹ there is little evidence to support this claim. There is an urgent need to evaluate the effect of interventions to improve the sexual and reproductive health of adolescents on reported behaviour and on the incidence of HIV, other STIs, and pregnancies.^{22–23}

Previous studies in Mwanza, Tanzania, have shown that many adolescents are unaware of sexual health services.^{24–25} An innovative package of sexual and reproductive health interventions involving primary schools, health facilities, and community leaders has been developed to improve the reproductive health of adolescents in Tanzania.²⁶ A community randomised trial has been conducted in Mwanza Region, Tanzania to assess the impact of this intervention package. This paper reports the baseline characteristics of a cohort of primary school pupils from the study communities, the prevalence of biomedical markers of sexual and reproductive health, and their reported sexual behaviour.

METHODS

Mwanza Region, in north west Tanzania, has an estimated population of three million, most children attend primary school, but few go on to secondary school.²⁷ Twenty rural communities, each with four to eight primary schools, were selected from four districts in Mwanza Region.

The baseline survey was carried out between August and December 1998. Teachers, parents, and community leaders were informed of the objectives of the study and all parents were given the opportunity to withhold their child from the study. The school register was used to identify pupils in years 4, 5, and 6, who were encouraged to attend school for the 2 days of the survey. On the first survey day, the study rationale and procedures were explained to all pupils, who were asked for basic demographic information and individual signed consent. Consenting pupils were then photographed, for subsequent preparation of photo-identity cards. Pupils who reported that their birth date was before 1 January 1985 were eligible to join the study.

The second survey day was held between 5 and 6 weeks later. Enrolment procedures were available for eligible pupils who had not been seen on the first survey day. A questionnaire was delivered to all eligible consenting pupils in a confidential interview with a young interviewer of the same sex as the respondent. The questionnaire recorded knowledge of STIs, attitudes towards key sexual health issues, and reported sexual behaviour. After interview, subjects were asked to provide a first void urine sample, and were seen by a clinician, who gave syndromic treatment for STI and offered confidential HIV counselling and testing. Pupils with conditions requiring further management were referred to the nearest health facility. A random sample of 20% of participants were re-interviewed by the clinician for quality control purposes.

One aliquot of urine was stored at +4°C until testing for HIV antibodies using a semiquantitative particle agglutination test (GACPAT-CPHL, London, UK) within 14 days of collection. Specimens that were positive or repeatedly indeterminate on GACPAT were tested with Wellcozyme HIV1+2 GACELISA (Murex Biotech Ltd, Dartford, UK) which provided the definitive result. HIV positive results from this survey were compared to results from blood spots from the same individual in subsequent surveys, and nine results were subsequently reclassified HIV negative.

Further urine aliquots were frozen at –20°C. The second aliquot was sent to the National Laboratory for Sexually Transmitted Diseases, Canada, for testing for CT and NG by pooled polymerase chain reaction (PCR, Roche Diagnostics Systems, USA). The third aliquot was kept as back-up. A

fourth aliquot was taken from female pupils only and tested for pregnancy using the IPAS Quickstick HCG test.

Ethics and research clearance for the study was obtained from the Tanzanian National Medical Research coordinating committee and the London School of Hygiene and Tropical Medicine.

Statistical methods

All data were double entered, verified, and cleaned using Dbase IV (Borland) and analysed using Stata Version 6 (Stata Corporation). Sociodemographic factors were examined by school year and sex. Prevalence of HIV and other STI were examined by age and sex. Reported sexual behaviour was analysed separately for males and females, and compared to biological markers for sexual activity. For each sex, life tables were constructed using reported age of sexual debut, to obtain the proportion of males and females who were sexually active at each age. Knowledge, attitudes, and reported sexual behaviour were examined, with the principal comparison between the male and female pupils. Within each sex, the effect of previous sexual and reproductive health education on knowledge, attitudes, and reported sexual behaviour was examined.

