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RESEARCH ARTICLE

The Relationship Between Patterns of Alcohol Use and Knowledge of Alcohol-Attributable Health Conditions: A Survey Among Students at a South African University

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Abstract:

Background:

While many studies exist on the prevalence of alcohol use among South African university students, such information is scant for universities in the Eastern Cape Province. This study examines the prevalence of alcohol use among students at one university in the Eastern Cape, the relationship between such use and the knowledge of alcohol-attributable health conditions and biographical characteristics.

Methods:

The cross-sectional study involved 213 students enrolled in a statistics service course. A self-administered questionnaire was used to collect information on various biographical characteristics, alcohol use and health knowledge. The English version of the Alcohol Use Disorders Identification Test (AUDIT) questionnaire was used to measure alcohol use. The Mann-Whitney and Kruskal-Wallis tests were used to compare health knowledge across levels of alcohol use and biographical variables. Multiple logistic regression was applied to determine patterns of association between alcohol use and health knowledge, and biographical variables.

Results:

The prevalence rates of alcohol use and risky alcohol use were 58.2% and 42.7%, respectively. Health knowledge was generally low and significantly higher among alcohol users (Z=-2.7; p=0.0074) and those whose fathers had a post-matric education X^2=6.4; p=0.0410) and/or employment (Z=-2.7; p=0.0064). Males, returning students and those with employed fathers were found to have a higher chance of alcohol use.

Conclusion:

Alcohol use among students was high and knowledge of alcohol-attributable diseases was low. These results suggest a need for health promotion interventions for the general student population and/or risk reduction interventions for risky alcohol users.

Keywords: Alcohol use, Alcohol-attributable diseases, Health knowledge, University students, Risk reduction, Health promotion, South Africa.

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1. INTRODUCTION

Globally, 5.9% (3.3 million) of all deaths and 5.1% of the global burden of disease are attributable to alcohol use [1]. As of 2010, the average per-capita alcohol consumption for South Africa was 11 litres and the percentage of alcohol use disorders was 5.6%, compared to 6 litres per capita consumption and 3.3% for alcohol use disorders on the African continent [1]. In South Africa, alcohol use contributes significantly to death and disability, causing 6.1% of all deaths, 7.4% of premature deaths and 6.2% of disabilities, altogether representing 7.0% of the burden of disease [2]. The age-standardised death rate from alcohol-related causes and the alcohol attributable fraction for cirrhosis in South Africa are 25.2 per 100 000 and 68.4% for males and 8.9 per 100 000 and 59.6% for females, respectively [1].

While alcohol use is a component cause of more than 200 chronic diseases and conditions, it is the necessary cause of all alcohol-use disorders such as alcohol dependence and harmful alcohol use, as defined in the tenth edition of the International Classification of Disease (ICD-10) [3, 4]. Alcohol use can lead to an increased risk of hypertension, cardiovascular and liver

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diseases, acute and chronic pancreatitis, risky sexual behaviour, non-adherence to antiretroviral treatment, spontaneous abortions and foetal development disabilities [3 - 6]. Harmful alcohol use has causal relationships with many chronic diseases and new evidence suggests similar relationships with pneumonia, tuberculosis and HIV/AIDS [1]. The drinking pattern score and years of life lost score for South Africa are both 4 out of a possible 5, repre-senting risky drinking patterns and increased loss of life [1].

University students are a generally young and adventurous population whose alcohol-use habits are dangerous and irresponsible, characterised by higher binge-drinking frequencies than is found among older adults [7, 8].Their reasons for alcohol use include, among others, relative ease of access to alcohol, ignorance of associated harm, the stress of university life, peer pressure, relaxation and experimentation [9, 10]. Whatever the reason, bad decisions at this stage of life can negatively affect academic performance and the health and wellbeing of students in the short and/or long term [11, 12]. Some studies on undergraduate students found that the students consider alcohol use to be a socially desirable habit [7, 13]. Different studies have identified various sets of variables as predictors of alcohol use at universities, including, but not limited to, gender, religion, income, peer pressure and campus residence, parental alcohol use, socioeconomic status, age at first alcohol exposure, year of study and academic faculty [12, 14 - 16].

A study on alcohol use among secondary school learners in KwaZulu Natal found that 54% of learners had consumed alcohol at some point, and of these, 32% had participated in binge and/or episodic drinking [12]. Eze *et al*. [17] found that 55.2% of male learners and 44.8% of female learners at a secondary school in Nigeria had experimented with alcohol or were current alcohol users. The prevalence of hazardous and harmful alcohol use was found to be at least 50% at some university campuses in South Africa [15]. At one university in the Eastern Cape, about 52% of students were found to use alcohol harmfully [16]. A study on male students at a university in Southeast Nigeria estimated the prevalence of alcohol use to be 78.4%, of which 27% were risky alcohol users [18], and a similar study involving undergraduate students' alcohol use in Nigeria reported a prevalence rate of 72% [19]. A cross-sectional study at Makerere University in Uganda found an alcohol use prevalence rate of 55.6% [20]. These studies show that at least half of the students at some universities use alcohol.

