Alcohol Use and Its Role in Female Homicides in the Western Cape, South Africa*

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ABSTRACT. Objective: Levels of alcohol use are high in South Africa and not much is known about women's use of alcohol when murdered. The aim of this article is to describe the patterns of blood alcohol concentration (BAC) at the time of death for female homicide victims and to explore the factors associated with having an elevated BAC. **Method:** A subsample of a national, representative, retrospective mortuary-based study of female homicides ages 14 years and older was analyzed. Data were gathered from medical legal laboratory records, autopsy reports, and police interviews from 153 cases at sampled mortuaries in the Western Cape Province of South Africa in 1999. **Results:** Sixty-two percent of women who were murdered had a high BAC at the time of their death, with an overall median BAC of .11% (110 mg/100 ml). A quantile regression analysis showed that a raised median BAC at the time of death was positively associated with the victim's age; being unemployed or not known to be employed; and being killed in a rural setting, in a public space, and on a weekend. Significant interactions between type of homicide and employment showed a modification in median BACs for unemployed victims killed by intimate partners compared with employed victims, with a median difference of .19% (190 mg/100 ml) (95% confidence interval: .14%-.23% [140-230 mg/100 ml]). **Conclusions:** This study highlights the public health impact of excessive alcohol consumption and the need for a comprehensive approach to reduce the harmful effects of drinking. (*J. Stud. Alcohol Drugs* **70:** 321-327, 2009)

THE RELATIONSHIP BETWEEN ALCOHOL and interpersonal violence is well established (Room et al., 2005). Alcohol consumption increases men's risk of violence perpetration and men and women's risk of becoming a victim of violence (World Health Organization, 2006). This relationship appears to be influenced by level of alcohol consumption and rates of violence in a country. Data from mortality studies confirm this, with 45% of victims of fatal injuries having a blood alcohol concentration (BAC) greater than or equal to .05% (50 mg/100 ml; above the legal limit for driving in South Africa) (Matzopoulos, 2004). Understanding this relationship is of particular importance to a country like South Africa, where interpersonal violence is one of the leading causes of death (Norman et al., 2007).

South Africa has one of the highest levels of absolute alcohol consumption per drinker: 20.1 L per adult per year compared with 16.5 L in heavy drinking regions such as the Ukraine and Russian Federation (Rehm et al., 2003).

Establishing an accurate picture of alcohol use in South Africa, however, is difficult because of the history of illegal community-based outlets (shebeens) selling home-brewed alcohol (Parry, 2005). National data from the 1998 South African Demographic Health Survey found one-third of both men and women who drink report risky drinking, particularly on weekends (Parry et al., 2005).

Violence often occurs in intimate relationships where men are heavy drinkers (Grisso et al., 1999; Kyriacou et al., 1999; Lipsky et al., 2005). However, researchers have debated whether male heavy drinking alone causes intimate partner violence (Leonard, 2005), and some studies of women's drinking and experience of violence have shown that male heavy drinking is not predictive of violence or of sustaining injury in an intimate relationship (Testa et al., 2003; Thompson and Kingree, 2006). However, one study of working men in South Africa found that women's use of alcohol was a justification for being violent toward an intimate partner (Abrahams et al., 2006).

Studies from the United States on victim and perpetrator use of alcohol in relation to intimate homicide suggest that there are gender differences in the pattern of alcohol use (Moracco et al., 1998; Sharps et al., 2001). Most of the female victims had negative BAC toxicology reports, whereas more than half of male perpetrators were intoxicated. A study of female murders and alcohol in Cape Town found that just more than half of women murdered had a BAC greater than .10% (100 mg/100 ml) (Lerer, 1992). It was also found that

nearly half (44%) of female victims of fatal sharp and blunt injuries were heavily intoxicated (BAC > .20% [200 mg/100 ml]) (Lerer, 1992). However, this study did not explore the victim–perpetrator relationship.

