

# Association between alcohol use and femicide in South Africa during the COVID-19 pandemic: a cross-sectional study



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## Summary

**Background** Alcohol use has previously been associated with femicide, the most extreme form of gender-based violence, but research on femicide from low-income and middle-income countries is scarce. We aimed to examine the role of alcohol restrictions during South Africa's COVID-19 lockdowns on femicide rates in the country.

**Methods** In this cross-sectional study, we compared estimates of overall femicide, intimate partner femicide, and non-intimate partner femicide from two retrospective national surveys of female individuals aged 14 years and older killed in 2017 and during nine COVID-19 lockdown periods in 2020–21. Both surveys used multistage, stratified cluster sampling with mortuaries or medico-legal laboratories as the primary sampling unit. Sampling frames that listed all mortuaries operating in the country in each study year were developed and mortuaries were stratified by size on the basis of the number of autopsies they performed per year. Mortuary data were supplemented with investigative data extracted from police dockets during interviews with police members. Cases in which age and sex were unknown and in which the cause of death was undetermined were excluded from data collection. Linearisation was used to obtain robust variance estimators for parameter estimates. Female population estimates were derived from the Thembisa mathematical model to calculate age-standardised rates, and the WHO world standard population distribution was used to normalise weightings for age-standardised rate calculations. We used Poisson regression and incidence rate ratios (IRRs) with 95% CIs to compare femicide estimates for periods of complete and partial alcohol sales and curfews with periods of no restrictions and to compare data from corresponding calendar periods in 2017 and 2020–21.

**Findings** We found no evidence of a significant change in age-standardised rates of overall femicide between 2017 and 2020–21 (IRR 0.95, 95% CI 0.88–1.03). Our Poisson regression results for 2020–21 showed no evidence of a significant difference in the average number of overall femicide cases between the first two lockdown periods, both periods with no alcohol sales but differing curfew levels (1.16, 0.88–1.54), but we found a significant increase in the average number of cases between periods 2 and 3, when alcohol sale restrictions were relaxed (2.14, 1.70–2.69). When combining periods with similar alcohol and curfew restrictions, we found a significant decrease in overall femicide cases between periods of no restriction and periods of restricted alcohol sales and night and late-night curfews (0.57, 0.49–0.66). Similarly, the average number of femicide cases during the period with a complete ban on both movement and alcohol sales was 63% lower than during periods of no restriction (0.37, 0.30–0.47). A similar significant difference was observed for both cases of intimate partner femicide (0.39, 0.28–0.53) and non-intimate partner femicide (0.39, 0.27–0.55). This pattern was not seen during the corresponding calendar periods in 2017.

**Interpretation** The COVID-19 lockdown presented an opportunity to study the association between alcohol use and femicide in South Africa. We found a decrease in overall femicide, intimate partner femicide, and non-intimate partner femicide during periods of complete alcohol prohibition compared with periods of partial or no alcohol sale bans. This analysis supports alcohol use as a risk factor for severe gender-based violence and emphasises the importance of implementing evidence-based alcohol harm reduction interventions and policies as part of gender-based violence prevention strategies.

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## Introduction

Gender-based violence is globally recognised as an obstacle to international development.<sup>1</sup> Femicide, also referred to as the gender-related killing of women and girls, is the most severe form and outcome of gender-based

violence. Femicide is commonly referred to in terms of the perpetrator, with intimate partner femicide (ie, being killed by a current or ex-partner) being the most common type of femicide reported in all countries with documented records.<sup>2</sup> Non-intimate partner femicide refers to women

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### Research in context

#### Evidence before this study

Femicide, including intimate partner femicide, is an increasingly prevalent global public health and social concern that has received comparatively little research attention. Most research comes from high-income settings, with very little being known about femicide in low-income and middle-income countries. There is increasing evidence of alcohol use as a risk factor for intimate partner violence and strong evidence of the positive association between alcohol use and male-on-male violence, but it remains uncertain whether alcohol use is a risk factor for femicide. We performed a comprehensive literature review to identify research on alcohol use as a risk factor for femicide. Our search of PubMed and Scopus was limited to articles written in English and published in the past 20 years (ie, from Dec 31, 2003, to Dec 31, 2023). We found only five articles that looked at alcohol use as a risk factor for femicide. The first dedicated study on femicide (conducted across multiple cities in the USA) found that perpetrators with problematic alcohol or drug use were associated with a two-fold increased risk of femicide or attempted femicide. Since 2001, few dedicated femicide studies have been conducted, with most research relying on administrative data, in which alcohol use is often not recorded. Two systematic reviews of risk factors for femicide were published in the past 5 years. A 2020 meta-analysis from 17 studies found that perpetrator alcohol and drug use increased the risk of intimate partner femicide perpetration by 85%. The second, a review published in 2022, included a

synthesis of 24 studies (mainly from high-income settings), with only five studies identifying alcohol use as a risk factor for femicide.

#### Added value of this study

The COVID-19 pandemic provided us with an opportunity to explore the association between alcohol use and femicide in South Africa. The value of this cross-sectional study lies in our ability to track femicide over periods of alcohol and curfew restrictions during the country's lockdowns. Our results show that there was a 63% decrease in femicide overall and a 61% reduction in intimate partner femicide during periods with complete alcohol bans.

