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RESEARCH ARTICLE

Patient Alcohol Consumption and Knowledge of Safe Alcohol Use at Dr. George Mukhari Academic Hospital, Pretoria

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Abstract:

Background:

According to the World Health Organisation (WHO), there were 3.3 million deaths globally due to alcohol use in 2012. Establishing patients' knowledge of safe alcohol use and practices regarding alcohol consumption could reform intervention policies.

Objectives:

The aim of this study was to assess patients' knowledge of safe alcohol use and practices regarding alcohol consumption among patients attending the Family Practice Clinic at Dr. George Mukhari Academic Hospital (DGMAH) in Pretoria.

Methods:

The sample consisted of 300 patients (150 males; 150 females). Data relating to patients' baseline characteristics, knowledge of safe alcohol use and practice were collected by means of a researcher administered questionnaire. The SAS, Release 9.3 was used for data analysis. The statistical level of significance was set at $p < 0.05$.

Results:

Majority of the respondents had lack of knowledge on safe quantities of alcohol use per day, for male and female individuals [268 (89.3%) vs 32 (10.7%); $p < 0.0001$] and [279 (93.0%) vs 21 (7.0%); $p < 0.0001$], respectively. Respondents mostly consumed alcohol on special occasions (152; 50.7%), and on weekends (100; 33.3%). Age groups ≥ 38 years consumed more alcohol per day (100; 33.3%). Majority of the respondents (179; 59.7%) were binge drinkers. Relatively less patients with higher levels of education were chronic harmful users of alcohol ($p \leq 0.001$).

Conclusion:

The finding that majority of the patients lacked knowledge on safe quantities of alcohol use for males and females, and the unsafe use of alcohol, including binge drinking, warrant introduction of safe alcohol use awareness campaigns at primary health care, particularly targeting the middle aged and the elderly.

Keywords: Patients' knowledge, Patients' practices, Harmful alcohol use, Binge-drinking, Alcohol types, Alcohol consumption.

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1. INTRODUCTION

According to the report by the WHO in 2015, 3.3 million deaths per annum worldwide were associated with alcohol abuse. Globally, over 200 diseases and injuries were attributable to alcohol abuse, which represented 5.1% of the global burden of disease. Furthermore, about 5.9% of all global

deaths and almost 25% of all deaths between the ages of 20-39 years were attributable to excessive alcohol consumption [1].

The effects of harmful alcohol use, including liver cirrhosis, pancreatitis, susceptibility to infections, various malignancies and interpersonal violence, have been reported in the literature world-wide [2 - 4]. It has also been shown that alcohol is a psychoactive substance with dependence-producing properties and that it is associated with violence, marital breakup and spouse abuse [5]. It also leads to poor life quality of individuals in general as it leads to poor productivity [5].

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It has been reported that the fifth leading cause of death in South Africa is harmful alcohol use and that the country has a high rate of foetal alcohol disorders, affecting at least 500 000 South Africans country-wide [6]. Furthermore, drunk driving has been found to be responsible for up to half of all road accidents in South Africa [7], making this practice one of the biggest threats to road safety in South Africa.

In 1984, Ewing devised a tool which he abbreviated “CAGE” to assess chronic harmful alcohol use. Using this tool, respondents are asked four close-ended questions: (1) if s/he has the feeling to cut (C) down on alcohol consumption, (2) has been annoyed (A) by critics for his/her alcohol consumption, (3) ever felt guilty (G) about his/her alcohol consumption and (4) needs a drink to steady the nerves on waking up in the morning (eye-opening), hence E. A “Yes” in any of the questions asked is allocated 1 mark. A score of ≤ 1 indicated “non-harmful alcohol use” while a score ≥ 2 indicates “harmful alcohol use” [8]. In addition to the definition of harmful alcohol use according to the CAGE assessment, binge drinking has been defined as taking above four drinks (alcohol standards) in one occasion regardless of the sex [9].