Women's use of alcohol and their associated vulnerability is underexplored, and this study on the epidemiology and pathology of female homicide in South Africa provides an opportunity to examine the role alcohol has played in the homicide of women in the Western Cape, South Africa. The aim of this article is to describe the patterns of BAC at the time of death for female homicide victims and factors associated with having an elevated BAC.

Method

Study design, setting, and sample

The data were collected as part of a nationally representative, retrospective study of female homicide victims ages 14 years and older who were admitted to mortuaries (Medical Legal Laboratories) between January 1, 1999, and December 31, 1999. (Medical Legal Laboratories are forensic mortuaries owned by the state Department of Health where all autopsies to investigate all unnatural deaths are performed.) Details of the study design, the identification of female homicide cases and the tools used for data collection are described in more depth elsewhere (Abrahams et al., 2008; Mathews et al., 2008). BAC data was available only for the Western Cape Province because BAC results for the other regions were destroyed before data collection. This article is based on analysis of female homicide cases from the Western Cape Province. A total of 182 cases were identified via death registers; no blood alcohol was taken in 24 cases, blood alcohol results were missing in 4 cases, and 1 postmortem report was missing. An analysis of this BAC missing group (n = 29) showed that the demographics were similar to the rest of the sample, and this group was excluded from further analysis. This article is based on the other 153 cases.

Data collection

Data were collected from 2002 through 2003 using a pretested data collection sheet. Three data sources were used. First, all cases of female homicide were identified from the death registers at the Medical Legal Laboratories. Second, autopsy reports were photocopied, from which the forensic pathologist on the team abstracted injury and pathology data. Third, police data were obtained via telephone interviews, record reviews, or face-to-face interviews with the investigating officer. Thus, the registers provided the first level of information on the cause of death, which was further verified with the information in the autopsy report as well as data obtained during interviews with the investigating officers or reviews of police dockets. Important to the study was the

classification of all cases into either intimate partner homicide or nonintimate homicide. Police data allowed for this classification based on the victim–perpetrator relationship. An *intimate partner* was defined as the victim's husband, boyfriend (dating or cohabiting), ex-husband (divorced or separated) or ex-boyfriend, same-gender partner, or a rejected would-be lover.

Variables

In addition to cause of death data obtained from the mortuary registers, we abstracted information on whether blood alcohol was taken during the autopsy, level of BAC and demographic details (race and age). Data collected from the police dockets included social and demographic characteristics of the victim and perpetrator, the relationship between them, information about the murder and its circumstances (if available), and the criminal investigation. Race as a variable is still of importance in South Africa, because the artificial racial boundaries created by apartheid have had a devastating and long-term public health impact that has to be taken into account by public health research. Data on race were, therefore, collected and are reported in the study based on the classification categories used by the apartheid regime, where "African" refers to those of black African descent and "non-African" refers to European, Asian, and mixed-race descent.

Injury and pathology data were extracted from the photocopied autopsy report and included type of specimen collected (e.g., blood alcohol) and number and description of injuries. If a blood alcohol specimen was taken, the result was obtained from either the autopsy report or police data, and if not available, the result was requested from the two national forensic laboratories. For this article, the BAC of the victim at the time of death was the variable of primary interest. In this article, we report BAC as milligrams per 100 ml for comparison with U.S. data, although standard practice for reporting in South Africa is grams per 100 ml. BAC was divided into two categories: below the legal alcohol limit (0-40 mg/100 ml) and above the legal limit for driving in South Africa ($\geq$50 mg/100 ml). We refer to the latter as *drunk*. We then created a further category for those that were above 150 mg/100 ml (*very drunk*).