#### Implications of all the available evidence

This study provides important information on alcohol use as a risk factor for femicide in South Africa, a country in which both gender-based violence and alcohol use are prevalent. Our findings underscore the need to acknowledge the role of alcohol in intimate partner violence and address alcohol use in prevention interventions. They also support the value of conducting dedicated femicide studies in countries with poor administrative data to track changes in both femicide and its associated risk factors over time. Risk factor research on femicide is scarce and the results of this study will be of value to gender-based violence prevention programmes and South African policy makers.

and girls being killed by perpetrators who are not or have not been their intimate partners. A systematic review published in 2013 concluded that 13.5% of all homicides globally were committed by intimate partners, with women being six-times more likely to be affected than men.<sup>3</sup> The UN Office on Drugs and Crime identified 47 000 gender-related killings of women and girls by intimate partners or family members in 2021 (58% of female murders globally) and concluded that this number showed a femicide rate of 1.2 killings per 100 000 population.<sup>2</sup> In South Africa, the 2017 national femicide study,<sup>4</sup> which is based on primary research, reported an intimate partner femicide rate of 4.6 killings per 100 000 population (excluding murders by family members). This rate was the highest ever recorded globally.

An increasing body of research has shown perpetrator alcohol use to be a risk factor for intimate partner violence, with evidence that alcohol use increases the severity of experiences of intimate partner violence.<sup>5,6</sup> However, not much is known about the role of alcohol use in femicide and findings are conflicting. In 2001, a well designed case-control study in the USA<sup>7</sup> found a two-fold increase in the risk of femicide or attempted femicide associated with perpetrators' problematic drinking, and a meta-analysis of 17 studies<sup>8</sup> published in 2020 attributed an 85% increased risk of intimate

partner femicide perpetration to perpetrator's alcohol and drug use.<sup>8</sup> However a second review paper, conducted in 2022 with 24 studies from high-income settings, reported that alcohol use was identified as a risk factor for femicide in only five studies.<sup>9</sup> Risk of intimate partner femicide might increase when both the victim and the perpetrator use alcohol, but the US case-control study did not report an association between victim alcohol use and the risk of femicide, and this association has not been investigated elsewhere.<sup>7,9</sup>

South Africa is one of few countries that implemented a ban on alcohol sales during its COVID-19 restrictions (in addition to introducing social distancing measures, stay-at-home curfews, and school, restaurant, and bar closures; halting non-essential economic activities; and banning sport and social activities). This strategy was based on strong evidence supporting alcohol use as a risk factor for injury and interpersonal violence both globally and in South Africa.<sup>10</sup> The South African Government initiated a public health emergency approach to decrease the number of people seeking health-care services for injuries to ease pressure on health services responding to the pandemic.<sup>11</sup> This action sparked concerns that unanticipated consequences of the country's lockdown measures might include an increase in gender-based violence.<sup>12</sup>

The aim of this study was to describe the role of South Africa's lockdowns and alcohol restrictions on femicide during the first year of the COVID-19 pandemic (ie, 2020–21) and to compare rates of overall femicide, intimate partner femicide, and non-intimate partner femicide both across lockdown periods and between 2017 and 2020–21.

## Methods

### Study design and participants

We conducted a femicide survey in 2020–21, the fourth in a series of national femicide surveys conducted in South Africa over approximately 20 years (1999–2017).<sup>4</sup> This survey spanned the first year of the COVID-19 pandemic in South Africa (from April 1, 2020, to March 31, 2021) and provided an opportunity to compare rates of intimate partner femicide and non-intimate partner femicide with the earlier 2017 survey.

The definitions of femicide and the two subtypes of femicide (ie, intimate partner and non-intimate partner femicide) that are reported in this cross-sectional study are included in the appendix (p 2). The 2017 and 2020–21 surveys had similar study designs. Both surveys were retrospective national surveys of murders of female individuals aged 14 years and older and both used multistage, stratified cluster sampling with mortuaries or medico-legal laboratories as the primary sampling unit. We chose 14 years as the age cutoff because our primary interest was in women killed by intimate partners, and intimate relations commonly start from approximately age 14 years in South Africa. Ethical approval was granted by the ethics committee of the South African Medical Research Council (EC 008–5-2018) and approval for access to data was obtained from the South African Police Service.

### Procedures

Sampling frames were developed that listed all mortuaries operating in the country in each study year. The mortuaries were stratified by size on the basis of the number of autopsies performed per year. A similar sampling fraction was drawn in both surveys (appendix p 2). Mortuary records were the primary data source. These data were supplemented with investigative data extracted from police dockets during interviews with police members. Data from medico-legal laboratories were considered the best source of murder data as the South African Inquests Act 58 of 1959 states that all cases of unnatural deaths must undergo post-mortem examination.<sup>13</sup>

The same research team collected the data in both studies. At the sampled medico-legal mortuaries, we identified female individuals (according to the sex recorded in the autopsy reports) aged 14 years and older who had been registered with deaths attributed to murder between Jan 1 and Dec 31, 2017, and between April 1, 2020, and March 31, 2021. We collected data from the mortuary

register and autopsy reports for each case, including the victim's age, cause of death (stab, gunshot, blunt force, etc), national identity document number, South African Police Service (SAPS) Crime Administration System number, and police station. We also recorded evidence of sexual assault (ie, the presence of genital injuries, a completed sexual assault evidence kit, or reports that the victim's underwear had been removed or displaced). We excluded cases in which age and sex were unknown and in which the cause of death was undetermined.