According to the report by the WHO in 2015, health educators and researchers employ different definitions of a standard drink (a notional drink that contains a specific amount of pure alcohol) because of differences in the typical serving sizes in various countries [5]. To this effect, one standard drink in Canada = 13.6 g of pure alcohol, in the UK = 8 g, in the USA = 14 g, in Australia and New Zealand = 10g and in Japan = 19.75 g. However, according to the guidelines provided by Fabor on alcohol use at primary care, the amount of alcohol contained in a standard drink is the conversion factor of ethanol and allows for conversion of any volume of alcohol into grams. For each millilitre of ethanol, there are 0.79 grams of pure ethanol. For example, one can of beer (330ml) at 5% (strength) \times 0.79 (conversion factor) = 13 grams of ethanol [10]. Using this formula, a glass of wine (140 ml at 12% ethanol) and a shot of spirit (40 ml at 40% ethanol) represent a standard drink of about 13 g of ethanol.

Most studies conducted on knowledge regarding alcohol quantities and use focussed on the general public [11], health workers and health worker trainees [12] and learners [13, 14]. However, the study by Sprague and Vinson in the USA on primary health care patients’ knowledge on risky alcohol drinking revealed that 21% screened positive for risky drinking and only 10% correctly estimated daily low risks limits and 9% weekly limits. Patients with a positive screen were twice as likely to say that they knew what a standard drink was, but only 33.3% gave accurate estimates [15].

This study sought to assess patients’ knowledge of safe alcohol use and practices regarding alcohol consumption among patients attending the Family Practice Clinic at DGMAH in Pretoria. The finding that patients at primary health care lacked knowledge on safe alcohol consumption and had unsafe alcohol consumption practices could be used by policy makers as evidence to raise awareness on the various local brands of alcohol at patients’ disposal. The various alcohol types, and the frequency of alcohol use in relation to patients’ demographic characteristics could be used as context

on which policies are based. It is hoped that the study findings will assist in curbing unsafe alcohol use among patients.

1.1. Significance of the Study

While working at the Family Practice Clinic at Dr. George Mukhari Academic Hospital (DGMAH) the main researcher observed that during social history taking, patients showed lack of knowledge regarding safe alcohol ingestion according to the individual’s sex, as well as the maximum number of days per week that alcohol can be consumed for, without causing harm to their health. This observation prompted to conduct an assessment on their knowledge and practices regarding alcohol use.

1.2. Ethical Considerations

The study commenced after obtaining ethics clearance from the Sefako Makgatho Health Sciences University Research Ethics Committee (SMUREC) in Pretoria, South Africa (Clearance Certificate number: SMUREC/M/ 203/2016:PG). Permission from DGMAH Chief Executive Officer and the Head of Department in charge of the Family Practice Clinic was obtained. Participation was voluntary and written informed consent, in both English and Setswana languages was completed by each consenting respondent.

2. MATERIALS AND METHODOLOGY

2.1. Definition of Safe Alcohol Use

Moderate / non-harmful alcohol consumption is defined as having up to one standard drink per day for women and up to two per day for men. This is the amount to be consumed on any single day [5]. The WHO recommended low-risk alcohol drinking levels as no more than 20 grams of alcohol per day, taken five days a week (hence, recommending two non-drinking days per week of seven days) [10].

2.2. Study Aim and Objectives

The study aim was to assess the knowledge and practices of patients using alcohol regarding safe alcohol use at DGMAH. The objectives were to evaluate their knowledge regarding safe alcohol consumption, their alcohol consumption practices and to assess the relationship between their knowledge and practices of alcohol use and selected demographic characteristics.

2.3. Study Design

This was a cross-sectional study.

2.4. Study Setting

The study was carried out at the Family Practice Clinic of DGMAH, a tertiary hospital in Pretoria, South Africa. At the time of writing of this article, the Family Practice Clinic served as a gateway clinic for the tertiary hospital whereby patients were treated as outpatients, and those requiring secondary and tertiary levels of health care were referred to appropriate disciplines within the hospital. All the patients that attended this clinic were primary health care patients referred from the neighboring Community Health Centres (CHCs) and clinics of

GaRankuwa and Soshanguve townships, with the combined population of 750,000.00 [16].