The χ^2 test was used to assess the significance of comparisons, with the χ^2 test for trend to assess changes in prevalence over age. Logistic regression was used to calculate odds ratios (OR) and 95% confidence intervals (95% CI) as a measure of association between biological markers, reported sexual behaviour, and knowledge and attitudes after adjusting for age and community effects. Logistic regression was also used to compare primary school pupils in this school based survey with those from a previously reported community based survey.⁷ Two tailed significance tests were used throughout.

RESULTS

Study population

In the 121 primary schools in this study, there were 17 084 pupils registered in years 4, 5, and 6 (table 1). Eighteen pupils refused to participate in the study, and 2505 (15%) were absent on both survey days. Basic demographic data on the pupils and their households were obtained from 14 561 (85%) pupils. Further participation in the survey was restricted to the 9970 (68%) pupils who reported that they were born before 1 January 1985. Additional data and a urine sample were collected from 9283 (93%) of these pupils, as the remaining 687 pupils were not present on the second survey day. In each school year and overall, the average reported age of males was almost 12 months older than females. The age reported at enrolment and the age in the school register frequently differed. The reported age was usually higher, and the difference was similar for both males and females, but increased with the age of the pupil, with a mean difference of 3 months (SD 15 months) at age 13 years, rising to 15 months (SD 18 months) at 16 years. Reported age has been used for all subsequent analyses.

The demographic characteristics of the 9283 pupils who participated in the survey are shown in table 1. About two thirds of the pupils were still living in the village in which they had been born, more than three quarters belonged to the Sukuma tribe, and most reported that their parents were farmers. More girls than boys reported that they were Christian.

STI and other biological markers

All recruited subjects gave a urine sample, but HIV results were not obtained for three pupils (two male, one female), CT and NG for nine pupils (four males, five females), and pregnancy for 23 female pupils. Prevalences of biological

Table 1 Demographic characteristics

	Boys			Girls		
	Year 4	Year 5	Year 6	Year 4	Year 5	Year 6
Registered pupils (17084)	3445	2493	2628	3639	2304	2575
Number of pupils per school	25	19	19	27	18	19
Median (range)	(6–86)	(3–56)	(6–58)	(3–99)	(3–53)	(4–65)
Age in school register (years)	13	14	15	12	13	14
Median (range)*	(9–19)	(10–19)	(9–22)	(9–18)	(10–18)	(11–20)
Survey status (17084)	n = 3445	n = 2493	n = 2628	n = 3639	n = 2304	n = 2575
Not seen†	593 (17%)	359 (14%)	445 (17%)	486 (13%)	237 (10%)	385 (15%)
Refused	4 (0.1%)	3 (0.1%)	2 (0.1%)	4 (0.1%)	2 (0.1%)	3 (0.1%)
Personal and demographic data obtained	2848 (83%)	2131 (85%)	2181 (83%)	3149 (86%)	2065 (90%)	2187 (85%)
Personal data (14561)	n = 2848	n = 2131	n = 2181	n = 3149	n = 2065	n = 2187
Reported age (years)	14	15	16	13	14	15
Median (range)‡	(9–21)	(9–22)	(10–24)	(9–19)	(10–19)	(10–20)
Living with biological mother	2299 (81%)	2527 (80%)	1638 (77%)	1640 (79%)	1664 (76%)	1695 (78%)
Head of household is father	2060 (72%)	2310 (73%)	1546 (73%)	1517 (74%)	1580 (72%)	1528 (70%)
Eligible for study (reported date of birth before 1 Jan 1985)	1644 (58%)	1769 (83%)	2084 (96%)	1121 (36%)	1354 (66%)	1998 (91%)
Enrolled in study, demographic data (9283) 1509		1671	1954	1012	1262	1875
Born in the same village	1004 (67%)	1174 (70%)	1323 (68%)	651 (65%)	860 (69%)	1316 (71%)
Sukuma tribe	1156 (77%)	1287 (77%)	1465 (75%)	788 (78%)	970 (77%)	1421 (76%)
Father farmer	1065 (71%)	1120 (67%)	1370 (70%)	686 (68%)	866 (69%)	1234 (66%)
Mother farmer	1334 (88%)	1441 (86%)	1746 (89%)	868 (86%)	1091 (87%)	1621 (86%)
Christian religion	1105 (73%)	1245 (75%)	1488 (76%)	859 (85%)	1081 (86%)	1602 (85%)

*2311 pupils without age in school register.