We used the victims' Crime Administration System and national identity document numbers to link each death with a police investigation. Further details of our police interviews are presented in the appendix (p 3). We waited a minimum of 2 years after each murder was registered before starting police data collection to ensure enough time for legal cases to be concluded. The police data collection for femicide cases perpetrated in 2017 started in April, 2020, and ended in November, 2021. Police data collection for the 2020–21 femicide cases started in April, 2022, and ended in June, 2023. We used Research Electronic Data Capture for the 2017 survey and Kobotools for the 2020–21 survey—both web-based data entry tools.

See Online for appendix

### Statistical analysis

Data management and analysis were done in Microsoft Excel and Stata 17. The analysis considered the survey designs, with weights applied to account for the selection probabilities of mortuaries within survey strata on the basis of stratification by mortuary size, province, and sample realisation. Selection probabilities were based on the number of mortuaries randomly selected in each stratum compared with the total number of facilities in that stratum. The formulas for the weight calculations are shown in the appendix (p 4).

We considered the two studies as independent surveys due to the time separation between 2017 and 2020–21 and so used independent sampling procedures. Linearisation was used to obtain robust variance estimators for parameter estimates. Female population estimates were derived from the Thembisa mathematical model to calculate age-standardised rates, and the WHO world standard population distribution was used to normalise weightings for age-standardised rate calculations.<sup>14</sup> The hot deck multiple imputation procedure (appendix p 4) was used to account for missing perpetrator information not identified by police (appendix p 10).<sup>15</sup> We present both overall femicide and non-intimate partner femicide statistics. All summarised data (with weighted counts and percentages, and estimated age-standardised rates for overall femicide and within femicide subgroups [intimate partner femicide and non-intimate partner femicide]) in 2017 and 2020–21 are provided in the appendix (p 10). We calculated incidence rate ratios (IRRs) and their respective 95% CIs to compare the two studies. The standard errors for the age-standardised rates and IRRs took into account the

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design effects of each survey (appendix p 5). The analysis of the association between alcohol availability and curfew restrictions (ie, social movement) and the volume of femicide cases took into account the five South African lockdown alert levels. Poisson regression models were used to compare consecutive restriction periods and different levels of restriction with periods of no restrictions. The same models were applied to the 2017 data and used to compare data from corresponding calendar periods in 2020–21. We used IRRs and their respective CIs and p values to compare consecutive restriction periods (and different restriction periods) with periods of no restrictions (appendix p 6).

#### Role of the funding source

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

## Results

An overview of South Africa's COVID-19 lockdown levels, alcohol sales restrictions, and curfew periods between March 27, 2020, and May 30, 2021 is provided in table 1. The weighted estimates for the number of murdered women aged 14 years and older for the two studies are presented in table 2 and the appendix (p 10). From cases identified at medico-legal laboratories, we estimated that there were 2409 (95% CI 2256–2561) femicide cases in 2020–21, which is similar to the 2017 estimate of 2407 (2204–2610). SAPS could not trace 8.6% of the 2020–21 cases identified at medico-legal laboratories in their administrative system, which was lower than 15.7% of 2017 cases that could not be traced. SAPS were unable to identify perpetrators for 44.2% of the 2020–21 cases, compared with 30.0% of the 2017 cases (appendix p 10).

Lockdown period	Duration	Lockdown level	Alcohol restrictions <sup>6,17</sup>	Curfew restrictions <sup>16,17</sup>	
March 27–April 30, 2020	1	5 weeks	Level 5	Complete ban on sale of alcohol	Stay-at-home curfew: people confined to their place of residence; only allowed outside for essential purposes; only essential travel allowed; businesses and other entities ceased operations; no interprovincial travel allowed; and national borders closed
May 1–May 31, 2020	2	5 weeks and 2 days	Level 4	Complete ban on sale of alcohol	Night-time curfew: people confined to their place of residence from 2000 h to 0400 h; closing time for places permitted to be operational was 2000 h; exercise allowed 5 km within radius of home; no international travel allowed; all gatherings prohibited (except for funerals, being at the workplace, or when obtaining goods or services); and part re-opening of borders
June 1–July 12, 2020	3	6 weeks	Level 3	Alcohol sales permitted with conditions: off-site sale and consumption permitted 1000–1800 h Monday to Thursday; and sale for on-site consumption permitted until 2000 h	Night-time curfew: people confined to their place of residence from 2200 h to 0400 h; closing time for establishments was 2100 h (including cinemas, theatres, casinos, museums, public swimming pools, beaches, public parks, zoos, restaurants, bars and taverns, religious buildings, and buildings for social and political gatherings); take-away restaurants and online food delivery allowed; interprovincial travel permitted; part re-opening of borders; night clubs remained closed to the public; bus and taxi services were not permitted to carry more than 70% of their licensed capacity for long distance travel (ie, ≥200 km); and schools re-opened
July 13–Aug 17, 2020	4	4 weeks and 3 days	Level 3 (modified)	Complete ban on sale of alcohol	Night-time curfew: people confined to their place of residence from 2200 h to 0400 h; closing time for establishments was 2100 h (including cinemas, theatres, casinos, museums, public swimming pools, beaches, public parks, zoos, restaurants, bars and taverns, religious buildings, and buildings for social and political gatherings); take-away restaurants and online food delivery allowed; interprovincial travel permitted; part re-opening of borders; night clubs remained closed to the public; bus and taxi services were not permitted to carry more than 70% of their licensed capacity for long distance travel (ie, ≥200 km); and schools remained open
Aug 18–Sept 20, 2020	5	4 weeks and 5 days	Level 2	Alcohol sales permitted with conditions: off-site sale and consumption permitted 1000–1800 h Monday to Thursday; and sale for on-site consumption permitted until 2200 h	Late-night curfew: people confined to their place of residence from 2300 h to 0400 h; closing time for establishments was 2200 h (including cinemas, theatres, casinos, museums, public swimming pools, beaches, public parks, zoos, restaurants, bars and taverns, religious buildings, and buildings for social and political gatherings); interprovincial travel permitted; night clubs remained closed
Sept 21–Dec 28, 2020	6	14 weeks	Level 1	Alcohol sales permitted with conditions; licensed alcohol establishments could operate beyond 2300 h	Late-night curfew: as above, but traditional initiation practices and celebrations were permitted
Dec 29, 2020–Jan 31, 2021	7	4 weeks and 5 days	Level 3 (modified)	Complete ban on sale of alcohol	Night-time curfew: people confined to their place of residence from 2100 h to 0600 h; closing time for restaurants was 2000 h; beaches, night clubs, and bars remained closed
Feb 1–28, 2021	8	4 weeks	Level 3 (modified)	Alcohol sales permitted with conditions as per level 1	Late-night curfew: returned to level 1 conditions
March 1–May 30, 2021	9	13 weeks	Level 1	Subject to usual laws	Curfew lifted