The literature reveals that university students have adequate knowledge of the consequences of risky alcohol use on physical and social health [21]. Peltzer *et al*. [22] found no association between alcohol use and knowledge of its links to cardiovascular disease and hypertension. A study at a South African university found that the students acknowledge the link between alcohol use and cirrhosis but lack the knowledge of the links with hypertension, cancer and diabetes [13]. Research on undergraduate students at Makerere University in Uganda found that students at that institution had adequate knowledge of both the short-term and long-term consequences of alcohol use [20].

There is very little information on alcohol use among university students in Eastern Cape Province, South Africa. The few studies that have been carried out did not examine the knowledge of the students regarding alcohol-attributable health conditions [16, 23]. The aim of this study was to examine the knowledge of university students concerning alcohol use patterns and long term alcohol-attributable health conditions; and to relate this knowledge to alcohol use patterns and biographical variables. The findings of the study might help in the development of risk reduction and/or health promotion interventions to reduce the incidence of alcohol use among university students, while increasing their alcohol-related health knowledge.

2. METHODS

This cross-sectional study involved 213 undergraduate university students enrolled for first level statistics service courses at one university in South Africa. The university has three campuses. The A campus is located in a rural setting, while B and C campuses are in an urban settings. The target population was undergraduate students who take the first level statistics courses as part of the requirements for their degree programmes. This was a prevalence study of a finite population of undergraduate university students. As such, the required sample size was determined using the finite population correction sample size calculation formula [24] below:

$$n = \frac{Nz^2_{\alpha/2}P(1-P)}{d^2(N-1) + z^2_{\alpha/2}P(1-P)}$$

where n is the sample size, N is population size, P is the hypothesised prevalence, d is the desired precision of the prevalence estimate and α is the significance level.

Based on a first level statistics enrolment of 468 undergraduate students in 2016, a significance level of 5%, a margin of error of 5% and hypothesised prevalence of 50%, the minimum required estimated sample size was 211 students. In order to compensate for possible withdrawals or non-response, 250 students were randomly selected from class lists at each campus. The simple random sampling feature of the MS EXCEL software was used for the participant selection process.

The gender, university campus, residence status, employment status and educational level of parents, degree programme and year of study were identified as biographical variables of interest for the study. The English version of the Alcohol Use Disorders Identification Test (AUDIT) questionnaire was used to measure alcohol use [25]. The overall alcohol use score for a given individual was calculated as the sum of the scores on the 10 AUDIT items. The definition of a standard drink was as given in [25]. Most of the university students who use alcohol prefer beers/lagers, spirits and ciders [7]. Two binary variables were derived from the AUDIT instrument, namely, alcohol use status and alcohol use extent. From the whole sample, students with AUDIT sum scores greater than 0 were defined as alcohol users and alcohol users with AUDIT sum scores greater than 8 were defined as risky alcohol users. All others were either users or safe users [16, 25].

Besides questions on biographical characteristics and alcohol use, the questionnaire included 30 items on knowledge of alcohol-attributable health conditions. The health knowledge questions were formulated based on the health consequences for drinkers as indicated in the WHO Global Status Report on Alcohol and Health [4] and Shield *et al*. [26]. The questions were of a true/false nature and covered cardiovascular disease, cancer, gastrointestinal disorders, diabetes, mental health and reproductive health. One health knowledge variable was derived as a proportion of the total number of correct answers to the health knowledge questions, expressed as a percentage.

The University of Fort Hare's Research Ethics Committee (UREC) gave approval for the study (Ref:GOO051SMAN01). The students were randomly identified, then invited for a study briefing. After the briefing, those who were interested were asked to sign an informed consent form prior to completing the questionnaire. The students completed the questionnaires in a designated quiet place secured for the purpose of data collection. Of the 250 sampled students, 221 gave their consent to participate in the study. Of the 221 completed questionnaires, 3.6% were incomplete and subsequently excluded from the analysis. This resulted in an effective sample size of 213 students.

Means and standard deviations were used to describe age and health knowledge while frequencies and percentages were used to summarise the categorical biographical variables and alcohol use variables. The significance of bivariate associations between alcohol use variables and biographical variables was tested using the chi-squared test for independence. This was followed up with odds ratios as measures of strength and direction of associations. The Mann-Whitney two samples test was used to compare age and health knowledge across the categories of alcohol-use status and extent. A multiple logistic regression of alcohol use and alcohol use extent on and health knowledge and student-specific biographical variables was carried out to determine the pattern of associations. All tests for statistical significance were carried out at a 5% level of significance and were performed using the SAS (Statistical Analysis Systems) software version 9.4.