Data analysis

Data were analyzed using Stata Version 9 (StataCorp LP, College Station, TX). This analysis was based on the homicide cases obtained from the mortuaries in the Western Cape province that formed part of the larger national sample. The larger study stratified mortuaries based on the number of postmortems performed annually, and mortuaries were weighted based on a ratio of allocation between the strata. This Western Cape sample included one large mortuary that

TABLE 1. Overall female homicide blood alcohol concentration (BAC), by cause of death and median BAC

BAC	Gun (n = 39) %	Sharp (n = 61) %	Blunt (n = 34) %	Strangled (n = 14) %	Total (N = 153)[a] %
0%	71.8	23.0	17.6	35.7	37.9
.01%–.04%	10.3	4.9	11.8	0.0	6.5
.05%–.14%	5.1	16.4	14.7	7.1	11.1
≥.15%	12.8	55.7	55.9	57.1	44.4

[a]Total includes cases that are classified as "other" and not accounted for by the cause of death listed above.

had more than 1,500 autopsied cases per year, one medium mortuary (500-1,499 cases per year), and two small mortuaries (<500 cases per year). Because this study used data from only one province, an unweighted analysis has been performed. Comparisons were made between BAC (below the legal alcohol limit and at or above the legal alcohol limit) for all cases using unadjusted odds ratios. To handle the nonnormal distribution of BAC a nonparametric regression approach was followed and quantile regression using the median was selected. The legal limit corresponds to the 45th percentile of the BAC distribution and is therefore very close to the median. For the multiple regression analysis, the victim characteristics were considered as the covariates, and the number of BAC units between a particular level of a variable and the reference group was the estimated coefficients' difference. Ninety-five percent confidence intervals (CI) were estimated for all parameters. The regression model included interactions between certain covariates. Exploratory analysis through the use of a tree regression showed the interrelationship between certain covariates. The regression model included interaction terms for type of homicide with employment and setting. A further postestimation stratified analysis of the interaction terms was conducted to obtain the differential in median BAC for intimate and nonintimate homicides by these covariates.

Ethical approval for this study was obtained from the ethics committee of the Medical Research Council of South Africa.

Results

Of the 153 cases used in the analysis a positive BAC toxicology reading was found in 62.1% (95% CI: 54.5%-70.0%) with a median BAC of .11% (110 mg/100 ml) and a mean BAC of .20% (200 mg/100 ml) (range: .01%-.41% [10 mg-410mg]). Table 1 shows the BAC distribution by cause of death. The overwhelming majority of women killed by gunshot injuries were sober, but the levels of BAC were particularly high for most victims with other mechanisms of death. Of note, victims of death by strangulation were either sober or very drunk. Those killed by intimate partners had a consistently higher median BAC for all causes of death except for gun homicides.

Table 2 presents BACs of victims by their demographic characteristics and the circumstances of their killing. Unemployed victims and those of unknown employment status had higher levels of alcohol at the time of death than those who were employed. Victims who were living in rural areas had much higher levels of alcohol than those living in urban areas, with a median BAC of .22% (220 mg/100 ml) compared with .06% (60 mg/100 ml). Those killed in public spaces and on weekends were also often very drunk. Importantly, women killed by an intimate partner were also much more likely to be very drunk compared with those killed by a nonintimate perpetrator. Further stratification by homicide type shows that unemployed victims killed by an intimate partner were most likely to be very drunk with a median BAC of .25% (250 mg/100 ml). Rural homicide victims irrespective of their relationship to the perpetrator were mostly very drunk at the time of the murder. This contrasted with urban victims of a nonintimate perpetrator who were more likely to be sober.

Table 3 presents perpetrator data. Higher BACs were found in victims of unemployed perpetrators, those who were themselves known to have a drinking problem, and those who did not own guns.

Table 4 shows the quantile regression model for factors associated with the victims' median BAC at the time of the homicide. The characteristics of the victims that were significantly associated with a higher median BAC were the following: being older than age 29 years; being unemployed or unknown employment status; and being killed in a rural setting, in a public space, and on a weekend. Significant interactions between the employment status of the victim and homicide type as well as homicide setting and homicide type were found. Stratified analysis showed that the median BACs of unemployed homicide victims were modified by the type of homicide (data not shown), with an almost fourfold difference between the median BACs of intimate homicide victims (.19% [190 mg/100 ml]) and nonintimate victims (.05% [50 mg/100 ml]; $p < .000$). Among victims killed in urban settings, the type of homicide was not associated with the median level of BAC, whereas those killed in rural settings had a .14% [140 mg/100 ml] higher median BAC for nonintimate homicides compared with those killed by an intimate perpetrator.