Table 1: South African COVID-19 lockdown levels, alcohol sales restrictions, and curfew periods between March 27, 2020, and May 30, 2021

Table 2 also shows the age-standardised rates for overall femicide, intimate partner femicide, and non-intimate partner femicide, and the IRRs of rate estimates per 100 000 population (comparing 2020–21 with 2017). There was no evidence of a significant change in overall femicide between the two time periods (IRR 0.95, 95% CI 0.88–1.03). We found an increase in the age-standardised rates for intimate partner femicide between 2017 and 2020–21 (table 2); however, this increase was not statistically significant (IRR 1.12, 95% CI 1.00–1.26). The age-standardised rates for non-intimate partner femicide were similar across the two surveys (table 2). There was an increase in firearm-related femicide overall, and for firearm-related cases of both intimate partner femicide and non-intimate partner femicide (table 2). There was a significant increase in sexual femicides in 2020–21 relative to 2017, particularly for cases of intimate partner femicide (table 2).

The figure shows the estimated cases of intimate partner femicide over the 2020–21 study period, overlaying cases from the corresponding calendar

periods in 2017. The 2020–21 findings show an initially low level of both overall femicide and intimate partner femicide compared with 2017, corresponding to the period of alcohol sales bans (appendix [p 11] for overall femicide and appendix [p 12] for non-intimate partner femicide). Thereafter, cases of both overall femicide and intimate partner femicide increased, as alcohol sales and movement restrictions relaxed, whereas no major changes in case numbers were observed in the corresponding calendar periods of 2017. The same patterns were seen for non-intimate partner femicide (appendix p 12).

This pattern is also shown in the results of the Poisson regression models (table 3). We found no evidence of a significant difference in the average number of overall femicide cases between the first and second months (ie, period 1 and period 2) in 2020–21, both periods with no alcohol sales but differing curfew levels (table 1). There was a significant increase in the average number of cases between periods 2 and 3, when alcohol sale restrictions were relaxed. A decrease was seen between periods 3 and 4, with the next alcohol sales ban.