3. RESULTS

3.1. Alcohol Use Variables

The Cronbach's reliability coefficient for the AUDIT questionnaire was 0.88, reflective of high internal consistency of the instrument [27, 28]. The two alcohol-use variables, namely, alcohol use status and alcohol use extent, were derived from the AUDIT sum score. The distribution of the students according to these variables and the corresponding goodness-of-fit tests are shown in Table **1**. The results show that there were significantly more alcohol users than non-users (χ^2 =5.8 ; p=0.0165). The estimated prevalence of alcohol use was 58.2%. There was no significant difference between the numbers of safe and risky alcohol users (χ^2=2.6 ; p=0.1060).

3.2. Knowledge of Alcohol-attributable Diseases

Table **2** shows the distribution of responses to statements on the health knowledge questionnaire. These statements are either true or false. A response of 'Don't know' reflects a lack of knowledge and was considered a wrong response for the purpose of computing the overall health knowledge score. The overall health knowledge score was derived from the responses presented in the table below as the proportion of correct responses. The students were not confident of their knowledge of the links between alcohol use and cardiovascular and chronic diseases, as reflected in the high proportion of 'Don't know' responses. On the other hand, they showed confidence in their responses to statements on alcohol use and pregnancy.

Table 1. Distribution of students by alcohol use variables.

Variables	n (%)	χ^2	p-value
Alcohol use status			
Users	124 (58.2)	5.8	0.0165*
Nonusers	89 (41.8)		
Alcohol use extent			
Risky	53 (42.7)	2.6	0.1060
Safe	71 (57.3)		

*Statistically significant at a 5% significance level

The derived overall health knowledge scores ranged between 0% and 80%, and had a mean of 42.9% and a 95% confidence interval of (40.8-45.1). The median knowledge score was 46.7%, which means half of the students scored at most 46.7%. The upper quartile of the knowledge scores was 53.3%, which means 75% of the students scored at most 53.3%. Only a quarter of the students scored between 53.3% and the maximum of 80%. This is an indication of poor performance by the students on the health knowledge questionnaire.

3.3. Bivariate Analysis of Alcohol Use Status and Biographical and Knowledge Variables

The chi-squared tests for goodness-of-fit of the uniform distribution of students across the categories of the biographical variables showed that there were significantly more students who resided in university accommodation (χ^2=13.4; p=0.0002) and significantly fewer students whose mothers were employed (χ^2 =6.88; p=0.0087). For the rest of the biographical variables, the goodness-of-fit test did not detect significant departures from uniformity. This means that the students were not significantly differently distributed across gender, degree, year of study, campus, parents' education and father's employment status. The frequencies and percentages showing the distribution of the students with respect to their biographical characteristics are shown in Table **3**.

The zero AUDIT score criterion identified 58.2% (124) of the students as alcohol users. The results show that there were statistically significant associations between alcohol use and gender, level of study and father's employment status. Female students were less likely to use alcohol than their male counterparts (OR=0.3; 95%CI (0.18; 0.68)). About 47.2% (51) of female students used alcohol compared to 69.5% (73) of the male students. First-year students were less likely to use alcohol than returning students (OR=0.5; 95%CI (0.25; 0.94)). About 48.7% (54) of the first-year students used alcohol compared to 70.0% (70) of the returning students. Those with

employed fathers were more likely to use alcohol compared to those with unemployed fathers (OR=2.3; 95% CI (1.19; 4.47)). In total 69.1% (58) of students whose fathers were employed used alcohol, compared with 45.4% (39) of those whose fathers were unemployed. The degree programme, campus, residence, parents' educational level, mother's employment status, age and health knowledge did not have significant bivariate associations with alcohol use status.

Table 2. Distribution of responses to statements on the health knowledge questionnaire.