2.5. Study population and Sampling Strategy

The study population were all the patients who attended the Family Practice Clinic of DGMAH. In Sub-Saharan Africa, the prevalence of alcohol drinking has been estimated at 25.1% [17]. In South Africa, Peltzer and Ramlagan reported the prevalence of alcohol use in the general population as ranging from 16-40% [18]. Given this range (average 28%), the researchers regarded the reported prevalence of 25.1% as a reasonable estimate. According to the clinic register, the monthly average intake of patients who attended the Family Practice Clinic at DGMAH were 1820 patients. Using the prevalence of 25.1%, the estimated number of patients drinking alcohol who attended the clinic was about 455 (1820 x 25.1%) per month. With a sample size of 300 patients, a two-sided 95% confidence interval for the percentage of patients who had knowledge about alcohol use and its harmful effects was within $\pm 2\%$ of the percentage to be calculated from the sample of 455 patients, assuming that the percentage was 10%. Sample size calculation was done on nQuery Advisor (Statistical Solutions Limited, Cork, Ireland), Release 7.0 and was based on the large sample normal approximation of the binomial distribution adjusted for a finite population of 455. Sampling occurred from 2nd of January to the 31st March 2017. Each patient who admitted to using alcohol and who consented to participate was included in the study. Assuming that the patients presented in a random order, the sample may be considered as a random sample of the target population.

2.6. Data Collection

The research team consisting of the main researcher and two research assistants, collected data using an adapted questionnaire issued in English, IsiZulu and Setswana languages, the latter two being the dominant African languages spoken in the study setting. The researcher administered questionnaire was formulated using questions from WHO on the Alcohol Use Disorders Identification Test (AUDIT) [19] and Michigan Alcohol Screening Test (MAST) issued by National Council on Alcoholism of the San Fernando Valley (NCADD) [20]. The AUDIT questions were adapted and used in the four questions relating to the section on "Practices of patients using alcohol". The Michigan Alcohol Screening Test (MAST) was integrated in the CAGE questions. The questions in the section on "Knowledge of patients using alcohol on harmful alcohol consumption" were developed *de novo* by the main researcher to address the study aim and objectives. The CAGE tool explained above was used to assess chronic harmful alcohol use for each patient.

2.7. Data Analysis

Descriptive data were presented as frequency tables. The SAS (SAS Institute Inc, Carey, NC, USA), Release 9.3 was used for data analysis. Univariate analyses of the baseline characteristics and bivariate statistical analyses of dependent and independent variables for associations using the Chi-square test were done. The statistical level of significance was set at p-

value < 0.05 . Data analysis was done through the guidance of a statistician.

3. RESULTS

3.1. Baseline Characteristics

Table 1 demonstrates that the mean age of the respondents was 49.9 years with a standard deviation of 13.8 years. Respondents above 57 years old (100; 33.3%) constituted the largest age-group, while those 18-27 years constituted the smallest age-group (17; 5.7%). The sex distribution comprised of an equal proportion of male to female patients (150; 50.0%). Regarding marital status, almost half (149; 49.7%) of the res-

Table 1. Baseline Characteristics (n=300).

Characteristic	Frequency	Percentage (%)
Age Groups (Years)		
18 – 27	17	5.7
28 – 37	38	12.7
38 – 47	77	25.7
48 – 57	68	22.7
Older than 57	100	33.3
Total	300	100.0
Mean (years)	49.88	
Range (years)	18 – 75	
Standard Deviation	13.81	
Sex		
Male	150	50.0
Female	150	50.0
Total	300	100.0
Marital Status		
Single	149	49.7
Married	128	42.7
Widowed	5	1.7
Divorced/ Separated	18	6.0
Total	300	100.0
Highest Level of Formal Education		
No education	10	3.3
Primary	60	20.0
Secondary	122	40.7
Tertiary	108	36.0
Total	300	100.0
Occupation		
Employed	148	49.3
Self-employed	13	4.3
Unemployed	53	17.7
Retired	86	28.7
Total	300	100.0
Income Per Month (Rand)		
1 – 5 000	147	59.5
5 001 – 10 000	84	34.0
10 001 – 15 000	10	4.1
15 001 – 20 000	1	0.4
More than 20 000	5	2.0
Total	247	100.0

Table 2. Respondents' knowledge about safe quantities of alcohol consumption (n=300).