	2020–21*			2017†			IRR of 2020–21 vs 2017 rate estimates (95% CI)
	N (95% CI)	Percentage (95% CI)	Rate per 100 000 population (95% CI)	N (95% CI)	Percentage (95% CI)	Rate per 100 000 population (95% CI)	
<b>Overall</b>							
All femicide	2409 (2256–2561)	..	10.6 (9.7–11.5)	2407 (2204–2610)	..	11.1 (9.8–12.4)	0.95 (0.88–1.03)
Intimate partner femicide	1253 (1136–1369)	57.5% (53.4–61.7)‡	5.5 (4.7–6.2)	1089 (969–1209)	55.0% (51.6–58.4)‡	4.9 (4.1–5.8)	1.12 (1.00–1.26)
Non-intimate partner femicide	924 (824–1024)	42.5% (38.3–46.6)‡	4.1 (3.4–4.8)	890 (805–976)	45.0% (41.6–48.4)‡	4.2 (3.4–4.9)	0.98 (0.86–1.11)
<b>Firearm</b>							
All femicide	897 (807–987)	37.3% (35.1–39.6)‡	4.0 (3.4–4.5)	563 (506–621)	23.4% (22.2–24.7)‡	2.6 (2.1–3.1)	1.54 (1.33–1.78)
Intimate partner femicide	438 (369–507)	34.9% (31.6–38.3)§	1.9 (1.4–2.5)	215 (174–256)	19.8% (16.6–22.9)§	1.0 (0.6–1.4)	1.90 (1.51–2.38)
Non-intimate partner femicide	355 (289–415)	38.1% (34.2–42.0)¶	1.6 (1.2–2.0)	213 (176–251)	24.0% (21.0–26.9)¶	1.0 (0.7–1.3)	1.60 (1.26–2.03)
<b>Stabbing</b>							
All femicide	743 (678–808)	30.9% (28.9–33.0)‡	3.3 (2.8–3.7)	897 (791–1004)	37.6% (35.8–39.4)‡	4.1 (3.4–4.8)	0.80 (0.70–0.92)
Intimate partner femicide	388 (336–441)	31.0% (27.8–34.2)§	1.7 (1.3–2.0)	423 (357–488)	38.9% (35.5–42.3)§	1.9 (1.4–2.4)	0.89 (0.74–1.08)
Non-intimate partner femicide	307 (274–339)	33.2% (29.9–36.5)¶	1.4 (1.1–1.7)	331 (290–373)	37.2% (33.5–40.9)¶	1.5 (1.1–2.0)	0.93 (0.75–1.16)
<b>Blunt force</b>							
All femicide	472 (441–502)	19.6% (18.7–20.6)†	2.1 (1.8–2.4)	501 (452–549)	20.8% (19.3–22.3)†	2.3 (1.9–2.8)	0.91 (0.77–1.09)
Intimate partner femicide	277 (248–307)	22.2% (20.0–24.3)§	1.2 (0.9–1.5)	249 (210–288)	24.6% (21.6–27.5)§	1.1 (0.8–1.4)	1.09 (0.86–1.38)
Non-intimate partner femicide	147 (119–174)	15.9% (13.5–18.2)¶	0.7 (0.4–0.9)	161 (130–193)	16.7% (13.6–19.7)¶	0.8 (0.5–1.0)	0.88 (0.64–1.19)
<b>Sexual femicide</b>							
All femicide	333 (286–380)	16.3% (14.5–18.3)	1.5 (1.1–1.8)	210 (176–244)	8.7% (7.1–10.6)	1.0 (0.7–1.2)	1.50 (1.18–1.91)
Intimate partner femicide	190 (151–228)	15.3% (13.5–19.1)**	0.8 (0.6–1.1)	33 (20–46)	4.9% (3.3–6.5)**	0.1 (0.0–0.2)	8.00 (4.79–13.4)
Non-intimate partner femicide	144 (115–172)	16.3% (13.3–19.3)††	0.6 (0.4–0.9)	128 (99–156)	12.1% (8.8–15.4)††	0.6 (0.4–0.8)	1.00 (0.72–1.39)

2017 female population estimates: 21 520 499 overall; 7 872 159 aged 14–29 years; 6 459 190 aged 30–44 years; 4 195 543 aged 45–59 years; and 2 993 607 aged 60 years and older. 2020–21 female population estimates: 22 551 381 overall; 7 809 187 aged 14–29 years; 6 944 862 aged 30–44 years; 4 478 441 aged 45–59 years; and 3 318 891 aged 60 years and older. IRR=incidence rate ratio. \*Overall unweighted N=1441; and overall weighted N=2409. †Overall unweighted N=1301, and overall weighted N=2407. ‡The denominator is the overall number of femicide cases (N=2409 for 2020–21; N=2407 for 2017). §The denominator is the overall number of intimate partner femicide cases (N=1253 for 2020–21; N=1089 for 2017). ¶The denominator is the overall number of non-intimate partner femicide cases (N=924 for 2020–21; N=890 for 2017). ||The denominator is the number of femicide cases (N=2043 for 2020–21; N=2407 for 2017); for 2020–21, the denominator excludes cases with missing data on sexual femicide. \*\*The denominator is the number of intimate partner femicide cases (N=1163 for 2020–21; N=890 for 2017); for 2020–21, the denominator excludes cases with missing data on sexual femicide. ††The denominator is the overall number of non-intimate partner femicide cases (N=880 for 2020–21; N=890 for 2017); for 2020–21, the denominator excludes cases with missing data on sexual femicide.

**Table 2: Age-standardised rates and IRRs for cases of all femicide, intimate partner femicide, and non-intimate partner femicide in 2017 and 2020–21**



Figure: Weekly number of cases of intimate partner femicide (weighted and imputed) in 2017 and 2020-21, grouped by alcohol and movement restriction levels

Thereafter, the average number of cases per 28 days increased between periods 4 and 5, when alcohol sales were relaxed under similar curfew conditions. These case numbers plateaued between periods 5 and 6, when restrictions were similar, then significantly declined between period 6 and period 7 (ie, during the last alcohol sale ban). When both curfew and alcohol sale restrictions were relaxed again (ie, in period 8), the number of average cases increased for overall femicide and both intimate partner femicide and non-intimate partner femicide. In contrast, we found no evidence of differences in the number of average cases between corresponding calendar periods in 2017, except for the post-Christmas holiday period (ie, period 7), which had significantly fewer cases than in the previous few months (ie, period 6). Similar patterns were seen with the non-imputed data (appendix pp 13–14).

We combined periods with similar alcohol and curfew restrictions and compared the average number of cases per 28 days for these periods with the average number of cases in the period of no restrictions (table 4). The average number of cases declined as restrictions in curfew and alcohol sales became more stringent. There was a significant decrease in overall femicide cases between periods of no restriction and periods of restricted alcohol sales and late-night curfews (table 4). Similarly, the average number of femicide cases during the period with a complete ban on both movement and alcohol sales was 63% lower than during the period of no restriction (table 4). A similar significant difference was observed

for cases of intimate partner femicide (table 4). This pattern was not seen during the corresponding calendar periods in 2017 (table 4). When significant differences were found between periods in 2017, there was an increase in the average number of cases relative to the periods corresponding to those of no restrictions rather than a decrease. Non-imputed data showed similar patterns (appendix p 15).