Statement	True n (%)	False n (%)	Don't know n (%)
Moderate alcohol use is good for the heart	57 (27.1)	82 (39.1)	71 (33.8)
Alcohol use can be good for some cancers	15 (7.0)	98 (46.0)	100 (47.0)
Alcohol causes all known cancers	15 (7.0)	93 (43.7)	105 (49.3)
Alcohol can be good for diabetes	15 (7.1)	111 (52.4)	86 (40.6)
Breast cancer cannot be caused by alcohol	66 (31.4)	40 (19.1)	104 (49.5)
Alcohol can cause damage to the liver	174 (84.1)	16 (7.7)	17 (8.2)
Alcohol does not affect the digestive system	57 (27.1)	82 (39.1)	71 (33.8)
Alcohol can cause heart diseases	15 (7.0)	98 (46.0)	100 (47.0)
Alcohol affects blood circulation	15 (7.0)	93 (43.7)	105 (49.3)
Kidneys can stand any amount of alcohol	15 (7.1)	111 (52.4)	86 (40.6)
Moderate alcohol use is good for the body	66 (31.4)	40 (19.1)	104 (49.5)
Coffee use reduces the risk of liver cirrhosis	174 (84.1)	16 (7.7)	17 (8.2)
Red wine increases the risk of blood clotting	15 (7.0)	129 (60.6)	69 (32.4)
Red wine increases brain power	103 (48.6)	14 (6.6)	95 (44.8)
Moderate use of whisky is good for the heart	125 (59.2)	17 (8.1)	69 (32.7)
Spirits are more dangerous than beers and wines	24 (11.3)	139 (65.6)	49 (23.1)
Alcohol use can cause epilepsy	62 (29.4)	69 (32.7)	80 (37.9)
Alcohol use does not cause brain damage	32 (15.1)	40 (18.9)	140 (66.0)
The human body can take any amount of alcohol	26 (12.2)	44 (20.7)	143 (67.1)
HIV infection has nothing to do with alcohol use	30 (14.1)	66 (31.0)	117 (54.9)
Drinking during pregnancy harms the mother only	31 (14.8)	86 (41.0)	93 (44.3)
Drinking during pregnancy slows baby's growth	137 (64.6)	18 (8.5)	57 (26.9)
Moderate alcohol use is good during pregnancy	144 (68.6)	29 (13.8)	37 (17.6)
Alcohol can cause hypertension	21 (10.0)	118 (55.9)	72 (34.1)
Alcohol use has no links with diabetes	119 (56.4)	29 (13.7)	63 (29.9)
Pregnant women can only take spirits and wines	74 (35.1)	101 (47.9)	36 (17.0)
Moderate alcohol use is safe during pregnancy	34 (16.0)	167 (78.8)	11 (5.2)
FAS is caused by alcohol use during pregnancy	157 (74.4)	9 (4.3)	45 (21.3)
FAS can be treated just like many other diseases	7 (3.3)	172 (81.1)	33 (15.6)
Binge drinking can result in alcohol poisoning	38 (17.9)	128 (60.4)	46 (21.7)

Table 3. Distribution of students by biographical characteristics and alcohol use status.

Characteristic	Category	Total n (%)	Alcohol Use		Crude OR	95% CI for Crude OR
			User n (%)	Nonuser n (%)		
Gender	Female	108 (50.7)	51 (47.2)	57 (52.8)	0.3	(0.18 ; 0.68)*
	Male	105 (49.3)	73 (69.5)	32 (30.5)	Reference	
Degree	Commerce	114 (56.4)	63 (55.3)	51 (44.7)	0.5	(0.40 ; 1.46)
	Science	88 (43.6)	56 (63.6)	32 (36.4)	Reference	
Year of study	First Year	111 (52.6)	54 (48.7)	57 (51.3)	0.8	(0.25 ; 0.94)*
	Returning	100 (47.4)	70 (70.0)	30 (30.0)	Reference	
Campus	Alice	106 (49.8)	66 (62.3)	40 (37.7)	1.3	(0.69 ; 2.52)
	East London	107 (50.2)	58 (54.2)	49 (45.8)	Reference	
Residence	On	131 (62.7)	80 (61.1)	51 (38.9)	1.6	(0.94 ; 2.79)
	Off	78 (37.3)	41 (52.6)	39 (47.4)	Reference	

(Table 3) contd.....

Characteristic	Category	Total n (%)	Alcohol Use		Crude OR	95% CI for Crude OR
			User n (%)	Nonuser n (%)		
Mother's Education	Primary	67 (33.0)	38 (56.7)	29 (43.3)	0.7	(0.32 ; 1.63)
	Secondary	66 (32.5)	37 (56.1)	29 (43.9)	0.6	(0.30 ; 1.42)
	Tertiary	70 (34.5)	45 (64.3)	25 (37.7)	Reference	
Father's Education	Primary	65 (35.3)	33 (50.8)	32 (49.2)	0.6	(0.29 ; 1.38)
	Secondary	50 (27.2)	30 (60.0)	20 (40.0)	0.7	(0.31 ; 1.52)
	Tertiary	69 (37.5)	43 (62.3)	26 (37.7)	Reference	
Mother's Employment	Employed	81 (40.7)	55 (67.9)	26 (32.1)	1.5	(0.77 ; 2.82)
	Unemployed	118 (59.3)	63 (53.4)	55 (46.6)	Reference	
Father's Employment	Employed	84 (49.4)	58 (69.1)	26 (30.9)	2.3	(1.19 ;4.47)*
	Unemployed	86 (50.6)	39 (45.4)	47 (54.6)	Reference	
Health Knowledge (%)		42.9(1.09)	45.1(1.32)	39.7(1.84)	5.4[d]	(0.92 ; 9.86)
Age (years)		22.0(0.29)	21.8 (0.31)	22.4(0.54)	-0.6[d]	(-1.84 ; 0.65)