†Pupils did not attend school on either of the two survey dates.

‡14 pupils did not report their age.

markers are shown in table 2. Fourteen pupils (0.2%) were HIV positive, and there were no significant differences by age or sex. There were 16 male pupils (0.3%) and 67 female pupils (1.6%, $p < 0.001$) who were positive for CT, and 12 pupils (two males, and 10 females, $p < 0.01$) positive for NG. There was no trend of increasing prevalence of NG or CT with age in either males or females. Thirty two female pupils (0.8%) were found to be pregnant. The prevalence of pregnancy increased from 0.3% in 14 year olds to 2.5% in those aged 17 years and above ($\chi^2_{\text{trend}} = 21.3$, $p < 0.001$). In total, there were 136 pupils, 22 males (0.4%) and 114 females (2.8%), with at least one biological marker of sexual activity (table 2).

On examination, 597 (11.7%) males were circumcised, of whom one was HIV positive and five were positive for CT. After adjusting for age and community, biological markers of any STI were significantly more common among circumcised (6/597, 1.0%) than uncircumcised (16/4537, 0.4%) males (OR 3.37, $p = 0.02$, 95% CI 1.18 to 9.60).

Sexual behaviour

Just over half of the males and one fifth of the females reported that they had ever had sex (table 3). Life tables of reported sexual debut are shown in figure 1 for males and females. However the reported age of sexual debut varied by the age of the respondent. For males, sexual debut by their

Table 2 Prevalence of biological markers related to sexual and reproductive health

	Age (years)				Total
	14	15	16	17 +	
Boys					
Number of pupils	1617	1305	1152	1060	5134
HIV	1 (0.1%)	2 (0.1%)	0 (0.0%)	1 (0.1%)	4 (0.1%)
<i>Chlamydia trachomatis</i> (CT)	0 (0.0%)	3 (0.2%)	9 (0.8%)	4 (0.4%)	16 (0.3%)
<i>Neisseria gonorrhoeae</i> (NG)	1 (0.1%)	0 (0.0%)	1 (0.1%)	0 (0.0%)	2 (0.04%)
Any biological marker of STI †	2 (0.1%)	5 (0.4%)	10 (0.9%)	5 (0.5%)	22 (0.4%)
Circumcised *	196 (12%)	156 (12%)	124 (11%)	121 (11%)	597 (11.7%)
Girls					
Number of pupils	1923	1293	687	246	4149
HIV	2 (0.1%)	5 (0.4%)	2 (0.3%)	1 (0.4%)	10 (0.2%)
<i>Chlamydia trachomatis</i> (CT)	27 (1.4%)	21 (1.6%)	16 (2.3%)	3 (1.2%)	67 (1.6%)
<i>Neisseria gonorrhoeae</i> (NG)	4 (0.2%)	3 (0.2%)	3 (0.4%)	0 (0.0%)	10 (0.2%)
Any biological marker of STI †	32 (1.7%)	27 (2.1%)	20 (2.9%)	4 (1.6%)	83 (2.0%)
Positive pregnancy test	5 (0.3%)	10 (0.8%)	11 (1.6%)	6 (2.5%)	32 (0.8%)
Any biological marker of sexual activity ‡	37 (1.9%)	37 (2.9%)	30 (4.4%)	10 (4.1%)	114 (2.8%)

*Circumcision observed on clinical examination.

†For both sexes, the markers of sexually transmitted infection are: positive for HIV, CT, or NG.

‡For females, the markers of sexual activity are: positive results for HIV, CT, NG, or pregnancy.