Respondents' Knowledge about Safe Alcohol Consumption	Yes (%)	No (%)	P-value	95% CI for "Yes"
Do you know the maximum number of drinks (standards) per day (e.g. glasses of wine) that a male person can take without causing harm to their health?	32 (10.7)	268 (89.3)	< 0.0001	7.7 – 14.7
Do you know the maximum number of drinks (standards) per day (e.g. glasses of wine) that a female person can take without causing harm to their health?	21 (7.0)	279 (93.0)	< 0.0001	4.6-10.5
Do you know the maximum number of days per week an individual can take without causing harm to their health?	40 (13.3)	260 (86.7)	< 0.0001	9.9-17.6

CI: Confidence interval

pondents were single, followed by the married (128; 42.7%). The dominant highest level of formal education was the secondary school education.

Table 3. Reported types of alcohol consumption and occasions of consumption (n=300).

Type of Alcohol	Frequency	(%)
Wine (100ml)	36	12.0
Beer (330 ml)	48	16.0
Beer (750 ml)	97	32.3
Spirits (e.g. whisky®) (40ml)	19	6.4
Cider (e.g. Savana®) (330ml)	94	31.3
Home-brew (quantity not specified)	6	2.0
Total	300	100.0
Occasions During which Alcohol Consumption Occurs		
Only on special occasions	152	50.7
1-2 days / week (any day of the week)	33	11.0
3-5 days / week (any day of the week)	3	1.0
Everyday	12	4.0
Only on weekends (Friday – Sunday)	100	33.3
Total	300	100.0
Duration of Alcohol Consumption		
≤ 5 years	99	33.0
6 – 10 years	94	31.3
> 10 years	107	35.7
Total	300	100.0

3.2. Knowledge about Safe Alcohol Consumption

Table 2 shows that the proportion of respondents who reported to know the maximum number of drinks per day that a male individual can take without causing harm to health (10.7%), was significantly lower than a chance outcome of 50% (z test, $p < 0.0001$). Likewise, the percentage of patients who knew the maximum number of drinks per day (7.0%) for a female individual, was significantly lower than a chance

outcome of 50% (z test $p < 0.0001$). The respondents who did not know the maximum number of days per week that an individual can take alcohol for without causing harm to their health was also significantly low (13.3%), z test, $p < 0.0001$. Ninety-five percent Confidence Intervals (CI) were calculated for the percentage knowledge ("Yes").

3.3. Practices about Harmful Alcohol Consumption

3.3.1. Types of Alcohol and Occasions of Consumption

Table 3 shows that amongst all the alcohol types reported consumed, beer 145 (48.3%) and cider 94 (31.3%) accounted for more than 79%. Regarding the reported occasions of consumption, consumption occurred mostly on special occasions (152; 50.7%), followed by "on weekends" (100; 33.3%). These two occasions accounted for 84.0% of all the occasions of alcohol was consumption. The reported duration of alcohol consumption was almost evenly distributed amongst the three duration categories: ≤ 5 years (99; 33.0%), 6 – 10 years (94; 31.3%) and > 10 years (107; 35.7%).

3.3.2. Alcohol Types and Age Groups versus Number of Alcohol Drinks

Table 4 illustrates that more than two-thirds of the respondents (107; 35.7%) reported consuming an average of 5 – 6 drinks per day followed by those who consumed 3 – 4 drinks per day (89; 29.7%) and more than six drinks per day (72; 24.0%). Beer in both 330ml and 750 ml bottles was consumed the most per day (145; 48.4%).

Regarding age groups versus number of alcohol drinks per day, the age group ≥ 38 years of age displayed high proportions of alcohol consumption (245; 81.7%). On average, the largest quantity of alcohol consumed across all the age groups fell in the category of 5-6 drinks per day (107; 35.7%). The age-groups that demonstrated more binge drinking were ≥ 48 years (104; 34.6%).

Table 4. Alcohol type and age groups versus number of alcohol drinks (n=300).

