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Abstract

The aim of the research on which this article is based was to understand the behavioural changes of the target student population over time to ensure that future prevention programmes are more effective in changing behaviour. This study reports on quantitative data collected at the University of the Western Cape over a six-year period between 2007 and 2012. All the students attending the orientation sessions and who were willing to complete the anonymous questionnaire during each of the six years were included in the study. Data were collected on the following aspects and subjects: sexual activity, age at first sexual encounter, number of sexual partners, condom usage, knowledge of how to use a condom, perceived ability to discuss condoms usage with a sexual partner, perception of HIV risk and HIV testing as well as the intention to be tested. Reported alcohol and drug usage, as well as depressive symptoms, was also recorded. The percentage of students reporting having had vaginal sex prior to entering university increased from 44% in 2007 to 51% in 2012 but, alarmingly, the consistent use of condoms decreased from 60% in 2007 to 51% in 2012. The average onset age of about 15.6 years for males and 16.7 years for females for vaginal sex did not change over the six-year period. No difference in smoking patterns or drug use was seen over the period of the study, but the number of entering students who indicated that they consumed alcohol increased significantly from 48% in 2007 to 58% in 2012. HIV testing increased from 19% in 2007 to 47% in 2012, whereas the intention to be tested showed no significant change over the period. Although students increasingly reported that they knew enough about HIV/AIDS (63% in 2007 and 69% in 2012), about a third reported suffering from AIDS fatigue. Prevention efforts targeted at those incoming first-year students who are not yet sexually active (about 45% in this study) should be developed and should take into account the multiplicity of factors that appear to influence their sexual debut.

Keywords: HIV/AIDS, sexual activity trends, prevention, risk behaviour, smoking, substance and alcohol abuse

Résumé

Les auteurs tentent d'appréhender les changements de comportements de la population étudiante afin de s'assurer que les futurs programmes de prévention soient plus efficaces auprès des étudiants. Cette étude rend-compte de résultats tirés de données quantitatives collectées sur une période de six ans, entre 2007 et 2012, à l'Université du Cap Occidental (Afrique du Sud). Tous les étudiants qui ont assisté aux réunions d'orientation de rentrée en début d'année et qui ont accepté de répondre à un questionnaire anonyme furent inclus dans ce travail de recherche. Les questions posées ont permis de collecter des informations sur l'activité sexuelle, l'âge au premier rapport intime, le nombre de partenaires sexuels, l'utilisation du préservatif, la connaissance pratique du maniement du préservatif, le sentiment de pouvoir discuter de l'utilisation du préservatif avec son partenaire, la perception du risque lié aux rapports non-protégés et au VIH, le sentiment sur les tests de séropositivité ainsi que l'intention de se soumettre au test. Des données sur la consommation d'alcool et de drogues de même que des informations sur les symptômes dépressifs furent aussi recueillies. Les résultats montrent que la proportion d'étudiants ayant déclaré avoir déjà eu des rapports sexuels par voir vaginale a augmenté, passant de 44% en 2007 à 51% en 2012 ; dans le même temps et de façon alarmante l'utilisation du préservatif a diminué de 60% en 2007 à 51% en 2012. L'âge au premier rapport sexuel, environ 15.6 ans pour les garçons et 16.7 ans pour les filles, est demeuré stable et n'a pas évolué sur la période considérée. La consommation de cigarettes ou de drogues est aussi resté constante sur la durée de l'étude, mais le nombre relatif d'étudiants qui ont déclaré consommer de l'alcool a fortement augmenté, passant de 48% en 2007 à 58% en 2012. La proportion d'étudiants ayant déjà passé un test de dépistage du VIH s'est accrue de 19% en 2007 à 47% en 2012 ; néanmoins, l'intention de se soumettre à un test

de dépistage du virus n'a pas connu de changement sur la période. En dépit du fait que les étudiants aient de plus en plus déclaré qu'ils considéraient en savoir assez sur le VIH-SIDA (63% en 2007 contre 69% en 2012), un tiers d'entre eux ont déclaré être fatigués d'entendre parler du virus. Des efforts de prévention ciblés pour les étudiants qui n'ont pas encore eu de rapport sexuel (environ 45% des sondés dans cette étude) devraient être développés en prenant en compte la pluralité des facteurs qui semblent influencer l'entrée dans la sexualité.

Mots-clés: VIH-SIDA, tendances de l'activité sexuelle, prévention, comportements à risques, fumer, consommation de drogues et d'alcool

Introduction

As South Africa is one of the countries with the largest number of HIV infections (Joint United Nations Programme on HIV/AIDS [UNAIDS] 2013), many South African universities have developed prevention programmes for first-year students to curb the spread of HIV at their institutions. Although these prevention programmes may differ from university to university, they share a common aim which is to ensure that first-year students are sufficiently well informed to make responsible decisions to prevent risk-taking behaviour and avoid dangerous situations that could lead to HIV infection.

Research has shown that young females remain most at risk (United Nations Population Fund [UNFPA] 2012) for HIV infection. In 2010, the South African HIV prevalence among females aged 15–24 was 13.6%, compared with 4.5% among males of the same age group (UNFPA 2012). The first national sero-prevalence study conducted nationally amongst university students in South Africa in 2009 found an HIV prevalence of 3.4%, with female students being three times more likely to be infected compared with their male counterparts (Higher Education and Training HIV/AIDS programme [HEAIDS] 2010). This study also reported that HIV prevalence increased with age, with 18–19-year-old students having a prevalence of 0.7% compared with 8.3% for students over the age of 25 years. These figures highlight the importance of specifically targeting first-year students to help ensure that they do not become infected with HIV.

Universities have investigated various aspects of targeted interventions to increase the effectiveness of HIV prevention training programmes, but ongoing research is needed to ensure that intervention programmes remain suitable and novel (Agardh, Cantor-Graae & Östergren 2012; Blignaut, Vergnani & Jacobs 2014; Durojaiye 2011; Mutinta, Govender, Gow & George 2012; Oppong & Oti-Boadi 2013).

