Trends in HIV risk behaviour of incoming first-year students at a South African university: 2007–2012

Rénnette J. Blignaut\textsuperscript{a*}, Joachim Jacobs\textsuperscript{b}, Tania Vergnani\textsuperscript{c}

\textsuperscript{a}PhD, is a Professor at the Department of Statistics and Population Studies, UWC, Bellville, South Africa, *Email: rblignaut@uwc.ac.za
\textsuperscript{b}MA, is a Director of HIV & AIDS Programme, UWC, Bellville, South Africa
\textsuperscript{c}PhD, is a Retired Director of HIV and AIDS Programme, c/o HIV & AIDS Programme, UWC, Private Bag X17, Bellville, South Africa

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-pro-tégés 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 voie 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 restée 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...
Oppong & Oti-Boadi (2013), for instance, found that intervention 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 learners 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 black1 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

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1 Black
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 ($Rao–Scott \chi^2 = 7.27; p = 0.0070$; $Rao–Scott = 7.99; p = 0.0047$).

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

| Variable                      | Outcomes   | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Rao–Scott chi-square |
|-------------------------------|------------|------|------|------|------|------|------|----------------------|
| 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   | 10   | 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    | 5    | 5    | 5    |                      |
| Indian/Asian                  |            | 8    | 6    | 5    | 5    | 4    | 4    |                      |
| Residence 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                      |            | 20   | 19   | 20   | 21   | 20   | 18   | .5246                |
| Unimportant                   |            | 6    | 5    | 5    | 4    | 5    | 5    |                      |

* $p$-value <0.01.
Table 2. Sexual activity and related responses over time (2007–2012).

| Variable                                                                 | Outcomes                                                                 | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 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    | .7294               |         |
| Ever had oral sex                                                        | Yes                                                                       | 27    | 24    | 26    | 24    | 25    | 23    | 11.79               |         |
|                                                                          | No                                                                        | 66    | 68    | 69    | 71    | 70    | 70    | .2995               |         |
| Used condom/barrier with last oral sex (only sexually active students)   | Yes                                                                       | 62    | 64    | 64    | 63    | 70    | 66    | 20.92               |         |
|                                                                          | No                                                                        | 26    | 25    | 25    | 27    | 20    | 23    | .0216*              |         |
| How often are condoms/barriers used for oral sex (only sexually active students) | Never                                                                  | 4     | 5     | 6     | 6     | 6     | 6     | 5.52                |         |
|                                                                          | Sometimes                                                                | 88    | 88    | 87    | 87    | 87    | 87    | .8532               |         |
|                                                                          | Always                                                                   | 12    | 11    | 11    | 10    | 10    | 11    | .9361               |         |
| Have you ever had anal sex                                               | Yes                                                                       | 4     | 5     | 6     | 6     | 6     | 6     | 5.52                |         |
|                                                                          | No                                                                        | 88    | 88    | 87    | 87    | 87    | 87    | .8532               |         |
| Contract HIV from oral sex                                               | Yes                                                                       | 76    | 74    | 74    | 72    | 77    | 74    | 17.39               |         |
|                                                                          | No                                                                        | 11    | 12    | 15    | 16    | 13    | 13    | .9662               |         |
| How often is alcohol drank before sexual intercourse (only sexually active students) | Never                                                                  | 44    | 43    | 60    | 38    | 47    | 48    | 6.15                |         |
|                                                                          | Sometimes                                                                | 56    | 57    | 40    | 62    | 53    | 52    | .9293               |         |
| 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    | .0462               |         |
| Do you ever have sexual intercourse under the influence of alcohol?       | Yes                                                                       | 20    | 29    | 33    | 32    | 35    | 33    | 49.92               | <.0001* |
|                                                                          | No                                                                        | 80    | 71    | 67    | 68    | 65    | 67    | .0199               |         |
| How often is alcohol drank before sexual intercourse after using drugs?  | Never                                                                     | 5     | 6     | 6     | 7     | 8     | 6     | 6.86                |         |
|                                                                          | Sometimes                                                                | 42    | 37    | 46    | 44    | 47    | 44    | .0378*              |         |
|                                                                          | Every time                                                               | 1     | 0     | 0     | 1     | 1     | 0     | 1.004               |         |
| 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    | .5579               |         |
|                                                                          | 3 or more                                                                | 15    | 20    | 19    | 19    | 20    | 19    | .1524               |         |
| 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    | .6481               |         |
|                                                                          | Never use condoms                                                        | 3     | 2     | 4     | 4     | 4     | 3     | 1.90                |         |
| 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)
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 \(\chi^2 = 228.94\), \(p < .0001\)). 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   | 2008   | 2009   | 2010   | 2011   | 2012   |
|---------------------------|-----------------|--------|--------|--------|--------|--------|--------|
| Racial groups             |                 |        |        |        |        |        |        |
| Depressed or suicidal ideation Yes | 43   | 42    | 42     | 32     | 32     | 32     |
|                           No   | 57             | 58     | 58     | 68     | 68     | 68     |
|                           |                |        | 0.070* |        |        |        |        |
| Have you ever used drugs? Yes | 30             | 25     | 25     |        |        |        |        |
|                           No   | 70             | 75     | 72     |        |        |        |        |
|                           |                |        | 0.002* |        |        |        |        |
| During the past 30 days, did you use drugs? Yes | 6              | 8      | 8      |        |        |        |        |
|                           No   | 94             | 92     | 92     |        |        |        |        |
|                           |                |        | 0.0001 |        |        |        |        |
| Do you smoke? Yes         |                |        |        |        |        |        |        |
|                           No   | 30             | 28     | 30     | 32     | 29     | 27     |
|                           |                |        |        |        |        |        |        |
| Do you drink alcohol? Yes |                |        |        |        |        |        |        |
|                           No   | 67             | 63     | 68     | 71     | 71     | 71     |
|                           |                |        |        |        |        |        |        |