Alcohol Type by Number of Drinks Per Day						
Type of Alcohol	Number of Drinks Per Day n (%)					Total
	1	2	3 - 4	5 - 6	> 6	
Wine (100ml)	7 (2.3)	5 (1.7)	8 (2.7)	9 (3.0)	7 (2.3)	36 (12.0)
Beer (330 ml)	4 (1.3)	3 (1.0)	12 (4.0)	18 (6.0)	11 (3.7)	48 (16.0)
Beer (750 ml)	2 (0.7)	5 (1.7)	31 (10.3)	39 (13.0)	20 (6.7)	97 (32.4)
Spirits (e.g. whisky®) (40ml)	5 (1.7)	0 (0.0)	8 (2.7)	4 (1.3)	2 (0.7)	19 (6.3)

(Table 4) contd....

Alcohol Type by Number of Drinks Per Day						
Type of Alcohol	Number of Drinks Per Day n (%)					Total
	1	2	3 - 4	5 - 6	> 6	
Cider (e.g. Savana ®) (330ml)	0 (0.0)	1 (0.3)	30 (10.0)	36 (12.0)	27 (9.0)	94 (31.3)
Home-brew (quantity not specified)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	5 (1.7)	6 (2.0)
Totals	18 (6.0)	14 (4.6)	89 (29.7)	107 (35.7)	72 (24.0)	300 (100.0)
Age Groups by Number of Alcohol Drinks Per Day						
Age groups (years)	Number of Drinks Per Day n (%)					Total
	1	2	3 - 4	5 - 6	> 6	
18 – 27	3 (1.0)	1 (0.3)	4 (1.3)	5 (1.7)	4 (1.3)	17 (5.7)
28 – 37	2 (0.7)	2 (0.7)	10 (3.3)	14 (4.7)	10 (3.3)	38 (12.7)
38 – 47	7 (2.3)	5 (1.7)	23 (7.7)	30 (10.0)	12(4.0)	77 (25.7)
48 – 57	3 (1.0)	1 (0.3)	25 (8.3)	24 (8.0)	15 (5.0)	68 (22.7)
≥ 57	3 (1.0)	5 (1.7)	27 (9.0)	34 (11.3)	31 (10.3)	100 (33.3)
Total	18 (6.0)	14 (4.7)	89(29.7)	107 (35.7)	72 (24.0)	300 (100.0)

3.3.3. Types of Alcohol Consumed versus Patient’s Sex

Table 5 shows that the proportions of women using wine (25; 8.3%) and cider (67; 22.3%) were significantly higher compared to those for men; p = 0.032 and p = 0.0001, respectively. There was a significantly higher proportion of beer consumption (330ml and 750ml) by men, (100; 33.3%) compared to women (45; 15.0%), p < 0.05.

Table 5. Types of alcohol consumed by sex and amount of alcohol consumption per sitting versus sex (n=300).

Type of Alcohol Consumed	Sex		Total	p-value
	Male n (%)	Female n (%)		
Wine (100ml)	11 (3.7)	25 (8.3)	36 (12.0)	0.032
Beer (330 ml)	31 (10.3)	17 (5.7)	48 (16.0)	0.018
Beer (750 ml)	69 (23.0)	28 (9.3)	97 (32.3)	<0.0001
Spirits (e.g. whisky) (40ml)	9 (3.0)	10 (3.3)	19 (6.3)	0.834
Cider (e.g. Savana) (330ml)	27 (9.0)	67 (22.3)	94(31.3)	<0.0001
Home-brew (quantity not specified)	3 (1.0)	3 (1.0)	6 (2.0)	1.000
Total	150 (50.0)	150 (50.0)	300 (100.0)	
Number of Drinks per Sitting				
1 drink	8 (2.7)	10 (3.3)	18 (6.0)	0.943
2 drinks	6 (2.0)	8 (2.7)	14 (4.6)	0.935
3 - 4 drinks	40 (13.3)	49 (16.3)	89 (29.7)	0.695
5 – 6 drinks	57 (19.0)	50 (16.7)	107 (35.7)	0.758
> 6 drinks	39 (13.0)	33 (11.0)	72 (24.0)	0.797
Total	150 (50.0)	150 (50.0)	300 (100.0)	

Regarding the number of drinks consumed per sitting there was no significant difference between males and females, p > 0.05. However, when both sexes were combined, 179 (59.7%) took five or more drinks per sitting (binge drinking).