In order for intervention programmes to be successful, they need to result in actual behaviour change. Michielsen, Temmerman and Van Rossem (2013), for instance, found that intervention programmes among adolescents in Rwanda mostly increase knowledge but are not really effective in changing behaviour. It is also known that a significant change in risk-taking behaviour is needed to curb the spread of HIV effectively. The researchers argue that for HIV prevention programmes to be more effective, an understanding of the sexual behaviour of the target population is needed. In order to plan more effective prevention programmes, we need to understand how behaviour can be changed by including composite relational and contextual aspects to develop interventions for specific populations.

Aims of the study

The aim of this research was to collect baseline information on existing risk-taking behaviour (sexual and other) of students entering the University of the Western Cape (UWC). An identical survey was administered annually to incoming first-year students from 2007 to 2012. The research aimed to document the trends in risk-taking (sexual and other) behaviour of these students in order to design more targeted orientation programmes that would prevent new HIV infections amongst university students.

Methodology

A descriptive study was designed to collect information about risk-taking behaviour of entering first-year students. All first-year UWC students who attended the orientation programmes from 2007 to 2012 were included in this study. As a compulsory part of the orientation programme, students attended a two-hour HIV and AIDS information session and prior to this information session all the first-year students were encouraged to complete a questionnaire. No sampling plan was followed as all students attending the training session were requested to complete the questionnaire. It was felt that by not implementing any sampling plan and by including all attending students, the most representative response would be obtained. Participation in the study was entirely voluntary and anonymous but it was found that almost all attending students had completed the questionnaire (students outside of the age range of 16–24 years, or those who were married, were excluded from the study during the analysis phase). All the questionnaire responses reported on in this article were quantitative in nature.

The survey instrument, a self-completion questionnaire, comprised four sections: background information; knowledge about HIV and AIDS; sexual attitudes and practices; and risk-taking behaviours. In addition, questions on depression and suicidal ideation were included. The questionnaire aimed to assess the knowledge, attitudes and sexual practices, as well as other risk behaviours related to HIV infection, of incoming first-year students.

All six data sets were cleaned using the same data-cleaning protocol. Married students and/or older students over the age of 24 were excluded as they might well have engaged in sexual practices that varied from those of younger unmarried students. All questionnaires that showed inconsistent answers were excluded—for example, an answer stating that the respondent had never had

sex would be contradicted by an answer to another question stating at what age he or she had become sexually active or the number of sexual partners he or she had had or whether or not he or she used condoms.

The data were entered using Microsoft Excel and were verified by duplicate capturing. The Excel spreadsheets were read into the Statistical Analysis System (SAS 2011) and the same programme was used for cleaning and analysis purposes.

Between 50% and 60% of all entering students completed the survey annually. Each year the samples of that year were weighted to ensure a representative sample reflecting the gender and race profile of registered first-year students for that particular year. This was necessary because late registration, late arrival on campus and late acceptance meant that not all students could attend the orientation programme.

The Rao–Scott chi-square test, a design-adjusted version of the Pearson chi-square, was used to test the association and changes over time (Rao & Scott 1987). The Rao–Scott chi-square test makes a design correction based on the adjusted proportions due to the weighting used.

Researchers are not unanimous in their opinion concerning the reliability of self-reporting sexual behaviour of the youth. Some studies found that school-going youth and university students reported sexual behaviour with high reliability (Clowes, Shefer, Fouten, Vergnani & Jacobs 2009; Flisher, Evans, Muller & Lombard 2004; Jaspan *et al.* 2007; Shefer, Clowes & Vergnani 2012). By contrast, investigations conducted by Palen and co-researchers found inconsistencies when high school leaners reported on sexual behaviour (Palen, Smith, Caldwell, Flisher, Wegner, & Vergnani 2008). In this study, we found very similar risk behaviour trends reported over the period of the study, and we therefore believe that this is an indicator of data reliability.

Ethics statement

Ethical approval for the study was obtained from UWC's Ethics Committee (number 05/1/33). Informed written consent was obtained from all students prior to the completion of the questionnaire. The consent forms were collected and stored separately from the completed questionnaires to ensure anonymity. Students were requested not to enter their name, surname or student number anywhere on the questionnaires and were provided with the contact details of the principal investigator for future counselling or guidance, if needed.

Results

The data used in this study comprised 6731 usable questionnaires (approximately a third of the completed questionnaires could not be used due to the age limit of 24 years, marriage and/or inconsistent answers).

The 6731 usable questionnaires included 879 questionnaires from the 2007 intake, 823 from the 2008 intake, 845 from the 2009 intake, 1261 from the 2010 intake, 1409 from the 2011 intake and 1514 from the 2012 intake. Only questions that were repeated

with the same wording and the same possible response categories were included in the combined data set.

Background

The gender profile of incoming first-year students remained female dominated across all the years of the study. From Table 1 it can be seen that slight differences were reported in the background information over the study period. The majority (approximately 80%) of students were aged between 16 and 20 on entering university and had matriculated in the Western Cape. The enrolment of black[1] students increased slightly from 40% in 2007 to 45% in 2012, whereas a slight drop in Indian/Asian student numbers over the same period was observed. Close to three quarters of the students resided at home with relatives at the time of the data collection. Most (from 78% in 2007 to 85% in 2010) students indicated that they were Christian. In all years, religion was reported to be very important in influencing sexual behaviour (see Table 1).

Trends in sexual behaviour over time

Reported sexual activity (which includes vaginal, anal and oral sex) increased slightly, although not significantly, over the study period (Rao–Scott = 4.96; p = .4203). However, if only vaginal sex of students entering the university is considered, a significant increase can be observed over the six-year time period (from 44% in 2007 to 51% in 2012) (Rao–Scott = 16.58; p = .0054). Noteworthy is the significant decrease (from 60% in 2007 to 51% in 2012) in consistent condom use for vaginal sex over the same time period (Rao–Scott = 20.41; p = .0255). Although only a small percentage of students indicated that they had had anal sex, the regular use of condoms for anal sex significantly decreased over time (from 37% in 2007 to 25% in 2012) (Rao–Scott = 18.56; p = 0.0462). There was a significant increase in respondents reporting having had sex under the influence of alcohol over the six-year study period (20% in 2007, 35% in 2011 and 33% in 2012) (Rao–Scott = 49.92; p < .0001). The reported number of sexual partners in the year prior to the questionnaire completion did not change significantly over the time period of the study. Approximately, 50% of the sexually active students over the six-year period indicated that they had had only one sexual partner in the year prior to completing the questionnaire. However, close to 20% indicated that they had had three or more partners during the same period (see Table 2).