*Statistically significant at a 5% level of significance

**Mean (se) in first three columns

[d] mean difference

3.4. Bivariate Analysis of Alcohol Use Extent and Biographical and Knowledge Variables

Based on the AUDIT sum score, 42.7% (53) of the 124 alcohol users were identified as risky alcohol users. Table **4** shows the bivariate distribution of alcohol use extent and the biographical and knowledge variables. Gender, degree programme, campus and father's employment status had statistically significant associations with alcohol use extent. Females were significantly less likely to be risky alcohol users (OR=0.3; 95% CI (0.15; 0.71)). Only 28.0% (14) of the female alcohol users were risky alcohol users compared to 53.4% (39) of male alcohol users. Commerce students were less likely to be risky alcohol users (OR=0.4; 95% CI (0.19; 0.85)) compared to Science students. The results show that 33.3% (21) of the Commerce students were risky alcohol users compared to 55.4% (31) of Science students. With respect to campus, Alice campus students were more likely to use alcohol in a risky manner (OR=3.4; 95% CI (1.58; 7.11)) than East London campus students. About 16 (28.1%) of East London campus alcohol users were risky users compared to 56.1% (37) of Alice campus alcohol users. Students with employed fathers were more likely to be risky alcohol users (OR=2.4; 95% CI (1.03; 5.66)) than those with unemployed fathers. Only 30.8% (12) of those with unemployed fathers had risky alcohol use habits, compared to 52.6% (30) of those with employed fathers. The year of study, degree, residence, parents' educational level, mother's employment status, age and health knowledge had no significant associations with alcohol use.

3.5. Multivariate Analysis of Alcohol Use

Table **5** shows the estimated logistic regression parameter estimates, their standard errors, the Wald's chi-squared tests for the significance of the parameter estimates, the adjusted odds ratios and their corresponding 95% confidence intervals.

Taking all the predictor variables into consideration, status of alcohol use status was found to be significantly dependent on gender and health knowledge. The results suggest that females are less likely to use alcohol and that those with more knowledge are more likely to use alcohol. However, the 95% confidence interval for the odds ratios associated with health knowledge includes 1.0, the null value of the odds ratio. This suggests that, while present, the effect of health knowledge is weak and borderline significant.

Since most of the predictors are not significantly related to alcohol, the stepwise automatic variable selection procedure was used to find the best set of predictors for alcohol use. On applying the stepwise automatic variable selection method, the model with gender and father's employment status was identified as the best model for predicting alcohol use. The resultant model identified as the best is shown in Table **6**.

The parameter estimate (β) for females is -0.60, which means that being female reduces the log odds of alcohol use by 0.6 when the father's employment status remains constant. Analogously, the parameter estimate for employed father is 0.47, which means having an employed father increases the log odds of alcohol use by about 0.5 when the gender of the student remains constant. This model excludes the level of study and health knowledge, which had been found to have significant associations with alcohol use status. This confirms that the effect of the level of study on alcohol use status is so weak that it disappears in the presence of gender and employment status of the father of the participant. The model estimates the odds ratios for gender and father's employment status to be 0.30 (95% CI (0.15; 0.62)) and 2.6 (95% CI (1.26; 5.21)), respectively. This is in agreement with the bivariate analysis that showed that females are less likely to use alcohol while those with employed fathers are more likely to use alcohol.

3.6. Multivariate Analysis of Alcohol Use Extent

Table **7** shows the alcohol use extent. This full model identified age, father's educational level and father's employment status. While the confidence interval of the odds ratio for age excludes 1.0, the null value of an odds ratio, its lower limit is very close to 1.0.This suggests that the effect of age on the extent of alcohol use is very weak.

Table 4. Distribution of students by biographical characteristics and alcohol use extent.