### Discussion

This is the first study to report an association between alcohol use and femicide in a low-income or middle-income country. We found a 63% decrease in overall femicide during 2020–21 periods of complete alcohol bans relative to periods of no restrictions, whereas no significant difference was found for periods when alcohol sales were less restricted. Curfews in relation to people’s movement should also be considered, but the so-called stay-at-home curfew was only enforced in the first 5 weeks of the restriction period, after which nighttime-only curfews came into effect. Thus, the second and third complete alcohol ban periods were accompanied by night-time curfew restrictions, yet our findings show there was still a significant decrease in rates of intimate partner femicide in these periods. Furthermore, our results show an increase in all forms of femicide coinciding with the relaxing of alcohol sales (when the movement curfew remained unchanged), supporting the positive association seen between alcohol consumption and femicide. We found no major changes in the number

Lockdown level	Number of weeks	2020–21				Corresponding period in 2017				
		Total cases (N)	Average number of cases per 28 days (95% CI)	IRR (95% CI)	p value	Total cases (N)	Average number of cases per 28 days (95% CI)	IRR (95%CI)	p value	
<b>All femicides</b>										
1	Level 5 (April 1–30)†	5	102	82 (68–95)	1 (ref)‡	..	270	216 (175, 257)	1 (ref)‡	..
2	Level 4 (May 1–30)†	4	95	95 (73–117)	1.16 (0.88–1.54)	0.29	192	192 (136–248)	0.89 (0.74–1.07)	0.21
3	Level 3 (June 1–July 12)	6	305	203 (178–229)	2.14 (1.70–2.69)	<0.0001	268	179 (137–220)	0.93 (0.77–1.12)	0.45
4	Modified level 3 (July 13– Aug 17)†	5	163	130 (110–150)	0.64 (0.53–0.78)	<0.0001	212	170 (135–204)	0.95 (0.79–1.14)	0.57
5	Level 2 (Aug 18–Sept 20)	5	312	250 (211–288)	1.91 (1.58–2.31)	<0.0001	211	169 (119–218)	1.00 (0.82–1.20)	0.96
6	Level 1 (Sept 21–Dec 28)	14	785	224 (198–251)	0.90 (0.79–1.02)	0.11	675	193 (152–233)	1.14 (0.98–1.33)	0.091
7	Level 3 (Dec 27–Jan 30)†	5	174	139 (91–187)	0.62 (0.53–0.73)	<0.0001	200	160 (68–252)	0.83 (0.71–0.97)	0.020
8	Level 3 (Jan 30–Feb 28)	4	199	199 (176–222)	1.43 (1.17–1.75)	0.0057	171	171 (130–212)	1.07 (0.87–1.31)	0.52
9	Level 1 (March 1–31)	5	273	218 (142–294)	1.10 (0.91–1.32)	0.32	199	159 (78–240)	0.93 (0.76–1.14)	0.49
<b>Intimate partner femicides</b>										
1	Level 5 (April 1–30)†	5	52	42 (35–48)	1 (ref)‡	..	143	114 (86–143)	1 (ref)‡	..
2	Level 4 (May 1–30)†	4	58	58 (40–76)	1.39 (0.96–2.03)	0.082	85	85 (44–126)	0.74 (0.57–0.97)	0.030
3	Level 3 (June 1–July 12)	6	141	94 (74–114)	1.62 (1.19–2.20)	0.0020	112	75 (65–85)	0.88 (0.66–1.16)	0.37
4	Modified level 3 (July 13– Aug 17)†	5	68	54 (38–70)	0.58 (0.43–0.77)	0.0021	115	92 (64–120)	1.23 (0.95–1.60)	0.12
5	Level 2 (Aug 18–Sept 20)	5	166	133 (109–157)	2.44 (1.84–3.24)	<0.0001	89	71 (57–86)	0.77 (0.59–1.02)	0.069
6	Level 1 (Sept 21–Dec 28)	14	413	118 (95–141)	0.89 (0.74–1.06)	0.20	299	85 (69–102)	1.20 (0.95–1.52)	0.13
7	Level 3 (Dec 27–Jan 30)†	5	100	80 (38–122)	0.68 (0.54–0.84)	0.0005	97	78 (33–122)	0.91 (0.72–1.14)	0.41
8	Level 3 (Jan 30–Feb 28)	4	117	117 (100–134)	1.46 (1.12–1.91)	0.0052	57	57 (48–66)	0.73 (0.53–1.02)	0.065
9	Level 1 (March 1–31)	5	135	108 (60–156)	0.92 (0.72–1.18)	0.53	80	64 (34–94)	1.12 (0.80–1.58)	0.50
<b>Non-intimate partner femicides</b>										
1	Level 5 (April 1–30)†	5	43	34 (25–44)	1 (ref)‡	..	88	70 (54–86)	1 (ref)‡	..
2	Level 4 (May 1–30)†	4	33	33 (25–41)	0.96 (0.61–1.51)	0.86	75	75 (36–114)	1.07 (0.78–1.45)	0.69
3	Level 3 (June 1–July 12)	6	137	91 (83–100)	2.77 (1.89–4.05)	<0.0001	121	81 (58–103)	1.08 (0.81–1.43)	0.62
4	Modified level 3 (July 13– Aug 17)†	5	76	61 (44–78)	0.67 (0.50–0.88)	0.0044	72	58 (42–74)	0.71 (0.53–0.96)	0.024
5	Level 2 (Aug 18–Sept 20)	5	113	90 (70–110)	1.49 (1.11–1.99)	0.0075	77	62 (42–81)	1.07 (0.78–1.47)	0.68
6	Level 1 (Sept 21–Dec 28)	14	291	83 (73–93)	0.92 (0.74–1.14)	0.45	257	73 (50–97)	1.19 (0.92–1.54)	0.18
7	Level 3 (Dec 27–Jan 30)†	5	56	45 (34–56)	0.54 (0.40–0.72)	<0.0001	72	58 (27–88)	0.78 (0.60–1.02)	0.069
8	Level 3 (Jan 30–Feb 28)	4	65	65 (50–80)	1.45 (1.01–2.07)	0.041	52	52 (28–76)	0.90 (0.63–1.29)	0.57
9	Level 1 (March 1–31)	5	111	89 (60–118)	1.37 (1.01–1.86)	0.046	63	50 (18–82)	0.97 (0.67–1.40)	0.87