Approximately two-thirds of the respondents (in all years) indicated that the decision to use a condom was a joint decision. Over time, significantly more students had taken an HIV test prior to entering university (Rao–Scott = 228.94; p < .0001) (see Table 2).

Over the six-year period of this study, the average onset age of vaginal sex for female students (16.7 years) was about a year later than that reported for males (15.6 years). The average onset age of vaginal sex was the youngest for the black male group over all the years (15.07 years), followed by males from the other combined racial groups (16.15 years). The average onset age for vaginal sex for black females (16.73 years) was very similar to the onset ages reported by females from the other combined racial groups (16.70 years). The onset age for

Table 1. Background information of incoming students over time (2007–2012) (weighted).

Variable	Outcomes	2007 n = 879	2008 n = 823	2009 n = 845	2010 n = 1261	2011 n = 1409	2012 n = 1514	Rao–Scott chi-square p-value
Gender	Female	60	62	64	61	63	61	5.42
	Male	40	38	36	39	37	39	0.3669
Age group	16–<20	81	79	89	83	84	81	28.79
	20–<24	19	21	11	17	16	19	<.0001*
Matriculation province	Western Cape	71	73	82	75	75	77	25.41
	Others	29	27	18	25	25	23	.0001*
Race	Black	40	41	38	42	41	45	48.49
	Coloured	47	49	54	50	50	46	<.0001*
	White	5	4	3	3	5	5	
	Indian/Asian	8	6	5	5	4	4	
Reside when at university	Home with relatives	72	71	81	74	74	74	111.83
	UWC hostel	21	22	11	16	12	13	<.0001*
	Rent with friends	5	6	5	6	10	9	
	Rent a room alone	2	1	3	3	4	4	
Religion	Christian	78	80	83	85	81	83	46.57
	Muslim	14	16	12	12	12	10	<.0001*
	Traditional	3	2	2	2	3	4	
	Others	5	2	3	2	4	3	
Importance of religion in influencing sexual behaviour	Very important	58	60	56	57	55	59	18.96
	Somewhat important	20	19	20	21	20	18	.5246
	Slightly important	9	7	9	8	9	8	
	Not sure	7	9	10	10	11	10	
	Unimportant	6	5	5	4	5	5	

* p-value <0.01.

oral sex was about 16 years for males (16.32 for black males and 16.11 for males from the other combined racial groups) and 17 years for females (17.39 for black females and 16.91 for females from the other combined racial groups). Only a few students reported having had anal sex. The onset age for anal sex was very similar to that reported for oral sex (see Table 2 for the average ages reported for each year).

Trends in substance or alcohol use or depression related to sexual activity

The results revealed two discernible patterns. The first is that there was a highly significant correlation between sexual activity and drug use, smoking and drinking habits in all six years of the study ($p < 0.0001$ in all cases) (see Table 3). Second, sexual activity was significantly associated with depressive symptoms or suicidal ideation in two (2007, 2012) of the six years (Rao–Scott = 7.27; $p = 0.0070$; Rao–Scott = 7.99; $p = 0.0047$).

In the 2007 and 2012 cohorts, the likelihood that a student was depressed or reported suicidal ideation was about 1.3 times higher in the sexually active group compared with the students who were not sexually active. However, in the 2008 cohort, this likelihood was about 1.0 which indicated that the likelihood of

depression was similar in the sexually active and non-active groups. The confidence intervals in the graph depicting sexual activity by depression or suicidal ideation show that all relative risk confidence intervals (over the six years of the study) overlap, indicating that no real differences in these likelihoods were seen over time for students reporting depression or suicidal ideation (see Fig. 1). According to Table 3, sexual activity was significantly associated with depressive symptoms or suicidal ideation in two of the six years.

The likelihood for drug use needs to be inspected separately for 2007–2009 and for 2010–2012 as there was a slight change in the phrasing of the question related to drugs. During the first three years, the question about drugs was: 'Have you ever used drugs?' but in 2010–2012 the question was: 'During the past 30 days, were drugs used?'. The likelihood that a student used drugs was about 2.6 times higher in the sexually active group compared with the students who were not sexually active in the 2012 cohort. In the 2010 cohort this likelihood was about 4.4 times. The confidence intervals in the graph depicting sexual activity by drug use show that all confidence intervals of the relative risks with a similar phrased question about drug use overlap, indicating that no real difference in these likelihoods was seen over time for drug use (see Fig. 2).

Table 2. Sexual activity and related responses over time (2007–2012).