Table 3 Reported sexual behaviour

Question or variable*	Males	Females
Enrolled pupils	5134	4149
Have you ever had sex?	2629 (51.2%)	869 (20.9%)
In total, how many people have you ever had sex with in your life? †		
One	723 (27.5%)	467 (53.7%)
2–4 people	1383 (52.6%)	376 (43.4%)
5 or more	521 (19.8%)	24 (2.8%)
In total, how many people have you ever had sex with in the past 12 months?		
None	1085 (41.3%)	128 (14.8%)
One	766 (29.1%)	530 (61.2%)
Two	417 (15.9%)	171 (19.8%)
Three or more	361 (13.7%)	37 (4.3%)
In total, how many people have you ever had sex with in the past 4 weeks?		
None	1971 (75.0%)	521 (60.2%)
One	410 (15.6%)	281 (32.5%)
Two or more	247 (9.4%)	64 (7.4%)
Have you ever been forced to have sex by a boy/man?		202 (23.3%)
Have you ever used a condom?	102 (3.9%)	56 (6.4%)
Have you ever been pregnant?		9 (1.0%)
Which of the following best describes the person with whom you had sex the first time? ‡		
Pupil at your school	947 (36.0%)	423 (48.7%)
Person roughly your age	1382 (52.6%)	291 (33.5%)
Person younger than you	154 (5.9%)	82 (9.4%)
Person older than you or a stranger	115 (4.4%)	64 (7.4%)
Teacher	0	1 (0.1%)
Relative	30 (1.1%)	6 (0.7%)
Did you use a condom the first time you had sex?	56 (2.1%)	44 (5.1%)
Which of the following best describes the person with whom you had sex the last time? ‡		
Pupil at your school	1095 (41.7%)	402 (46.3%)
Person roughly your age	1199 (45.6%)	298 (34.3%)
Person younger than you	186 (7.1%)	84 (9.7%)
Older person or stranger	126 (4.8%)	77 (8.9%)
Teacher	0	2 (0.2%)
Relative	22 (0.8%)	4 (0.5%)
Did you use a condom the last time you had sex?	68 (2.6%)	42 (4.8%)

*Questions as they appeared in the English questionnaire, some response categories have been combined.

†Questions were not answered by 3–12 pupils for each question.

‡Categories for partners are mutually exclusive.

14th birthday was reported by 33% overall, but 42% of those aged 14 years old, 35% of those aged 15 years old, 30% of those aged 16 years old, and 21% for those aged 17 years or more ($p < 0.001$, χ^2 for trend = 129). For females, sexual debut by their 14th birthday was reported by 7% overall, breaking down into 9% of those aged 14 years, 6% of those aged 15 years, 5% of those aged 16 years, and 3% of those aged 17 years and more ($p < 0.001$, χ^2 for trend = 18.0).

Among those who reported having sex, over 70% of males, but only 46% of females reported they had had more than one sexual partner. Among the females, 23% reported that they had ever been forced to have sex by a boy or man. The types of sexual partner reported for the first sex act and the most recent sex act were similar, with over 80% of both males and females reporting sex with one of their peers (schoolmate or age mate). Only 4% of the pupils who reported having had sex said they had ever used a condom. There was no

association between reported sex and presence of HIV or CT in males, and of the 27 males with a biological marker of sexual activity only 12 (44%) reported ever having sex (table 4). Among the females, there was a significant association between reported sex and the prevalence of CT, NG and pregnancy, but of 114 females with a biological marker of sexual activity only 45 (39%) reported ever having sex (table 4).