IRR=income rate ratio. \*These periods correspond to different alcohol and movement restrictions (table 1). †Periods with a complete ban on the sale of alcohol. ‡IRRs are for eight comparisons of sequential COVID-19 restriction levels (ie, period 1 vs period 2, period 2 vs period 3, period 3 vs period 4, period 4 vs period 5, period 5 vs period 6, period 6 vs period 7, period 7 vs period 8, and period 8 vs period 9). The comparisons for 2017 follow corresponding calendar dates for the restrictions.

**Table 3: Poisson regression model comparisons of femicide, intimate partner femicide, and non-intimate partner femicide rates per 28 days for sequential COVID-19 restriction levels in 2020–21 and nine corresponding calendar periods\* in the 2017 survey**

of femicide cases across corresponding calendar periods in 2017.

At the start of the pandemic, many individuals were concerned about the unprecedented consequences of lockdown restrictions for women and children.<sup>18</sup> Known drivers of intimate partner violence were exacerbated during the COVID-19 pandemic as economic stress escalated, women's economic dependency on partners increased, children were confined to the home, support systems were undermined, and mental health worsened, driven by fear and grief. A systematic review of gender-based violence during the COVID-19 pandemic<sup>19</sup> reported a moderate-to-strong increase in gender-based violence, mainly on the basis of service-level data from high-income

settings.<sup>19</sup> Only a few South African studies reported on gender-based violence during the pandemic.<sup>20–22</sup> These showed an initial drop in the number of individuals reporting to police, shelters, and hotlines, but whether these trends simply reflected the lockdown restrictions or women's actual experiences remains unclear.<sup>20</sup>

We considered whether reduced social contact and little social support might have influenced femicide rates. We acknowledge that widespread depression was caused by the COVID-19 pandemic's social and economic disruption, and that emotional dysregulation (at times expressed in depressed or alternatively dysregulated behaviour) was seen when lockdowns were lifted.<sup>23</sup> Much of this behaviour shared a common pathway through

	Number of weeks	2020–21				Corresponding calendar period in 2017			
		Total cases (N)	Average number of cases per 28 days (95% CI)	IRR (95% CI)	p value	Total cases (N)	Average number of cases per 28 days (95% CI)	IRR (95% CI)	p value
<b>All femicide</b>									
No restrictions	5	273	218 (142–294)	1 (ref)*	..	199	159 (78–240)	1 (ref)*	..
Restricted alcohol sales and late-night curfew	23	1296	225 (206–245)	1.03 (0.91–1.18)	0.64	1057	184 (156–211)	1.15 (0.99–1.34)	0.063
Restricted alcohol sales and night-time curfew	6	305	203 (178–229)	0.93 (0.79–1.10)	0.39	268	179 (137–220)	1.12 (0.93–1.35)	0.22
No alcohol sales and night-time curfew	14	432	123 (103–144)	0.57 (0.49–0.66)	<0.0001	604	173 (136–209)	1.08 (0.92–1.27)	0.32
No alcohol sales and stay-at-home curfew	5	102	82 (68–95)	0.37 (0.30–0.47)	<0.0001	270	216 (175–257)	1.36 (1.13–1.63)	0.0011
<b>Intimate partner femicide</b>									
No restrictions	5	135	108 (60–156)	1 (ref)*	..	80	64 (34–94)	1 (ref)*	..
Restricted alcohol sales and late-night curfew	23	696	121 (106–136)	1.12 (0.93–1.35)	0.23	445	77 (66–89)	1.21 (0.95–1.53)	0.12
Restricted alcohol sales and night-time curfew	6	141	94 (74–114)	0.87 (0.69–1.10)	0.25	112	75 (65–85)	1.17 (0.88–1.55)	0.29
No alcohol sales and night-time curfew	14	226	65 (48–81)	0.60 (0.48–0.74)	<0.0001	297	85 (64–105)	1.33 (1.04–1.70)	0.025
No alcohol sales and stay-at-home curfew	5	52	42 (35–48)	0.39 (0.28–0.53)	<0.0001	143	114 (86–143)	1.79 (1.36–2.35)	<0.0001
<b>Non-intimate partner femicide</b>									
No restrictions	5	111	89 (60–118)	1 (ref)*	..	63	50 (18–82)	1 (ref)*	..
Restricted alcohol sales and late-night curfew	23	469	82 (73–90)	0.92 (0.75–1.13)	0.42	386	67 (51–83)	1.33 (1.02–1.74)	0.035
Restricted alcohol sales and night-time curfew	6	137	91 (83–100)	1.03 (0.80–1.32)	0.83	121	81 (58–103)	1.60 (1.18–2.17)	0.0025
No alcohol sales and night-time curfew	14	165	47 (38–57)	0.53 (0.42–0.68)	<0.0001	219	63 (47–78)	1.24 (0.94–1.64)	0.13
No alcohol sales and stay-at-home curfew	5	43	34 (25–44)	0.39 (0.27–0.55)	<0.0001	88	70 (54–86)	1.40 (1.01–1.93)	0.043

IRR=incidence rate ratio. \*All curfew and alcohol restriction periods compared with the no restrictions period.