Variable	Outcomes	2007 n = 879	2008 n = 823	2009 n = 845	2010 n = 1261	2011 n = 1409	2012 n = 1514	Rao–Scott chi-square p-value
Sexually active (vaginal, oral or anal)	Yes	52	54	57	54	56	56	4.96
	No	48	46	43	46	44	44	.4203
Ever had vaginal sex	Yes	44	49	52	48	52	51	16.58
	No	56	51	48	52	48	49	.0054*
Used a condom with last vaginal sex (only sexually active students)	Yes	72	69	73	69	69	67	5.45
	No	28	31	27	31	31	33	.3632
How often are condoms used for vaginal sex (only sexually active students)	Never	7	5	6	9	6	7	20.41
	Sometimes	33	40	36	39	43	42	.0255*
	Always	60	55	58	52	51	51	
Ever had oral sex	Yes	27	24	26	24	25	23	11.79
	No	66	68	69	71	70	70	.2995
	Do not know what oral sex is	7	8	5	5	5	7	
Contract HIV from oral sex	Yes	62	64	64	63	70	66	20.92
	No	26	25	25	27	20	23	.0216*
	Do not know what oral sex is	12	11	11	10	10	11	
Used condom/barrier with last oral sex (only sexually active students)	Yes	21	19	19	18	16	18	1.55
	No	79	81	81	82	84	82	.9073
How often are condoms/barriers used for oral sex (only sexually active students)	Never	65	63	66	62	66	66	2.64
	Sometimes	19	22	21	22	20	20	.9887
	Always	16	15	13	16	14	14	
Have you ever had anal sex	Yes	4	5	6	6	6	6	5.52
	No	88	88	87	87	87	87	.8532
	Do not know what anal sex is	8	7	7	7	7	7	
Contract HIV from anal sex	Yes	76	74	74	72	77	74	17.39
	No	11	12	15	16	13	13	.0662
	Do not know what anal sex is	13	14	11	12	10	13	
Used condom with last anal sex (only sexually active students)	Yes	44	43	60	38	47	48	6.15
	No	56	57	40	62	53	52	.2923
How often are condoms used for anal sex (only sexually active students)	Never	38	44	27	41	29	37	18.56
	Sometimes	25	24	17	29	31	38	.0462*
	Always	37	32	56	30	40	25	
Do you ever have sexual intercourse under the influence of alcohol? (only sexually active students)	Yes	20	29	33	32	35	33	49.92
	No	80	71	67	68	65	67	<.0001*
How often is alcohol drank before sexual intercourse (only sexually active students)	Never	57	63	54	55	52	55	19.20
	Sometimes	42	37	46	44	47	44	.0378*
	Every time	1	0	0	1	1	1	
Do you ever have sexual intercourse after using drugs? (only sexually active students)	Yes	5	6	6	7	8	6	6.86
	No	95	94	94	93	92	94	.2314
Number of sexual partners in the last year (only sexually active students)	None	11	7	6	11	9	8	18.49
	1	54	52	58	52	50	51	.2378
	2	20	21	17	18	21	22	
	3 or more	15	20	19	19	20	19	
Who decides when a condom should be used (only sexually active students)	I decide	31	32	34	34	33	34	8.03
	My partner	1	2	1	2	2	2	.9227
	Both of us	65	64	61	60	61	61	
	Never use condoms	3	2	4	4	4	3	
Had a sexually transmitted infection (only sexually active students)	Yes	4	4	3	3	3	4	3.77
	No	96	96	97	97	97	96	.5827

(Continued)

Table 2. Continued.

Variable	Outcomes	2007 $n =$ 879	2008 $n =$ 823	2009 $n =$ 845	2010 $n =$ 1261	2011 $n =$ 1409	2012 $n =$ 1514	Rao–Scott chi-square p-value
Taken an HIV test	Yes	19	24	28	38	39	47	228.94
	No	81	76	72	62	61	53	<.0001*
Age – first vaginal sex	Mean males	15.47	15.68	15.58	15.57	15.55	15.61	
	Mean females	16.85	16.97	16.63	16.55	16.83	16.58	
Age – first vaginal sex	Mean males black	14.99	15.48	15.00	15.00	14.94	15.10	
	Mean males other	16.04	15.96	16.14	16.20	16.21	16.22	
	Mean females black	16.79	17.07	16.69	16.51	16.90	16.53	
	Mean females other	16.93	16.86	16.59	16.58	16.77	16.63	
Age – first oral sex	Mean males	16.39	16.07	16.04	16.03	16.30	16.29	
	Mean females	17.12	17.42	16.91	16.92	17.19	17.01	
Age – first oral sex	Mean males Black	16.94	16.73	15.47	16.16	16.21	16.45	
	Mean males other	16.15	15.41	16.31	15.94	16.36	16.17	
	Mean females black	17.28	18.06	16.97	17.28	17.55	17.15	
	Mean females other	17.04	16.97	16.88	16.71	16.94	16.94	

*p-value <.05.

In the 2012 cohort, the likelihood that a student used alcohol was about 1.7 times higher in the sexually active group compared with the students who were not sexually active. In the 2007 cohort, alcohol use was more than twice as high in the sexually active group compared with those not sexually active (see Fig. 3).

In the 2012 cohort, the likelihood that a student smoked was about 1.8 times higher in the sexually active group compared with the students who were not sexually active. In the 2009 cohort, this likelihood was about 2.6. The confidence intervals in the graph depicting sexual activity by smoking habits show that all confidence intervals overlap, indicating no real difference in these likelihoods over time (see Fig. 4).

Trends in HIV testing

As could be expected, in all six years of the study, significantly more sexually active students took an HIV test prior to entering university compared with the students who were not sexually active ($p < .0001$ in all years). In five of the six years, the testing prevalence was very similar among the genders, but in 2010 a significantly larger proportion of females took an HIV test prior to entering university (Rao–Scott = 6.30; $p = .0121$). Although HIV testing increased in both the black and the other combined racial group over the years, significantly more black students had taken an HIV test prior to entering university in all years ($p < .0001$). A separate analysis of the genders shows that significantly more black female students tested for HIV compared with the other combined racial groups' females ($p < .0001$ in all years). Similarly, black male students tested significantly more than the other combined racial groups' males in four of the six years (see Table 4).

The sexually active students were more than three times more likely to have taken an HIV test compared with the students who were not sexually active in the 2007 and 2008 cohorts. From 2009 onwards, the sexually active students were between 1.2 and 1.7 times more likely to have taken an HIV test while still at school and before entering university. The confidence intervals of the relative risk in the graph depicting the HIV testing patterns over time reveal that not all the confidence intervals overlap, thus showing differences in testing patterns for the sexually active versus not active group over time. In more recent years, HIV testing of the sexually active group versus the not sexually active group was not as pronounced (see Fig. 5).

In 2007 and 2008, black students were more than 2.5 times more likely to have taken an HIV test compared with the students from the other racial groups. From 2009 onwards, the black students were about 1.5 times more likely compared with the other racial groups to take an HIV test before entering university. As not all the confidence intervals of the relative risk depicting the HIV testing patterns over time overlap, there is evidence of differences in testing patterns for the racial groups over time. In more recent years, HIV testing of the black racial group compared with the other racial groups was not as pronounced (see Fig. 6).