$x^2 = $ Rao–Scott chi-square.

*p-value < .01.

Trends in the intention to test for HIV
In only three (2008, 2010 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 = 13.87; p = .0014). 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
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. 1. Sexual activity related to depression or suicidal ideation.

Fig. 2. Sexual activity related to drug use.

Fig. 3. Sexual activity related to alcohol use.

Fig. 4. Sexual activity related to smoking.
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

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

| Variable | Taken HIV test |
|----------|----------------|
|          | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|          | n = 876 | n = 820 | n = 843 | n = 1257 | n = 1403 | n = 1512 |
| Sexually active |   |   |   |   |   |   |
| Yes | 30 | 36 | 36 | 48 | 48 | 57 |
| No | 70 | 64 | 64 | 52 | 52 | 43 |
|     |     |     |     |     |     |     |
|     | 9 | 10 | 18 | 27 | 27 | 35 |
|     | 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 |
|     |     |     |     |     |     |     |
|     | 17 | 26 | 24 | 33 | 36 | 44 |
|     | 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 |
|     |     |     |     |     |     |     |
|     | 12 | 15 | 23 | 31 | 33 | 39 |
|     | 88 | 74 | 76 | 67 | 64 | 56 |
|     | $x^2 = 36.24$ | $x^2 = 50.96$ | $x^2 = 15.29$ | $x^2 = 31.36$ | $x^2 = 30.64$ | $x^2 = 55.34$ |
|     | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ |
| Female Black |   |   |   |   |   |   |
| Yes | 36 | 38 | 42 | 56 | 52 | 67 |
| No | 46 | 62 | 58 | 44 | 48 | 37 |
|     |     |     |     |     |     |     |
|     | 12 | 14 | 24 | 32 | 34 | 40 |
|     | 88 | 85 | 77 | 69 | 67 | 61 |
|     | $x^2 = 37.25$ | $x^2 = 33.91$ | $x^2 = 17.51$ | $x^2 = 39.18$ | $x^2 = 25.67$ | $x^2 = 43.81$ |
|     | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ | $p < .0001^*$ |
| Male Black |   |   |   |   |   |   |
| Yes | 22 | 41 | 29 | 38 | 45 | 56 |
| No | 78 | 59 | 71 | 62 | 55 | 44 |
|     |     |     |     |     |     |     |
|     | 12 | 17 | 21 | 29 | 31 | 37 |
|     | 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 $< .05$.

Fig. 5. HIV testing by sexual activity.

Fig. 6. 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, Fig. 7. HIV testing by racial group.

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

| Variable | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------|------|------|------|------|------|------|
|          | Intention to HIV test |
|          | n = 879 | n = 823 | n = 845 | n = 1261 | n = 1409 | n = 1514 |
| Sexually active | Yes | Yes | Yes | Yes | Yes | Yes |
| | No | No | No | No | No | No |
| Gender | Female | Yes | 70 | 70 | 72 | 71 |
| | No | 30 | 30 | 28 | 29 | 27 |
| | Male | 57 | 64 | 66 | 62 | 60 |
| | No | 43 | 36 | 34 | 38 | 40 |
| Race | Black | Yes | 64 | 74 | 72 | 73 |
| | No | 36 | 26 | 28 | 27 | 29 |
| | Others | Yes | 69 | 67 | 66 | 69 |
| | No | 31 | 33 | 28 | 34 | 31 |
| | Female | Yes | 71 | 77 | 76 | 79 |
| | No | 29 | 23 | 24 | 21 | 23 |
| | Others | Yes | 72 | 68 | 73 | 68 |
| | No | 28 | 32 | 27 | 32 | 30 |
| | Male | Black | Yes | 55 | 69 | 66 | 66 |
| | No | 45 | 35 | 34 | 34 | 39 |
| | Others | Yes | 64 | 65 | 70 | 62 |
| | No | 36 | 35 | 30 | 38 | 34 |

$X^2$ = Rao–Scott chi-square.

*p-value < .05.
inconsistent or non-use 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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