3.3.4. CAGE Score by Age Groups, Sex and Levels of Education

The results of Table 6 indicate that the significant difference between the patients who were non-harmful alcohol

users (CAGE score ≤ 1) versus those who were (CAGE score ≥ 2) was observed in the younger age groups (18-37 years), while the older age-groups (38 - >57years) tended to be non-harmful chronic alcohol users (p < 0.01). However, on the whole, there was a higher proportion of non-harmful chronic alcohol users (CAGE ≤ 1) compared to harmful alcohol users (CAGE ≥ 2); [205 (68.3%) versus 95 (31.7%)]. Regarding the CAGE scores by sex, there was no significant difference between the proportion of males and females who indicated a CAGE score ≤ 1 and ≥ 2, respectively.

Table 6 also indicates that using the CAGE score by education level, there was no significant difference between those who were harmful alcohol users versus those who were not among the patients who had no formal education (p = 0.058). However, the higher the level of education, the greater the difference between the proportions of those who had harmful alcohol use (CAGE ≥ 2) and those who did not (CAGE ≤ 1); (p ≤ 0.001). It is also noticeable that the percentages of users increased with education in each category – more among the non-harmful alcohol users compared to their counterparts.

4. DISCUSSION

The study demonstrated that there was a larger proportion of respondents who consumed alcohol among the older age-groups and the single. Poor knowledge regarding the quantities of alcohol consumption which do not cause harm to health was also shown. A large proportion of men consumed beer than women who consumed wine and cider more. When comparing harmful and non-harmful alcohol use according to age and academic level progression, there was an inverse relationship in both cases.

Most of the respondents enrolled in the study belonged to the age groups of above 57 years old (33.3%) compared to the other age-groups. There was an increase in alcohol consumption as the participants’ age groups increased toward 57 years and above, in contradistinction with the study by Knott *et al.* [21], where alcohol consumption and related problems were found to decrease as drinkers grew older because of ill-health that set in with age. However, the study by Grant *et al.* [22], tallied with our study in also finding an increase in harmful alcohol use with age. In South Africa, the

Table 6. CAGE scores by sex, age groups and level of education (n=300).

CAGE Score by Age Groups				
Age Groups (years)	CAGE Score ≤ 1 n (%)	CAGE Score ≥ 2 n (%)	Total n (%)	p-value
18 – 27	7 (2.3)	10 (3.3)	17 (6.6)	0.458
28 – 37	24 (8.0)	14 (4.7)	38 (12.7)	0.098
38 – 47	53 (17.7)	24 (8.0)	77 (25.7)	0.0004
48 – 57	46 (15.3)	22 (7.3)	68 (22.7)	0.002
Older than 57	75 (25.0)	25 (8.3)	100 (33.3)	< 0.0001
Total	205 (68.3)	95 (31.7)	300 (100.0)	< 0.0001
CAGE Score by Sex				
CAGE score	Male (%)	Female (%)	Total	p-value
≤ 1	98 (32.7)	107 (35.7)	205 (68.3)	0.530
≥ 2	52 (17.3)	43 (14.3)	95 (31.7)	0.364
Total	150 (50.0)	150 (50.0)	300 (100.0)	1.000
CAGE Score by Highest Level of Education				
Highest level of education	CAGE score ≤ 1 n (%)	CAGE score ≥ 2 n (%)	Total n (%)	p-value
No education	8 (2.7)	2 (0.7)	10 (3.3)	0.058
Primary	42 (14.0)	18 (6.0)	60 (20.0)	0.001
Secondary	79 (26.3)	43 (14.3)	122 (40.7)	0.0003
Tertiary	76 (25.3)	32 (10.7)	108 (36.0)	< 0.0001
Total	205 (68.3)	95 (31.7)	300 (100.0)	< 0.0001

study by Peltzer *et al.* found that there was an increase in high risk drinking and alcohol abuse among older adults putting them at risk for increased morbidity and mortality [23]. The researchers in the current study are of the view that differences observed in the other studies are ascribable to the differences in sample sizes and the fact that the quoted studies were cohort studies over a period of time, unlike the cross-sectional method used in this study. Nevertheless, the current study suggests that health care professionals need to specifically enquire about alcohol abuse among elderly patients as well and not assume that they are unlikely engage in the harmful use of the substance.