Variable	Category	Total n (%)	Alcohol Use Extent		OR	95% CI for OR
			Risky n (%)	Safe n (%)		
Gender	Female	51 (41.1)	14 (27.5)	37 (72.5)	0.3	(0.15 ; 0.71)*
	Male	73 (58.9)	39 (53.4)	34 (46.6)	Reference	
Year of study	First Year	54 (43.5)	20 (37.0)	34 (63.0)	0.7	(0.32 ; 1.36)
	Returning	70 (56.5)	33 (47.1)	37 (52.9)	Reference	
Degree	Commerce	63 (52.9)	21 (33.3)	42 (66.7)	0.4	(0.19 ; 0.85)*
	Science	56 (47.1)	31 (55.4)	25 (44.6)	Reference	
Campus	Alice	66 (53.2)	37 (56.1)	29 (43.9)	3.4	(1.58 ; 7.11)*
	East London	58 (46.8)	16 (27.6)	42 (72.4)	Reference	
Residence	On	80 (66.1)	38 (47.5)	42 (52.5)	1.8	(0.80 ; 3.81)
	Off	41 (33.9)	14 (34.1)	27 (65.9)	Reference	
Mother's Education	Primary	38 (31.7)	15 (39.5)	23 (60.5)	0.8	(0.33 ; 1.91)
	Secondary	37 (30.8)	16 (43.2)	21 (56.8)	0.7	(0.28 ; 1.64)
	Tertiary	45 (37.5)	22 (48.9)	23 (51.1)	Reference	
Father's Education	Primary	30 (28.3)	13 (39.4)	20 (60.6)	2.0	(0.78 ; 5.15)
	Secondary	33 (31.1)	17 (56.7)	13 (43.3)	1.0	(0.40 ; 2.52)
	Tertiary	43 (40.6)	17 (39.5)	26 (60.5)	Reference	
Mother's Employment	Employed	55 (46.6)	28 (50.9)	27 (49.1)	1.7	(0.81 ; 3.51)
	Unemployed	63 (53.4)	24 (38.1)	39 (61.9)	Reference	
Father's Employment	Employed	58 (59.8)	30 (51.7)	28 (48.3)	2.4	(1.03 ; 5.66)*
	Unemployed	39 (40.2)	12 (30.8)	27 (69.2)	Reference	
Health Knowledge (%)**		45.1(1.32)	44.3 (2.25)	45.7(1.59)	-1.5[d]	(-6.93 ; 4.01)
Age (years)**		21.8(0.32)	21.9(0.32)	21.7 (0.48)	0.2[d]	(-1.03 ; 1.37)

*Statistically significant at a 5% level of significance
**Mean (se) in first three columns
[d] mean difference

Table 5. Logistic regression model for alcohol use.

Parameter	β	se(β)	χ^2	p-value	AOR	95%CI of AOR
Intercept	-0.75	1.830	0.2	0.684		
Degree (Commerce)	-0.25	0.316	0.6	0.422	0.6	(0.18 ; 2.08)
Gender (Female)	-0.60	0.221	7.3	0.007	0.3	(0.13 ; 0.72)*
Age	-0.01	0.076	0.0	0.929	1.0	(0.86 ; 1.15)
Year of Study (First Year)	-0.40	0.229	3.1	0.077	0.4	(0.18 ; 1.09)
Campus (Alice)	-0.38	0.333	1.3	0.260	0.5	(0.13 ; 1.74)
Residence (On Campus)	0.34	0.255	1.8	0.180	2.0	(0.73 ; 5.37)
Education						
Mother (Secondary)	-0.23	0.329	0.5	0.482	1.0	(0.31 ; 3.06)
Mother (Primary)	0.44	0.436	1.0	0.312	1.9	(0.43 ; 8.57)
Father (Secondary)	-0.06	0.338	0.0	0.858	0.7	(0.21 ; 2.54)
Father (Primary)	-0.21	0.397	0.3	0.604	0.6	(0.15 ; 2.64)
Employment						
Mother(Employed)	0.32	0.295	1.2	0.275	1.9	(0.60 ; 6.06)
Father(Employed)	0.23	0.294	0.6	0.436	1.6	(0.50 ; 5.01)
Health Knowledge	0.03	0.015	4.7	0.030	1.0	(1.00 ; 1.06)*

*Statistically significant at α=0.05

The estimated logistic regression model presented in Table **7** is a full model with all the predictors included. However, most of the predictors are not statistically significant, which makes the model unnecessarily complex. In order to obtain a simpler and more parsimonious model, the stepwise automatic variable selection was implemented and the results are shown in Table **8**.

The automatic variable selection procedure identified gen-

der, campus and father's employment status as the only signifi-

Table 6. Automatically selected estimated logistic regression model of alcohol use.