Figure 1 Proportion of boys and girls reporting sexual debut by age.**Table 4** Reported sexual intercourse by biological indicators for sexual activity and sex of pupil

	Reported sexual activity		
	Never had sex	Had sex	p Value
Boys			
Number of pupils	2505	2629	
HIV	2 (0.1%)	2 (0.1%)	0.9
<i>Chlamydia trachomatis</i> (CT)	8 (0.3%)	8 (0.3%)	0.9
<i>Neisseria gonorrhoeae</i> (NG)	2 (0.1%)	0	0.15
Any biological marker of STI	12 (0.5%)	10 (0.4%)	0.6
Observed circumcision	263 (10.6%)	334 (12.8%)	0.01
Girls			
Number of pupils	3280	869	
HIV	9 (0.3%)	1 (0.1%)	0.4
<i>Chlamydia trachomatis</i> (CT)	46 (1.4%)	21 (2.4%)	0.04
<i>Neisseria gonorrhoeae</i> (NG)	4 (0.1%)	6 (0.7%)	0.002
Any biological marker of STI	58 (1.8%)	25 (2.9%)	0.04
Pregnancy	11 (0.3%)	21 (2.4%)	<0.001
Any biological marker of sexual activity	69 (2.1%)	45 (5.2%)	<0.001

Reported sexual and reproductive health knowledge and attitudes

Forty two per cent of males and 48% of females reported receiving some sexual and reproductive health education during the past year, about sex, AIDS, the prevention of pregnancy, or STI (table 5). Knowledge that HIV can be transmitted sexually was high, but overall less than a quarter of the pupils were able to name any other STI. Although knowledge of HIV and STI was associated with recent sexual and reproductive health education, the difference was less than 10% for each of the individual STI. For both males and females, those who had received sexual and reproductive health education were more likely to know that a healthy looking person could have HIV or AIDS than those who had not received sexual and reproductive health education. On the other hand, sexual and reproductive health education was associated with an increased proportion of males and females who had misconceptions about catching HIV through sharing food with an HIV positive person, and catching STI through sharing a towel with someone who has an STI.

Less than one third of all pupils said there were ways that a woman can use to prevent pregnancy, but when prompted about various methods, many agreed with both correct and incorrect methods for pregnancy prevention (table 5). Significantly more males than females thought that pregnancy could be prevented by using condoms. A high

proportion of both males and females agreed with locally common misconceptions, that pregnancy could be prevented by taking chloroquine tablets, and that pregnancy could be prevented through having sex in the standing position. sexual and reproductive health education was associated with a higher agreement with both correct and incorrect methods of pregnancy prevention among both males and females. More males than females felt that a girl could refuse sex with an older man, and sexual and reproductive health education increased this proportion among both males and females. Only one fifth of males and half of females felt that a girl could refuse sex if she had accepted a gift, and this proportion was lower for females who had received sexual and reproductive health education during the past year. Only one quarter of the males and one third of the females felt that a girl could refuse to have sex with her lover, and while this proportion was higher for females who had received sexual and reproductive health education, the proportions were similar among males.

DISCUSSION

As far as we are aware, this is the first reported school based survey of the prevalence of HIV and STI infection in primary school children in rural sub-Saharan Africa. The pupils in this survey formed a cohort that has been followed up for 3 years to assess the impact of a multifaceted sexual and reproductive health intervention targeted to primary school pupils.

Table 5 Knowledge of STI and HIV transmission and attitudes towards sexual health issues by sex and previous sexual and reproductive health education