Discussion

This study showed that two out of three female homicide victims consumed substantial amounts of alcohol before their murder. More than half of the women exceeded the legal blood alcohol limit, with the median BAC (.11% [110 mg/100 ml]) more than twice the legal limit. This finding is similar to that reported by Lerer (1992) in research in the same region more than a decade earlier; however, direct comparison is limited because comparative legal alcohol

TABLE 2. Demographic characteristics of victims of female homicide and blood alcohol concentration (BAC) at time death

		All female homicides (N = 153)				
Variable	n	Median (range) BAC	0%-.04% %	≥.05% %	OR (CI) %	p
Age, years						
14-29	51	.05% (0%-.41%)	49.0	51.0	ref.	
30-39	59	.22% (0%-.37%)	32.2	67.8	2.02 (0.93-4.39)	.074
40-49	17	.08% (0%-.33%)	47.1	52.9	1.08 (0.36-3.25)	.668
≥50	23	0% (0%-.30%)	65.2	34.8	0.51 (0.19-1.42)	.199
Race						
African	57	.08% (0%-.37%)	45.6	54.4	ref.	
Non-African	96	.15% (0%-.41%)	43.8	56.3	1.07 (0.55-2.08)	.823
Employment						
Employed	45	0% (0%-.33%)	75.6	24.4	ref.	
Unemployed	70	.21% (0%-.41%)	25.7	74.3	8.93 (3.76-21.22)	<.001
Unknown	38	.08% (0%-.32%)	42.1	57.9	4.25 (1.67-1.84)	.002
Setting						
Rural	33	.22% (0%-.36%)	27.3	72.7	ref.	
Urban	120	.06% (0%-.41%)	49.2	5.8	0.39 (0.17-0.90)	.028
Scene						
Other	95	.04% (0%-.36%)	51.6	48.4	ref.	
Public space	52	.17% (0%-.41%)	3.8	69.2	2.40 (1.17-4.89)	.016
Day of homicide						
Weekday	58	.01% (0%-.41%)	58.6	41.4	ref.	
Weekend	95	.14% (0%-.37%)	35.8	64.2	2.54 (1.3-4.97)	.006
Perpetrator relationship						
Nonintimate	80	.03% (0%-.37%)	53.8	46.3	ref.	
Intimate	73	.20% (0%-.41%)	34.3	65.8	2.23 (1.16-4.29)	.016
Type of homicide and employment						
Intimate employed	17	0% (0%-.33%)	70.6	29.4	ref.	
Intimate unemployed	39	.25% (0%-.41%)	18.0	82.0	1.97 (2.91-41.30)	<.001
Intimate unknown employment	17	.09% (0%-.25%)	35.3	64.7	4.4 (1.04-18.59)	.044
Nonintimate employed	28	0% (0%-.33%)	78.6	21.4	ref.	
Nonintimate unemployed	31	.14% (0%-.37%)	35.5	64.5	6.67 (2.08-21.36)	.001
Nonintimate unknown employment	21	.07% (0%-.32%)	47.6	52.4	4.03 (1.16-13.99)	.028
Type of homicide and setting						
Intimate rural	17	.24% (0%-.36%)	35.3	64.7	ref.	
Intimate urban	56	.19% (0%-.41%)	33.9	66.1	1.06 (0.34-3.32)	.917
Nonintimate rural	16	.22% (0%-.33%)	18.6	81.3	ref.	
Nonintimate urban	64	0% (0%-.37%)	62.5	37.5	0.14 (0.04-0.54)	.004

Notes: OR = odds ratio; CI = confidence interval; ref. = reference.

levels differ. This pattern of alcohol use among female homicide victims in South Africa appears to be different from those reported in the United States, where most women who are murdered have negative BAC toxicology reports (Moracco et al., 1998; Sharps et al., 2001). Our finding fits with an overall pattern of high alcohol consumption and interpersonal violence in South Africa (Norman et al., 2007; Parry, 2005).