In this study, the highest age group among the alcohol users were single (49.7%), in keeping with the study by Halme *et al.*, who found an association between “not being married” and alcohol drinking problem [24] and Dan, who also found binge drinking in men to be associated with those who were divorced, separated or widowed (*i.e.* living single) [25]. This suggest that being single for whatever reason renders the individual vulnerable to harmful alcohol use.

The current study demonstrated that only about one-in-ten (10.7%) respondents were aware of the maximum number of drinks per day that a male individual can take without causing harm to health, while nine-in-ten (89.3%) were not. These findings are almost similar to a study conducted by Rosenberg *et al.*, in the UK were the level of awareness on recommended alcohol limits stood at 8% [26]. The same trend was displayed in the current study on the level of awareness on the maximum number of drinks per day recommended for a female individual without causing harm to their health – only 7% were aware.

Furthermore, on the maximum number of days per week that an individual can take alcohol for, without causing harm to their health, awareness was only found in 13.3%. According to the United States Department of Health and Human services and the United States Department of Agriculture, recommendations for moderate drinking has been defined as one alcoholic drink for females and two drinks for males per day [27]. Low risk for developing Alcohol Use Disorder (AUD) was described for males as drinking a maximum of 4 drinks on any day of the week to a maximum of 14 drinks per week, and a maximum of 3 drinks on any day of the week to a maximum of 7 drinks per week for females [19]. Lack of awareness by individuals about these recommended alcohol quantities and frequencies of ingestion could be a reflection on the lack of patient education in this regard by health care professionals.

The study demonstrated that beer was considered favourable amongst respondents accounting for almost half of all respondents’ consumption (48.4%) and was followed by ciders with almost a third of the respondents (31.3%) using it. The finding regarding beer consumption was also reported by the WHO [28], in its Global Status Report on alcohol and individual country profiles for South Africa in 2014 where beer was found to constitute 48% of all alcohol consumption. However, unlike in the current study, the beer frequency was followed by wine at 18%. Globally, the most consumed beverage type is spirits (50.1%), followed by beer (34.8%). Wine constituted only 8.0% of the total recorded alcohol consumption (*ibid*). Given that what matters most is the number of alcohol standards consumed by an individual, health care professionals have the responsibility to educate patients that it is the quantity consumed that matters [8], and not the alcohol types.

Almost one-in-two respondents reported that they consumed alcohol mostly on special occasions, followed by “on weekends” (33.3%). These two occasions accounted for almost one-in-five (84.0%) of all the occasions during which alcohol was consumed, in keeping with the study by Lau-Barraco *et al.* [29]. Weekend drinking was found to be associated with more risks of violence compared to during the week drinking [30]. There was no difference in the proportion of patients based on the duration of time they have been ingesting alcohol. However, there is evidence that excessive alcohol drinking for longer duration is associated with a number of diseases, notably liver cirrhosis, some types of cancer and immune system disorders [5]. Health care professionals need to factor in the possibility of binge drinking on weekends and the duration of excessive alcohol intake in their enquiry on the history of alcohol intake by their patients.

Binge drinking which represents acute alcohol use in the current study was demonstrated in almost 60% of the respondents whereby five or more drinks per sitting were consumed. The deleterious effects of binge drinking on cognition – particularly among adolescents [31], health and safety [32] its contribution towards Alcohol Use Disorders (AUD) [33] have already been reported. Beer in both 330ml and 750 ml bottles was consumed the most per day by about half of the respondents. Regarding the types of alcohol consumed, the 2016 report by STATS SA has shown that beer

is currently the most popular alcohol type in South Africa and accounts for 2.1% of total household spending [34]. The large proportion of men consuming beer compared to women has also been reported by Colen and Swinnen, whose study on the determinants of global beer consumption among beer drinking nations found that men were more likely to drink beer than women and that beer was more popular in the younger ages (18-44 years) [35]. However, this has no clinical significance as all types of alcohol are amenable to abuse, depending on the amount consumed [8].