So far this year have you received any school lessons on sexual and reproductive health?†	Boys (n = 5134)			Girls (n = 4149)			p V value for difference between sexes*
	No 2978 (58%)	Yes 2156 (42%)	p Value for difference among boys*	No 2146 (52%)	Yes 2003 (48%)	p Value for difference among girls*	
Are there any diseases that one can get by having sex?‡	2803 (94%)	2072 (96%)	0.2	1790 (83%)	1850 (92%)	<0.001	0.1
How many STI can you name? (unprompted)							
Gonorrhoea	602 (20%)	606 (28%)	0.003	226 (11%)	398 (20%)	<0.001	0.02
Syphilis	709 (24%)	712 (33%)	0.001	235 (11%)	414 (21%)	<0.001	<0.001
HIV	2711 (91%)	1984 (92%)	0.5	1677 (78%)	1718 (86%)	<0.001	<0.001
Herpes	50 (1.7%)	63 (2.9%)	0.007	47 (2.2%)	79 (4.0%)	0.004	0.4
Can a person who looks healthy have HIV/AIDS?‡	1039 (35%)	906 (42%)	<0.001	663 (31%)	872 (44%)	<0.001	0.9
Can you catch HIV/AIDS by sharing a plate of food with an HIV positive person?‡	1251 (42%)	934 (43%)	0.5	763 (36%)	899 (45%)	<0.001	0.1
Can you catch an STD by sharing a towel with someone who has an STD?‡	1591 (53%)	1307 (61%)	<0.001	884 (41%)	1150 (57%)	<0.001	<0.001
Are there any ways that a woman can use to stop herself becoming pregnant?‡	756 (25%)	736 (34%)	<0.001	663 (31%)	881 (44%)	<0.001	<0.001
Knowledge of correct ways (prompted)							
By not having sex at all‡	2795 (94%)	2013 (93%)	0.5	1885 (88%)	1900 (95%)	<0.001	0.6
By using condoms while having sex‡	2090 (71%)	1579 (73%)	0.4	705 (33%)	1048 (52%)	<0.001	<0.001
By taking contraceptive pills every day‡	1952 (66%)	1597 (74%)	<0.001	1239 (58%)	1469 (75%)	<0.001	0.9
Misconceptions (prompted)							
By taking chloroquine tablets‡	1111 (37%)	942 (44%)	<0.001	614 (29%)	812 (41%)	<0.001	0.2
By having sex in standing position‡	434 (15%)	384 (18%)	0.002	280 (13%)	437 (22%)	<0.001	0.05
Have you ever heard of a condom?‡	2843 (96%)	2112 (98%)	0.004	1265 (59%)	1532 (76%)	<0.001	<0.001
If a man or youth wants to have sex with a girl:							
Can she refuse if he is older than her?‡	1904 (64%)	1483 (69%)	0.001	1194 (56%)	1297 (65%)	<0.001	0.3
If she has accepted a gift, must she agree to sex?‡	2416 (81%)	1724 (80%)	0.5	995 (46%)	1133 (57%)	<0.001	<0.001
Can she refuse if he is her lover?‡	781 (26%)	574 (26%)	0.8	675 (31%)	790 (39%)	<0.001	<0.001

*Probability of difference adjusting for age and community.

†Sexual and reproductive health education includes sex education, AIDS education, education about STD prevention, education about pregnancy prevention.

Questions were asked about each of these four aspects of sexual and reproductive health education during the past 12 months.

‡Responses (No (%)) are those who answered "yes" to the question.

This survey provides baseline data on their sexual and reproductive health knowledge, reported attitudes and sexual behaviour, and risk of HIV, STI, and pregnancy.

The numbers of pupils registered in years 5 and 6 were substantially lower than those in year 4, 25% lower for boys and 33% lower for girls. These results are consistent with educational statistics in Tanzania, where some pupils drop out of primary school after national examinations at the end of year 4. With intensive community and school mobilisation, the survey team saw 86% of pupils registered in 121 primary schools. Although it was not possible to confirm this conclusively, the survey team had the impression that some school registers included some pupils who had not attended school for a long time.

This study used self reported age for the analysis, so that comparison could be made with other community based studies and to facilitate identification checks at subsequent follow up, when pupils had left school. The 9283 pupils enrolled in our study represent about 81% of all pupils aged 14 years and older in years 4–6 of these primary schools. This school based survey may not be representative of all adolescents in the community, because out of schoolchildren and pupils who do not attend school many have fewer constraints and more time to engage in risky sexual behaviour than their school peers.