Parameter	β	se(β)	χ^2	p-value	AOR	95%CI of AOR
Intercept	0.41	0.181	5.2	0.023		
Gender (Female)	-0.60	0.182	10.7	0.001	0.3	(0.15 ; 0.62)
Father (Employed)	0.47	0.181	6.8	0.009	2.6	(1.26 ; 5.21)

cant predictors of the extent of alcohol use. These results show that females were associated with lower odds of risky alcohol use than males; Alice campus was associated with higher odds of risky alcohol use than East London campus; and those with employed fathers had a higher likelihood of risky alcohol use. The parameter estimates show that being female reduces the log odds of risky alcohol use by 0.55, being at the Alice campus increases the log odds of risky alcohol use by 0.61, and having an employed father increases the log odds of risky alcohol use by 0.66, when all other predictors remains constant.

4. DISCUSSION

The study sought to determine alcohol use patterns and knowledge of alcohol-attributable health conditions among university students in the Eastern Cape, South Africa, on which information is currently lacking. The prevalence of alcohol use was moderately high (58.2%), and comparable to the findings obtained in other universities in South Africa [15, 29 - 31]. Young and De Klerk [16] found a prevalence of 52.7% at Rhodes University, which lies 106 km to the south-east of the University of Fort Hare's Alice campus, and 160 km west of Fort Hare's East London campus. Compared with other studies in South Africa and elsewhere, alcohol use prevalence among university students in this study was moderately high. Olukemi *et al*. [21] found an alcohol use prevalence of 62.0% at a Nigerian university. Kyei *et al*. [15] found an alcohol use prevalence of 65.0% and a risky alcohol use prevalence of 49.0% among alcohol users at the University of Venda. Davoren *et al*. [32] estimated an alcohol use prevalence of 66.4% at an Irish university. Chauke *et al*. [33] found a high-school alcohol use prevalence of 35.5% at a school in KwaZulu Natal Province in South Africa. Given such a high prevalence rate at high school, the 50.0% prevalence rate at some universities is not surprising. Bearing in mind the contribution of alcohol-attributable health conditions on the burden of disease, these results suggest that alcohol use among university students is a potential public health problem.

In this study, there was generally little knowledge of the long-term effects of alcohol use among the students. This is consistent with the findings from other studies that looked at knowledge of the long-term effects of alcohol on the health of users [13, 22]. Alcohol users in this study were more knowledgeable of the long-term health effects of alcohol use than those in some studies. The dissemination of alcohol-related health information is usually targeted at the general population, while some safe alcohol use campaigns specifically target alcohol users through events in social spaces where alcohol consumption is not restricted. Alcohol users are likely to pay attention to the health promotion materials because they are stakeholders. Conversely, non-users may find the information irrelevant to them because they do not practise the behaviour.

This study showed that socioeconomic status, measured through educational level and employment status of the father, is a significant predictor of health knowledge. This is a plausible outcome, especially regarding educational level, based on the assumption that higher educational level is associated with higher ability to understand and value information. However, students with employed fathers are likely to have access to more financial resources and therefore more money to sponsor alcohol use habits. Results from other studies show that high socioeconomic status is associated with a higher risk of alcohol use [7, 15, 29 - 31]. However, there is no consensus on the influence of socioeconomic status on the decision to experiment with alcohol and other substances [32]. This study identified father's employment status as the only socioeconomic variable associated with alcohol use. The Eastern Cape is a poor and rural province in South Africa. The province is characterised by high unemployment. The few that are employed are predominantly male, and as such, father's employment status would be a good proxy for socioeconomic status.

Both alcohol use and risky alcohol use were lower among the female students than among the males. This is consistent with the findings of other studies on alcohol use among university students and adolescents [9, 12, 14, 15, 29, 33 - 35]. However, one study found no significant gender difference in alcohol use among university students [36]. Males tend to consume alcohol more than females, in terms of the quantity of alcohol and frequency of use [7, 13].

Similar studies carried out with university students elsewhere also found that returning students have a higher likelihood of alcohol use than first-year students [9, 16, 34]. This is probably due to the fact that first-year students would still be familiarising themselves with the university environment. However, in contrast to the above findings, Govender *et al*. [37] found that alcohol use was higher among first-year students than among returning students. It is worth noting that alcohol experimentation is already high at the school level in South Africa [38]. Given the freedoms associated with university life, it may be reasonable to expect that alcohol and substance experimentation would be higher among first-year university students. This difference in results suggests that alcohol use habits are not necessarily homogeneous across different universities.

Rural campus students were at a higher risk of unsafe alcohol use than urban campus students. The lack of recreational opportunities at the rural campus might cause students to resort to excessive alcohol consumption. In addition, the cost of living in the urban setting is generally high and financially more demanding than rural life, and it is possible that students in an urban setting have less disposable money for alcohol. Notably, students residing on a rural campus enjoy favourable alcohol prices compared to urban students, who would have to drink in hotels at higher costs, or

Table 7. Estimated logistic regression model for alcohol use extent.