In 2007, black female students were about three times more likely to have taken an HIV test prior to entering university compared with females from the other combined racial groups. In 2007, black male students were about two times more likely to have taken an HIV test compared with male students of the other combined racial groups. In more recent years, HIV testing was still more likely to occur among black students, but the likelihood of testing was about 1.5 times higher than the combined racial group for both genders (see Fig. 7).

Table 3. Risk behaviour according to sexual activity (2007–2012) (%).

Variable		Sexually active	2007 $n = 879$	2008 $n = 823$	2009 $n = 845$	2010 $n = 1261$	2011 $n = 1409$	2012 $n = 1514$
Depressed or	Yes	Yes	43	42	42	32	32	32
suicidal		No	57	58	58	68	68	68
ideation	No	Yes	33	41	37	29	30	25
		No	67	59	63	71	70	75
			$x^2 = 7.27$	$x^2 = 0.04$	$x^2 = 1.83$	$x^2 = 1.12$	$x^2 = 0.77$	$x^2 = 7.99$
			$p = .0070^*$	$p = .8360$	$p = .1764$	$p = .2898$	$p = .3787$	$p = .0047^*$
Have you ever	Yes	Yes	30	25	28			
used drugs?		No	70	75	72			
	No	Yes	19	11	14			
		No	81	89	86			
			$x^2 = 13.63$	$x^2 = 25.13$	$x^2 = 23.48$			
			$p = .0002^*$	$p < .0001^*$	$p < .0001^*$			
During the past	Yes	Yes				6	8	8
30 days, did		No				94	92	92
you use drugs?	No	Yes				1	3	3
		No				99	97	97
						$x^2 = 70.0$	$x^2 = 18.22$	$x^2 = 14.98$
						$p < .0001^*$	$p < .0001^*$	$p < .0001^*$
Do you smoke?	Yes	Yes	30	28	30	32	29	27
		No	70	72	70	68	71	73
	No	Yes	14	13	12	15	12	15
		No	86	87	88	85	88	85
			$x^2 = 30.87$	$x^2 = 26.21$	$x^2 = 40.05$	$x^2 = 39.69$	$x^2 = 54.79$	$x^2 = 28.06$
			$p < .0001^*$	$p < .0001^*$	$p < .0001^*$	$p < .0001^*$	$p < .0001^*$	$p < .0001^*$
Do you	Yes	Yes	67	63	70	68	71	71
drink alcohol?		No	33	37	30	32	29	29
	No	Yes	32	35	39	37	37	43
		No	68	65	61	63	63	57
			$x^2 = 80.87$	$x^2 = 54.91$	$x^2 = 70.58$	$x^2 = 92.98$	$x^2 = 141.18$	$x^2 = 103.04$
			$p < .0001^*$	$p < .0001^*$	$p < .0001^*$	$p < .0001^*$	$p < .0001^*$	$p < .0001^*$

$X^2 = $ Rao–Scott chi-square.
$^*p$-value $<.01$.

Trends in the intention to test for HIV

In only three (2008, 2011 and 2012) of the six years of the study, significantly more of the sexually active students indicated that they intended to have an HIV test compared with the students who were not sexually active (Rao–Scott $= 34.45$; $p < .0001$; Rao–Scott $= 8.38$; $p < .0038$ and Rao–Scott $= 26.49$; $p < .0001$, respectively for 2008, 2011 and 2012). The intention to test for HIV was more pronounced in females in all years, although not always significantly different from that reported by males. In 2007, 2010, 2011 and 2012 significantly more females indicated that they intended to go for an HIV test compared to males (Rao–Scott $= 12.44$; $p = .0004$; Rao–Scott $= 10.70$; $p = .0011$; Rao–Scott $= 14.49$; $p = .0001$; Rao–Scott $= 10.2$; $p = .0014$). A comparison of race as a variable indicates that in 2010 and in 2012 significantly more black students indicated that they intended to go for an HIV test compared with the students from other racial groups (Rao–Scott $= 6.53$; $p = .0106$; Rao–Scott $= 4.79$; $p = 0.0300$). A gender-based analysis of the data shows that from 2010 to 2012 there was a significant increase in the intention to test for HIV in the black female group compared with the other combined racial groups' females. No difference in intention to test for HIV was seen between the black males and the males from the other combined racial groups (see Table 5).

Trends in perceived HIV knowledge and HIV/AIDS fatigue

There was a highly significant association between perceived HIV/AIDS knowledge and students who felt that they were sick and tired of hearing about HIV/AIDS (HIV/AIDS fatigue) in all years of the study ($p < .0001$)(see Table 6).