This study was conducted in the Western Cape, a region known to have one of the highest levels of alcohol consumption in South Africa (Parry et al., 2005). This is a wine- producing area with a historical practice known as the "dop system," whereby farm laborers were partly paid in crude acidic wine that is very addictive (Mager, 2004). Although this practice is legally prohibited, a residual pattern of very heavy drinking persists, particularly on weekends,

in these rural farming communities. Discussions with community-based organizations in the region have pointed to a relationship between hazardous communal drinking and high levels of interpersonal violence. There are few real strangers in these communities and, even when the perpetrators were nonintimate partners, the perpetrators were predominantly known to their victims. This suggests that murders were probably not random acts but that there was some form of preexisting relationship between the victim and perpetrator, which may in fact have had a sexual nature. Waldman (1996) reported that women have very little control over their own sexuality in such communities and that there is often fluidity in sexual partnerships, which is related to the men's sense of sexual entitlement. Unequal gender power relations on farms are likely to be a key factor in explaining the association between higher levels of alcohol and being killed by a

TABLE 3. Perpetrator characteristics and female homicide victim blood alcohol concentration (BAC) at time of death

		All female homicides ($N = 153$)				
Variable	n	Median (range) BAC	0%-.04% %	≥.05% %	OR (CI) %	p
Age, years						
14-29	50	.09% (0%-.33%)	46.0	54.0	ref.	
30-39	39	.18% (0%-.41%)	33.3	66.7	1.70 (0.72-4.06)	.229
≥40	29	.23% (0%-.36%)	37.9	62.1	1.39 (0.55-3.55)	.486
Race						
African	51	.11% (0%-.41%)	41.2	58.8	ref.	
Non-African	76	.15% (0%-.35%)	40.8	59.2	1.02 (0.49-2.09)	.965
Employment						
Employed	48	.08% (0%-.41%)	50.0	50.0	ref.	
Unemployed	66	.17% (0%-.31%)	28.8	71.2	2.47 (1.14-5.38)	.022
Unknown	39	0% (0%-.29%)	64.1	35.1	0.56 (0.24-1.33)	.189
Perpetrator problem alcohol use						
No	93	.01% (0%-.41%)	56.4	43.6	ref.	
Yes	53	.14% (0%-.37%)	22.6	77.4	4.42 (2.06-9.46)	<.001
Gun ownership						
No	138	.15% (0%-.41%)	37.5	62.5	ref.	
Yes	9	0% (0%-.23%)	74.1	25.9	0.21(0.08-0.54)	.001

Notes: OR = odds ratio; CI = confidence interval; ref. = reference.

TABLE 4. Quantile regression analysis: Victim characteristics associated with median blood alcohol concentration (BAC) at time of homicide

Variable	Coefficient (95% CI)	p
Intercept	.07% (.02%-.12%)	
Age, years		
14-29	ref.	
30-39	.06% (.03%-.09%)	<.001
40-49	.05% (.01%-.09%)	.013
≥50	.05% (.02%-.10%)	.004
Employment		
Employed	ref.	
Unemployed	.05% (.02%-.09%)	.006
Unknown	.08% (.04%-.12%)	<.001
Setting		
Rural	ref.	
Urban	−.15% (−.19%-−.11%)	<.001
Scene		
Other	ref.	
Public space	.06% (.03%-.08%)	<.001
Day of homicide		
Weekday	ref.	
Weekend	.05% (.03%-.08%)	<.001
Homicide type		
Nonintimate	ref.	
Intimate	−.14% (−.20%-−.08%)	<.001
Interactions		
Intimate × Urban	.17% (.11%-.22%)	<.001
Intimate × Unemployed	.14% (.08%-.19%)	<.001
Intimate × Unknown Employment	.02% (−.04%-.08%)	.523

Notes: R^2 = .35. CI = confidence interval; ref. = reference.

nonintimate perpetrator and may explain why this pattern is similar to that found with intimate homicides.