Parameter	β	se(β)	χ^2	p-value	AOR	95%CI of AOR
Intercept	-6.50	3.352	3.8	0.052		
Degree (Commerce)	-0.12	0.417	0.1	0.773	0.8	(0.15 ; 4.04)
Gender (Female)	-0.66	0.360	3.4	0.067	0.3	(0.07 ; 1.10)
Age	0.30	0.144	4.4	0.036	1.4	(1.02 ; 1.79)*
Year of Study (First Year)	0.25	0.342	0.5	0.462	1.7	(0.43 ; 6.33)
Campus (Alice)	0.46	0.461	1.0	0.315	2.5	(0.41 ; 15.42)
Residence (On Campus)	0.43	0.362	1.4	0.236	2.4	(0.57 ; 9.73)
Education						
Mother (Secondary)	-0.67	0.525	1.6	0.205	0.3	(0.04 ; 1.63)
Mother (Primary)	-0.04	0.635	0.0	0.944	0.5	(0.05 ; 4.34)
Father (Secondary)	1.05	0.511	4.3	0.039	12.3	(1.59 ; 94.63)*
Father (Primary)	0.40	0.567	0.5	0.482	6.4	(0.70 ; 57.70)
Employment						
Mother (Employed)	0.40	0.456	0.8	0.381	2.2	(0.37 ; 13.27)
Father (Employed)	1.20	0.534	5.1	0.024	11.1	(1.37 ; 89.65)*
Health Knowledge	-0.02	0.022	0.6	0.427	1.0	(0.94 ; 1.03)

*Statistically significant at α=0.05

Table 8. Stepwise automatically selected logistic regression model of alcohol use.

Parameter	β	se(β)	χ^2	p-value	AOR	95%CI of AOR
Intercept	-0.53	0.263	4.0	0.044		
Gender (Female)	-0.55	0.273	4.0	0.045	0.3	(0.11 ; 0.97)
Campus (Alice)	0.62	0.256	5.9	0.015	3.5	(1.27 ; 9.44)
Father (Employed)	0.60	0.263	5.1	0.023	3.3	(1.18 ; 9.21)

could drink in cheaper but overcrowded and criminally risky drinking places in close proximity to the campus residences.

5. LIMITATIONS

Although students were assured of the confidentiality and anonymity of the information they provided, that alone may not have guaranteed the honesty of their responses to the alcohol use questionnaire. A biomarker-based measurement of alcohol use could have been more reliable. However, the caveat is that measuring alcohol use in such a manner is challenging. Students may not be willing to participate in a study that involves the clinical assessment of alcohol use. The restriction of the study population to a specific group of students limits the generalisability of the results to the wider university student population. This study was concerned with the current use of alcohol. Notwithstanding these limitations, the study could serve as a basis for a larger longitudinal randomised controlled trial of alcohol-attributable health risk reduction and health promotion interventions among university students. The findings of the study might help in the development of risk reduction and/or health promotion interventions to reduce the prevalence and incidence of alcohol use among university students, while increasing their alcohol-related health knowledge. Given the scarcity of data on university students' alcohol use patterns and knowledge of alcohol-attributable health conditions in the Eastern Cape, this study adds to the scientific literature on the subject.

CONCLUSION

The findings of the study show that slightly more than half the students use alcohol, and of these, the majority are safe alcohol users. The chances of alcohol use are higher among males, seniors and those with employed fathers than among females, first years and those with unemployed fathers, respectively. With respect to health knowledge, alcohol users and those whose fathers have post-primary education were significantly more knowledgeable than non-users and those whose fathers have primary education, respectively. Among those that use alcohol, the chances of risky alcohol use are higher among males and students with employed fathers than among females and those with unemployed fathers, respectively. While gender and father's employment status are significant predictors of alcohol use, gender, father's employment status and campus are significant predictors of risky alcohol use. Health knowledge is low, regardless of individual biographical variables and extent of alcohol use. The prevalence of alcohol use is moderately high and health knowledge is low regardless of risky alcohol use. The likelihood of alcohol use, risky and non-risky, is higher among males, those in rural environments and those with high socioeconomic status. While knowledge of alcohol-attributable health conditions is generally low, alcohol users and those with educated parents are more knowledgeable.

The combination of lack of knowledge and the high prevalence of alcohol use provides fertile ground for possible future experimentation with alcohol among current non-users and increased consumption among current users. Health promotion and risk reduction interventions should be targeted at educating both users and non-users of alcohol about the value of a healthy lifestyle.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The University of Fort Hare's Research Ethics

Committee(UREC) gave approval for the study (Ref:GOO051SMAN01).

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Informed consent was obtained from all the participants

AVAILABILITY OF DATA AND MATERIALS

Data from this study will be made available on request.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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