HIV infections were present in this school based survey of primary school pupils, although the prevalences were low (0.1% in males and 0.2% in females) and showed little trend with age. In a community based survey in the same communities 1 year earlier, the overall HIV prevalence among adolescents aged 15–19 years was 0.3% in males and 1.0% in females who were still at school, and 0.7% in males and 3.0% in females who had left school.⁷ We compared the results from the two surveys by restricting the analysis to adolescents aged 15–17 years and still at school, and adjusting for year of age. There was a lower HIV prevalence in the school based survey for both males (OR 0.27, 95% CI 0.06 to 1.15, $p = 0.08$) and females (OR = 0.36, 95% CI 0.15 to 0.88, $p = 0.024$), although the difference in males was not statistically significant. In the community based survey, detection of HIV was based solely on antibodies in urine. In the school cohort, later follow up surveys, using dried blood spots, confirmed an HIV positive result in only 14 of the 23 subjects initially identified as positive using the urine test. Urine tests for HIV have been shown to have high sensitivity and specificity in another African population.²⁸ However, even with a specificity as high as 99.9%, in a population with a low HIV prevalence, the urine test produced many false positive results.

In this school based survey, the overall prevalence of CT was 0.3% in males and 1.6% in females. In the community based survey 1 year earlier, the prevalence of CT was similar both for adolescents who were still at school (0.5% for males and 2.1% for females) and for those who had left school (1.0% in males and 2.4% in females).⁷ Restricting the analysis to adolescents aged 15–17 years who were still at school, and adjusting for year of age showed no significant difference between the two surveys, in CT prevalence for either males (OR = 0.92, $p = 0.85$) or females (OR = 1.10, $p = 0.74$). The prevalence of NG was not measured in the community based survey, but was very low in this survey (0.04% in males and 0.3% in females). Overall, our survey found that 0.5% of male pupils, and 2.1% of female pupils had at least one biological marker of an STI. The tests for CT and NG are based on PCR detection and the pooling methods used in this survey have been shown to have extremely high sensitivity and specificity.²⁹ However the sensitivity of urine based PCR detection of NG has been questioned in other studies.³⁰

Almost 1% of female pupils aged 14 years and above in years 4, 5, and 6, were pregnant, with the prevalence of pregnancy increasing to 2.5% among female pupils aged 17 years and above. Given that girls who become visibly pregnant are usually not allowed to remain in primary school, the point prevalence of pregnancy is likely to have underestimated the burden of pregnancy in terms of early termination of schooling for girls. The pregnancy test used in this survey has been used in the United Kingdom for many years and has been shown to have high sensitivity and specificity (IPAS, NC, USA).

The proportion of girls who reported ever having sex was lower than among boys, and lower than that reported in similar community based surveys.⁷ This may have been due partly to the reluctance of schoolgirls to admit sexual debut, as the survey was held in school classrooms, although no teachers or adults were present, and young interviewers of the same sex as the survey subjects were trained in non-judgmental interview techniques. Other methods of collecting sexual behaviour data from the same adolescents, including self completion questionnaires administered in schools, have shown a higher proportion reporting sex.³¹ This indicates that data on self reported sexual behaviour obtained from adolescents in relatively brief face to face interviews must be treated with considerable caution. Other studies have used biological markers, including herpes simplex virus type 2 (HSV-2), as a measure of sexual behaviour.^{32–33} Our survey measured HIV, CT, NG, and pregnancy, and almost two thirds of girls who were positive for any of these biological markers denied ever having sex. Given the low prevalence of these biological markers in this adolescent population, some of the biological results may have been false positives, but the discrepancy between reported sexual behaviour and the biological markers highlight the need for more accurate measures of sexual behaviour.²²

Among pupils who reported having had sex, over 80% of both boys and girls reported that their sexual partners were school pupils or adolescents of their own age. The relatively small number of reported sexual partners, may indicate that the sexual networks of the great majority of school pupils are at relatively low risk for HIV and other STI. However, the risk of acquiring HIV and STI after leaving school is considerable, as demonstrated by the prevalence of HIV and CT in older adolescents in the same communities.⁷

In our survey, 23% of girls reported that they had been forced to have sex by a man or boy, which is consistent with other studies in this region that have reported forced sex to be common.²⁴ In these communities, forced sex does not necessarily imply rape, but may include coercion, bribes, and threats against adolescent girls.³⁴ Further evidence that schoolgirls have little power to make decisions about who they can have sex with was provided by the responses to some of the questions regarding sexual attitudes. These showed that very few of the pupils believed that a girl can refuse sex with a man if she had accepted a gift from him, or has consented to sex with him on previous occasions. Measures are needed to improve girls' ability to refuse unwanted sexual advances and to negotiate safe sex, and to change attitudes of the community towards sexual abuse and coercion.