The relationship between the cause of death and BAC is also revealing, because women who faced a firearm before they were killed were sober, whereas those killed with either sharp or blunt force were highly intoxicated at the time of their death. These data indicate that there are distinct sub-

groups of women who are murdered. The murder of women who were sober appears to be planned, because the weapon used requires more forethought. However, the higher BACs in the group killed by sharp objects or blunt force appear to be linked to a combination of levels of interpersonal violence prevalent in communities and the social nature of drinking.

Our results found that intimate partner homicide is associated with an increase in the odds of the victim having a high BAC at the time of death. Furthermore, unemployed victims had a higher median blood alcohol when killed by an intimate partner. This might suggest that unemployed women are at increased risk because they are more likely to be financially dependent and use alcohol as a means to cope with the violence in the relationship, making it more difficult to leave and exacerbating an already violent relationship. Research has shown that women in violent relationships are at increased risk of misusing substances (Campbell, 2002), and it has been proposed that women use alcohol as a consequence of the violence to cope with the fear, terror, pain, and anticipation of future attacks (Browne, 1997). It is clear that being intoxicated renders women unable to protect themselves, impairs their judgment, and therefore increases their vulnerability as easy targets for violence during arguments.

The study has also revealed some aspects of the social nature of alcohol use and the vulnerability that it creates for women. Heavy drinking and the increased risk of being killed in a public space would indicate that the pattern of alcohol use among murdered women differs in South Africa from that in the United States (Sharps et al., 2001). Heavy drinking in public spaces suggests that it is linked to the social norms of drinking. In South Africa, heavy drinking on weekends is socially accepted for both men and women and is viewed as recreational (Morojele et al., 2006). It is,

therefore, not surprising that being killed on weekends was associated with a high BAC at time of death. Given the social context of drinking, the concern is why others within the social setting do not intervene to prevent such killings or notice that the woman is too drunk to protect herself and help her to safety. It would appear, however, that heavy social drinking is an accepted norm and engaged in by many, resulting in a lack of response.

The pattern of excessive social drinking in South Africa poses a major public health problem and requires urgent attention. The World Health Assembly has recently adopted a resolution with the aim of developing a global strategy to reduce the harmful use of alcohol (World Health Assembly, 2008). Initiatives to reduce such harmful drinking should be in line with this global strategy. A comprehensive approach to address excessive drinking should take into account both societal and individual factors (Morojele et al., 2006; World Health Assembly, 2008). The approach should include the introduction of a national plan to reduce substance abuse with a focus on developing alternative recreational facilities, regulating the multitude of unlicensed liquor outlets, and educating the general population on the risks of excessive drinking (Parry et al., 2005). Shifting norms and perceptions of what is drunk, on serving intoxicated people in taverns, and deciding what and when is enough are the first steps in changing the culture around drinking. These steps are critical if we hope to shift patterns of excessive drinking in communities.

An important limitation to the study is that the data were gathered in a region known for its high level of alcohol consumption. The region, in this respect, is not strictly representative of South Africa. However, heavy drinking on weekends is a part of alcohol-consumption patterns throughout the country. Having said this, the findings may not be generalizable to all homicide victims in South Africa. Although the study shows a significant association between the perpetrator's problem alcohol use and the victim's elevated BAC at the time of the killing, the study was unable to measure the perpetrator's BAC at the time of the killing, because the data were obtained from police files.

Conclusions

This study shows that women who are killed have excessively high levels of alcohol at the time of their death. The pattern we observe in South Africa is different from what has been reported elsewhere. High levels of social drinking and its acceptance within South African society is a public health challenge. These risky drinking patterns among both women and men combined with high rates of intimate partner violence render women vulnerable, because it increases the likelihood that women will be unable to defend themselves or elude a possible attack. This study highlights the public health risk of excessive alcohol consumption, its relationship with intimate partner killings, and the need to introduce a comprehensive approach to change behavior and attitudes around drinking.

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