Discussion

It is evident that the demographic profile of students remained reasonably constant over the six years of the study. In all years about 60% of the new incoming students were female, which has been the general profile of undergraduate students entering UWC. The majority of the students were aged between 16 and 20 years and 80% of them had matriculated in the Western Cape province of South Africa. Approximately 80% indicated that they were Christians, with the majority of students of all religions indicating that religion was either somewhat or very important in influencing their sexual behaviour. This finding was similar to the findings of a number of studies conducted in other regions (e.g. Lammers, Ireland, Resnick & Blum 2009; Leonard 2006; Inyang 2008). Religious belief was also found to be linked to sexual risk behaviour of college students in a study completed in Croatia (Štulhofer, Šoh, Jelaska, Baćak & Landripet 2011). In the
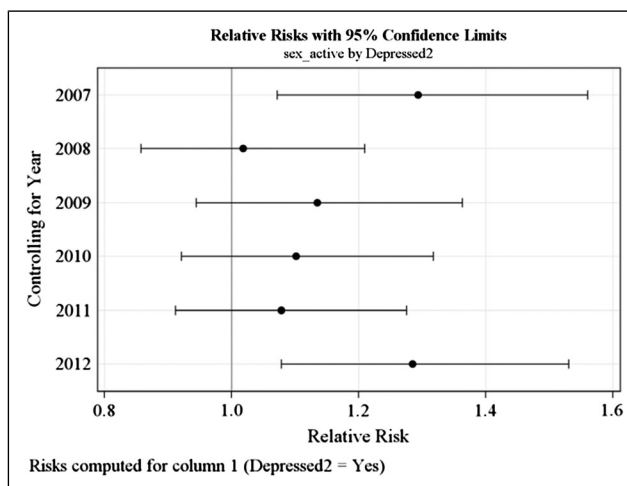
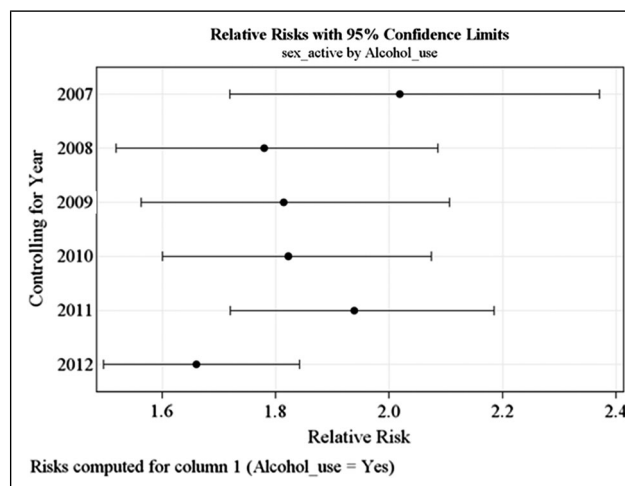Fig. 1. Sexual activity related to depression or suicidal ideation.

Fig. 3. Sexual activity related to alcohol use.

context of this study, it is assumed that religious belief has some predictive value as far as sexual risk behaviour is concerned.

The findings of the current study indicate that some risk behaviour patterns seem to have changed over the six years of the study; others (e.g. sexual activity) remained relatively constant over the same period. Pre-university vaginal sex increased significantly from 44% in 2007 to 52% in 2011 and 51% in 2012. Mturi and Gaearwe (2014) found that university students in Mafikeng reported that about half of the males and a third of the females lost their virginity before entering university. By contrast, the Mafikeng study on average reported slightly lower percentages in this regard.

The percentage of students who indicated that they had had oral or anal sex remained constant over the six years. It is a cause for concern, however, that the regular use of condoms for anal sex significantly decreased over time. Sexual activity under the influence of alcohol increased significantly over the time period. As substance use could impair judgement, this could lead to risky sexual behaviour, which in turn could increase the risk of contracting HIV. A narrative review of 86 studies conducted by

Woolf-King and Maisto (2011) provides clear evidence of the greater odds of HIV infection for individuals with a history of alcohol consumption and individuals whose partners regularly consume alcohol.

This study showed a clustering of risk behaviours related to sexual activity. Over the six-year time period, the sexually active group had significantly higher rates of smoking, alcohol and drug use and depressive symptoms compared with the non-sexually active group. This trend is also confirmed by research reported in other studies (see, for instance, Reddy 2009; Reddy *et al.* 2010; Shishana *et al.* 2009). This clustering of risk behaviours (including sexual activity) indicates the need for more targeted prevention programmes among first-year students. The results also indicate the need for maximising synergies with other programmes and departments at the university to address specific vulnerabilities among students. In this regard, the unexpected and disturbingly high reported rates of depressive symptoms, and the importance of religion as a protective factor, stand out. Special attention and further research are needed on how to address the high rates of alcohol and drug use, especially when this is combined with unsafe sex. The clustering of factors
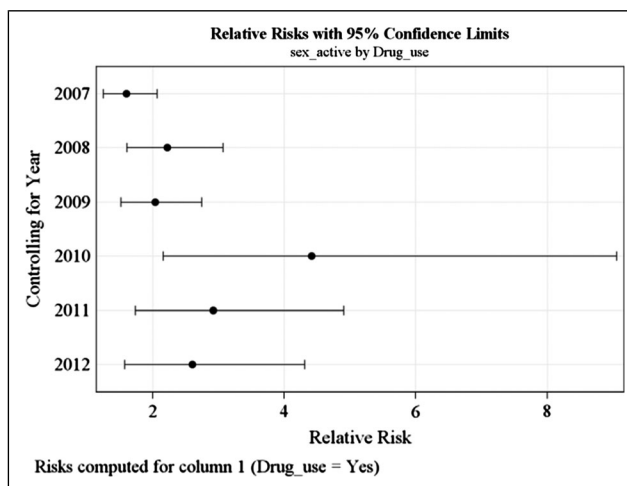

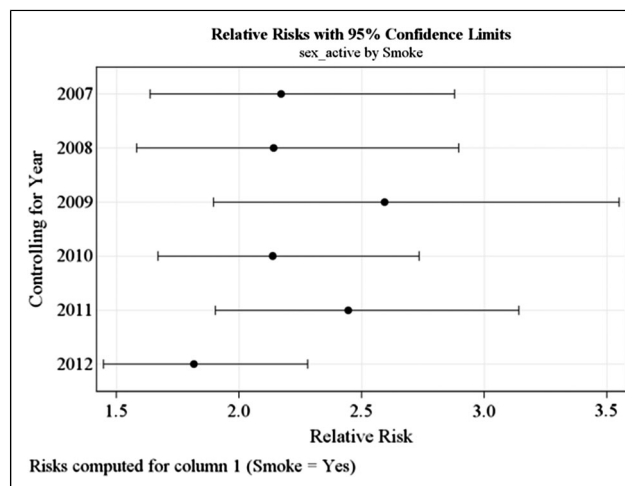
Fig. 2. Sexual activity related to drug use.

Fig. 4. Sexual activity related to smoking.

Table 4.   HIV testing (2007–2012) (%).