The current study findings indicated that there was a significant difference between the patients who were non-harmful chronic alcohol users (CAGE score ≤ 1) versus those who were (CAGE score ≥ 2) among those in the age groups ≥ 38 years. There were less respondents in the age group ≥ 38 years who engaged in chronic harmful alcohol consumption (CAGE score ≥ 2) compared to their younger counterparts. This finding suggests an inverse relationship between age and harmful alcohol use. In this study, comparing males and females, the CAGE screening showed no significant difference between them regarding non-harmful and harmful alcohol uses (CAGE score ≤ 1 and ≥ 2). However, a study conducted by Bradley *et al.*, using the Alcohol Use Disorders Identification Test (AUDIT-C) tool illustrated a higher prevalence of alcohol-related problems and disorders in primary care among men compared with women [36]. This could be explained by the differences in the parameters used in these two tools, with the AUDIT-C questionnaire looking more at the quantity and frequency of alcohol ingestion, compared to the CAGE questionnaire which looks at the individual's social behaviour and his/her functionality as a result of alcohol use [8].

Regarding the use of the CAGE scoring system in relation to the highest level of education, the current study demonstrated that the higher the level of education, the greater the difference between the proportions of those who had harmful alcohol use (CAGE score ≥ 2) versus those who did not (CAGE score ≤ 1). However, the percentages of users increased with education in each category – more among the non-harmful alcohol users compared to their counterparts. This suggests that the higher the education level, the fewer the harmful users of alcohol. This could suggest that education brings about awareness on the dangers associated with harmful alcohol use. However, other studies have shown an increasing harmful alcohol consumption with an increase in academic levels, as a result of the socio-economic status conferring affordability to the individual [37 - 39]. These studies are multicentre large sample surveys which could explain the different finding in the current study. Furthermore, there was paucity of comparative studies conducted specifically among patients.

4.1. Strengths and Weaknesses

This study was a cross-sectional study conducted in one setting, the Family Practice clinic of the DGMAH. These study findings are not necessarily generalizable to the South African population. However, this study can be viewed as a formative research as recommended by Bohren *et al.* [40], which can be used as a basis to launch further studies in this area.

Furthermore, the fact that the results are based on information as reported by the respondents had the potential to introduce the social desirability bias (the tendency of respondents to give an answer they deem to be more socially acceptable than would be their “true” answer) [41], especially that harmful alcohol use is associated with stigma [42]. The fact that we could not work out the ingredients of home-brew, as well as the measurements of the containers in which it is served made it difficult for the researchers to quantify the amount of alcohol contained in this type of alcoholic beverage.

CONCLUSION

The finding that there was lack of knowledge on safe alcohol use among the majority of the respondents in this population suggests introduction of alcohol use awareness campaigns targeting especially the middle aged and the elderly. Furthermore, the finding that women consumed more wine and cider, compared to men who consumed more beer offers an opportunity to health care professionals to raise awareness to patients that safe use is determined by the amount rather than necessarily the type of alcohol used. This awareness should include the deleterious effects of binge drinking observed among the younger age groups, with caution for all patients against harmful alcohol use on special occasions and weekends. The finding through the use of the CAGE scoring system that with an increase in the highest level of education there were significantly more patients who did not engage in chronic harmful alcohol use should be leveraged on by health care professionals in educating patients against indulgence in harmful alcohol use.

RECOMMENDATIONS

Patient education is required on the amounts of alcohol constituting harmful use, including binge drinking (regardless of the alcohol type used and the occasion during which alcohol ingestion occurs) so as to prevent diseases associated with the harmful use.

Although education on alcohol use should be for all patients, according to this study, emphasis should be laid on patients 38 years and above who tend to engage in harmful alcohol use.

Further studies with larger samples and in multiple centers should be undertaken to further explore the findings of this study among patients.

AUTHORS' CONTRIBUTIONS

K.K.N. conceptualised the research idea. K.K.N. and L.H.M. both drafted the manuscript, approved the final manuscript and agreed to submission it to the Open Public Health Journal for publication.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study commenced after obtaining ethics clearance from the Sefako Makgatho Health Sciences University Research Ethics Committee (SMUREC) in Pretoria, South Africa (Clearance Certificate number: SMUREC/M/203/

2016:PG). Permission from DGMAH Chief Executive Officer and the Head of Department in charge of the Family Practice Clinic was obtained.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

The study details were explained to each respondent, and written informed consent to participate was obtained before the study commenced.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

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CONFLICT OF INTEREST

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

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