Almost half of pupils reported having received some form of sexual and reproductive health education in the past year, although we did not ask about its content, or where and by whom it was delivered. Formal sexual and reproductive health education in Tanzanian primary schools has focused largely on knowledge of STI using didactic teaching methods and most sexual and reproductive health teaching in churches and mosques is limited to simple messages promoting sexual abstinence. Both correct and incorrect

Key messages

- HIV and other STIs are present among adolescents in rural primary schools in Tanzania, although at a relatively low prevalence
- Primary school pupils have inadequate knowledge of reproductive health and methods of preventing transmission of STI and HIV, which puts them at risk of acquiring these infections after they leave school
- There is an urgent need for effective reproductive health interventions in primary school to protect adolescents from HIV and STI
- Evaluation of such interventions needs to include biological markers of sexual health, as well as changes in reported knowledge, attitudes, and behaviour

beliefs about pregnancy prevention and STI were more likely to be held by pupils who claimed to have received sexual and reproductive health education before the survey. Our survey shows that sexual and reproductive health education did not seem to have changed the reported attitudes of pupils to a girl's ability to refuse sex under different hypothetical circumstances. This is consistent with other studies on the effectiveness of sexual and reproductive health education.^{18 19}

In conclusion, this survey of rural primary school pupils has shown relatively low prevalences of HIV and STI, but high rates of sexual activity, inadequate knowledge of sexual and reproductive health, and sexual attitudes that are likely to put adolescents, and particularly girls, at high risk of STI and unwanted pregnancy. With HIV prevalence rising to 5% by age 19, data from the community based survey⁷ suggest that girls are at high risk shortly after leaving school. These findings highlight the need for high quality, innovative sexual and reproductive health education for adolescents that includes efforts to change attitudes relating to sexual decision making. This should include skills based approaches, opportunities for self reflection and internalisation of decisions taken by participants, and be linked to youth friendly sexual and reproductive health services and initiatives within the wider community.²⁶ The vision of the 1994 International Conference on Population and Development will only be fully realised when young people, especially young women, are empowered to avoid unwanted or risky sex and to make informed decisions about their own sexual behaviour within a supportive community environment.

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CONTRIBUTORS

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ECHO.....

Israeli study uncovers health needs of trafficked female prostitutes

Please visit the Sexually Transmitted Infections website [www.stijournal.com] for a link to the full text of this article.

An exploratory study of women working in Israeli brothels, their self reported health problems, status, and working conditions has policy implications for other countries where illegal immigrant women are trafficked for prostitution. These disadvantaged women urgently need outreach services to satisfy their unmet health needs.

The researchers interviewed 55 volunteers aged 18–38 years working in brothels in Tel Aviv, Beer-Sheva, and Eilat and established baseline detailed demographic and working profiles during a private, questionnaire based, one to one interview.

They found that 82% of brothel workers in three Israeli cities were illegally trafficked women. Most were working up to 12 hours a day, seven days a week, seeing an estimated 200–300 clients a month—up to twice the number in similar studies. A third had high scores for risk factors such as urinary or sexually transmitted infections likely to increase occupational health risk, index though these did not match recent health visits, which are commonly controlled by brothel owners. Stepwise regression showed age <18 at first sexual encounter, suicidal thoughts in the past, hours of work per day, post-traumatic stress disorder (PTSD) as important variables, and in a final overall regression number of work hours and PTSD were significant. The few women who were legal immigrants—with access to health care—had slightly better health.

Israel's sex industry is now a high volume business dominated by illegal immigrant women trafficked mainly from the former Soviet Union to work in brothels, where they are more at risk of poor health, violence, and trauma. Understanding their circumstances is crucial to drawing up a healthcare policy for them.

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