Variable		Taken HIV test	2007 $n = 876$	2008 $n = 820$	2009 $n = 843$	2010 $n = 1257$	2011 $n = 1403$	2012 $n = 1512$
Sexually active	Yes	Yes	30	36	36	48	48	57
		No	70	64	64	52	52	43
	No	Yes	9	10	18	27	27	35
		No	91	90	82	73	73	65
			$x^2 = 48.77$	$x^2 = 64.71$	$x^2 = 29.5$	$x^2 = 41.73$	$x^2 = 57.17$	$x^2 = 63.05$
			$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$
Gender	Female	Yes	21	23	30	41	40	49
		No	79	77	70	59	60	51
	Male	Yes	17	26	24	33	36	44
		No	83	74	76	67	64	56
			$x^2 = 1.64$	$x^2 = 0.77$	$x^2 = 2.47$	$x^2 = 6.30$	$x^2 = 2.29$	$x^2 = 2.32$
			$p = .2002$	$p = .3815$	$p = .1168$	$p = .0121*$	$p = .1300$	$p = .1273$
Race	Black	Yes	30	39	37	48	49	60
		No	70	61	63	52	51	40
	Others	Yes	12	15	23	31	33	39
		No	88	85	77	69	67	61
			$x^2 = 36.24$	$x^2 = 50.96$	$x^2 = 15.29$	$x^2 = 31.36$	$x^2 = 30.64$	$x^2 = 55.34$
			$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$
Female	Black	Yes	36	38	42	56	52	67
		No	46	62	58	44	48	37
	Others	Yes	12	14	24	32	34	40
		No	88	86	76	68	66	60
			$x^2 = 37.25$	$x^2 = 33.91$	$x^2 = 17.51$	$x^2 = 39.18$	$x^2 = 25.67$	$x^2 = 43.81$
			$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$
Male	Black	Yes	22	41	29	38	45	56
		No	78	59	71	62	55	44
	Others	Yes	12	17	21	29	31	37
		No	88	83	79	71	69	63
			$x^2 = 4.89$	$x^2 = 17.12$	$x^2 = 1.72$	$x^2 = 2.89$	$x^2 = 7.73$	$x^2 = 15.52$
			$p = .0270*$	$p < .0001*$	$p = .1894$	$p = .0890$	$p = .0054*$	$p < .0001*$

$X^2 =$ Rao–Scott chi-square.
* p-value $<.05$.

further points to the need for customised prevention interventions for a local setting such as the university.

As expected, over the six-year period, more of the sexually active students had taken an HIV test compared with those who were not sexually active before entering university. For five of the six years, the prevalence of testing was similar between the genders, but in 2010 significantly more females tested for HIV compared with males. Black students (male and female) were more likely to have taken an HIV test prior to entering university compared
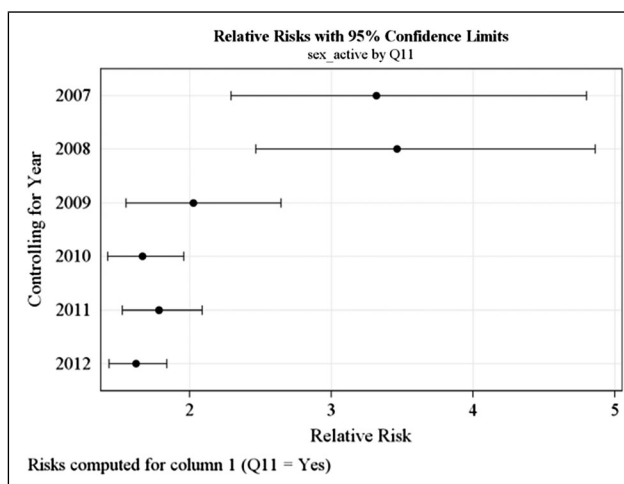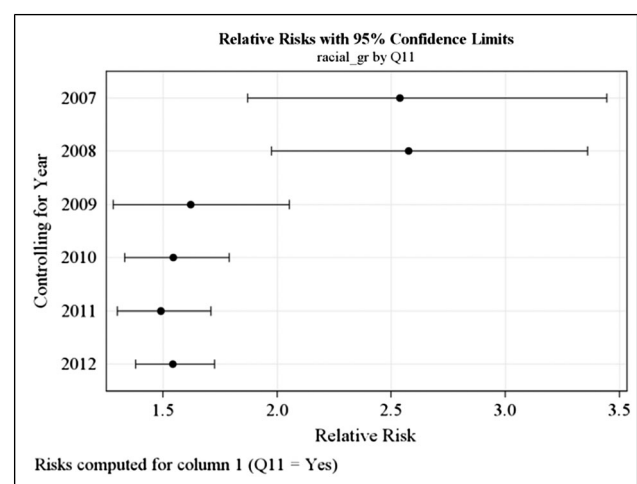
Fig. 5. HIV testing by sexual activity.

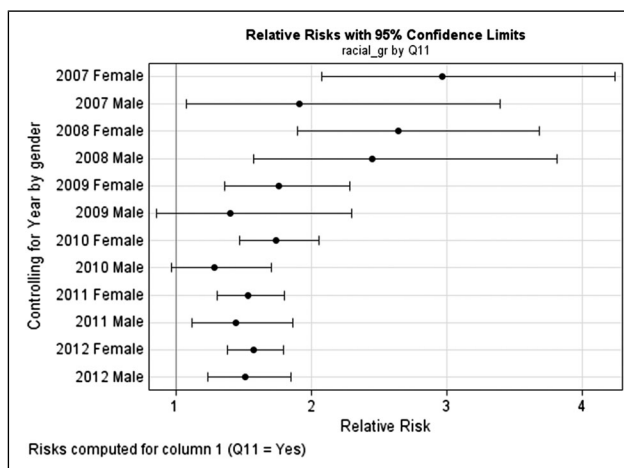*Fig. 6. HIV testing by racial group.*

Fig. 7. HIV testing by racial group.

with the other combined racial groups. A study conducted by the Centre for Disease Control and Prevention found that HIV testing was lower among males than females but that more blacks or Afro-Americans presented for HIV testing than other racial groups (Whitmore, Kann & Prejean 2013). A meta-analysis of higher risk sexual behaviour of women from third world countries

concluded that young women have a false sense of security as far as high risk behaviour is concerned (Berhan & Berhan 2012) which could result in a lower HIV testing uptake. The focus should be on getting the youth to assess their level of risk correctly as a way of getting them to understand the value of knowing their HIV status.

Cognisance should be taken of the fact that HIV/AIDS fatigue was indicated by a third of the students who felt that they knew enough about HIV/AIDS. HIV prevention fatigue among students has also been found in other studies (Anderson 2013; Baelden, Vergnani & Van Audenhove 2008; Shefer, Strebel & Jacobs 2012). Developers of HIV preventative programmes thus need to renew prevention strategies continuously to include various new perspectives relevant to students entering university life. A stronger emphasis on combination approaches to behaviour change is needed with programme coverage and uptake as key considerations.

Conclusion

The results of this study showed that over a six-year period, incoming first-year students at UWC continue to enter university already engaging in a range of behaviours that could put them at risk for contracting HIV. These include early sexual activity,

Table 5.   Intention to go for HIV testing (2007–2012).

Variable		Intention to HIV test	2007 $n = 879$	2008 $n = 823$	2009 $n = 845$	2010 $n = 1261$	2011 $n = 1409$	2012 $n = 1514$
Sexually active	Yes	Yes	68	78	73	69	72	71
		No	32	22	27	31	28	29
	No	Yes	61	57	67	67	65	58
		No	39	43	33	33	35	42
			$x^2 = 3.72$	$x^2 = 34.45$	$x^2 = 3.14$	$x^2 = 0.92$	$x^2 = 8.38$	$x^2 = 26.49$
			$p = .0537$	$p < 0.0001^*$	$p = .0762$	$p = .3363$	$p = .0038^*$	$p < .0001^*$
Gender	Female	Yes	70	70	72	71	73	68
		No	30	30	28	29	27	32
	Male	Yes	57	64	66	62	62	60
		No	43	36	34	38	38	40
			$x^2 = 12.44$	$x^2 = 3.49$	$x^2 = 2.33$	$x^2 = 10.70$	$x^2 = 14.49$	$x^2 = 10.2$
			$p = .0004^*$	$p = .0618$	$p = .1267$	$p = .0011^*$	$p = .0001$	$p = .0014^*$
Race	Black	Yes	64	74	72	73	71	70
		No	36	26	28	27	29	30
	Others	Yes	69	67	72	66	69	64
		No	31	33	28	34	31	36
			$x^2 = 1.34$	$x^2 = 3.40$	$x^2 = 0.001$	$x^2 = 6.53$	$x^2 = 0.31$	$x^2 = 4.79$
			$p = .2478$	$p = .0654$	$p = .9682$	$p = .0106^*$	$p = .5766$	$p < .0300^*$
Female	Black	Yes	71	77	76	79	77	75
		No	29	23	24	21	23	25
	Others	Yes	72	68	73	68	70	66
		No	28	32	27	32	30	34
			$x^2 = 0.03$	$x^2 = 3.73$	$x^2 = 0.41$	$x^2 = 9.95$	$x^2 = 4.12$	$x^2 = 7.48$
			$p = .8650$	$p = .0535$	$p = .5222$	$p = .0016^*$	$p = .0425^*$	$p < .0063^*$
Male	Black	Yes	55	69	66	66	61	63
		No	45	35	34	34	39	37
	Others	Yes	64	65	70	62	66	61
		No	36	35	30	38	34	39
			$x^2 = 1.96$	$x^2 = 0.51$	$x^2 = 0.37$	$x^2 = 0.59$	$x^2 = 1.01$	$x^2 = 0.32$
			$p = .1617$	$p = .4750$	$p = .2200$	$p = .4418$	$p = .3143$	$p = .5741$

X^2 = Rao–Scott chi-square.
*p-value <.05.

Table 6. HIV knowledge and fatigue (2007–2012) (%).

Variable		HIV/AIDS fatigue	2007 $n = 851$	2008 $n = 797$	2009 $n = 822$	2010 $n = 1088$	2011 $n = 1236$	2012 $n = 1395$
Do you know enough about HIV/AIDS?	Yes	Yes	41	36	44	44	44	41
		No	59	64	54	56	56	59
	No	Yes	19	17	18	18	15	18
		No	81	83	82	82	85	82
			$x^2 = 36.09$	$x^2 = 28.69$	$x^2 = 47.06$	$x^2 = 62.95$	$x^2 = 99.40$	$x^2 = 68.25$
			$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$	$p < .0001*$

x^2 = Rao–Scott chi-square
*p-value <.01.

inconsistent or non-usage of condoms, engaging in alcohol and/ or drug use that could impair their decision-making power, having multiple partners and not having HIV tests. Despite these disturbing and potentially destructive behaviour patterns, many students feel that they already know enough about HIV and are tired of hearing about HIV prevention. Depressive symptoms among a number of these students pose a further risk factor. These results indicate not only the need for prevention programmes targeting first-year students, but also the need for novel approaches that address the prevalence of AIDS fatigue among many of the students.

The data further reveal that about 45% of the entering students are not yet sexually active. It is therefore important to address social norms at university to help sustain this behaviour. About half of the sexually active students indicated that they practised safer sex (always using condoms), which indicates that more effective HIV prevention programmes should be implemented at the school level. Ross (2010) found that intervention programmes could increase in effectiveness by targeting not only an isolated group (e.g. university students) but concurrently addressing risk-taking behaviour in the wider community to increase community acceptance and the effectiveness of intervention. This aspect of multi-level interventions is underscored by the research of Maticka-Tyndale and Tenkorang (2010) which looks at a multi-level model of condom use in schools in Kenya. Although the data are specific to a student population, lessons can be deduced that may impact on prevention programmes designed for the wider population of youth.

In order to understand how to utilise some of the protective factors (in this case religion), we intend to expand our research in future to explore how religious societies on campus could become involved in curbing the spread of HIV. A further research focus should be developed to explore the relationship between religion and other psychosocial constructs, for example, self-esteem, self-control and spirituality. The association between risky sexual behaviour and HIV and other STI infections in a university context warrants further investigation with specific emphasis on gender power dynamics.

Note
1. The four broad groupings of race in South Africa, namely: black, coloured, Indian/Asian and white as used in this study—"black" refers to African mother tongue speakers.

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