**Table 4: Poisson regression model comparisons of all femicide, intimate partner femicide, and non-intimate partner femicide rates per 28 days for different COVID-19 restrictions**

heavy alcohol consumption. These dynamics were also likely to have contributed to the increase in intimate partner femicide observed when alcohol bans were lifted.

We also considered policing as a confounding factor and whether the decrease in femicide rates could be accounted for by the change in visibility of the police. In South Africa, the military were deployed to assist the police in enforcing pandemic lockdown measures (particularly curfews in urban and lower socioeconomic areas), but their presence and visibility was at best sporadic. Their presence might have deterred interpersonal violence in the small number of communities in which the military were deployed—but this accounts for only a small number of communities. Our study team collected the 2017 data during the COVID-19 period and often found police members not available for interviews because they were ill and police stations closed as part of infection control measures. Our perception was that policing might have decreased during the COVID-19 period rather than increased.<sup>24</sup> Further evidence of poor policing is shown by the decline in police investigations over the COVID-19 year, evidenced by the increase in the number of cases with no identified perpetrators.

The relationship between heavy alcohol use and aggressive behaviour is well established in studies of male-on-male violence, but in the field of gender-based violence, alcohol use has been problematised within prevention discourse because of a fear of reducing individual culpability for acts of violence.<sup>5</sup> Our study shows that this caution around naming alcohol use as a risk factor for intimate partner violence is no longer appropriate. Any further hesitation in referring to alcohol use as a major risk factor for intimate partner femicide and intimate partner violence is a barrier to effective prevention work.

Our findings from the COVID-19 period confirm women's previously reported assertions that their risk of abuse increases as their abusers' alcohol use increases.<sup>6</sup> Regulating alcohol availability is a key violence prevention intervention, with some evidence of effect.<sup>25</sup> Despite the decrease in intimate partner femicide observed during South Africa's alcohol bans, when looking at the full year, we found an increase, albeit not statistically significant, in the age-standardised rates of intimate partner femicide. We also found a significant increase in sexual intimate partner femicide and in firearm-related femicide during 2020–21 compared with 2017. The same pattern of

increasing overall murder among men was not observed, which confirms the gender-specific nature of the increased risk for women during the pandemic.<sup>26</sup>

Our findings are in contrast to those from previous research on gender-related killings during COVID-19. A 2022 UN report concluded that murders that occurred in the home were driven by family members and not intimate partners,<sup>27</sup> and a study of intimate partner femicide in six Spanish-speaking countries comparing data from 2017 with data from 2020 found no change in femicide during the COVID-19 period.<sup>28</sup> Furthermore, a review of administrative data from 105 mainly high-income countries, including data on both intimate partner femicide and murder by family members, found variability across countries and very little change during lockdown periods, compared with previous years.<sup>29</sup> South Africa appears to be among the few countries that observed an increase in intimate partner femicide during the COVID-19 pandemic.

We consider mortuary data to be the most reliable source for deaths from murder, but also acknowledge that they have limitations. Some murders might have been misclassified whereas others might have been labelled as natural or accidental deaths (and therefore not included in the study). In 2017, we investigated all undetermined deaths in the sample and found that very few were murders.<sup>4</sup> We also do not know the extent to which murders attributable to natural or accidental deaths occur in the country, but this rate would presumably have been similar across the two study years.

Another limitation is the absence of data on alcohol use by both victims and perpetrators in this study. Alcohol consumption during the COVID-19 period in South Africa can be gleaned from social media surveys. Two social media studies included data on illegal alcohol sales from unlicensed outlets and alcohol produced through home brewing.<sup>30,31</sup> The studies showed an overall reduction in alcohol consumption during the COVID-19 pandemic, but individuals with heavy, episodic alcohol use were reported to have increased their intake and found ways to access alcohol despite the bans.<sup>30,31</sup> These studies have their own limitations in that they are not representative of all alcohol users. However, similar findings from a systematic review<sup>32</sup> showed an overall decline in alcohol consumption during the pandemic. This review was largely based on data from high-income countries, but also suggested that individuals with heavy, episodic alcohol use continued to consume alcohol at the same rate.<sup>32</sup> Hoarding of alcohol might also have happened in preparation for lockdown periods, but only people with enough money could purchase alcohol in bulk, making this an option for the country's (very small) middle class only. Our study showed that even given some extent of home consumption of alcohol (supported by illegal sales, home brewing, and hoarding), a decrease in intimate and non-intimate partner femicide was still observed during the ban periods, which could not be

explained by curfew restrictions as these killings increased when the curfew remained unchanged but the alcohol ban was lifted.

The last limitation we would like to acknowledge is the fact that race, which (as a social construct) is an important risk factor for experiences of violence in South Africa, was not included in our analyses due to space constraints. In a previous analysis of three femicide surveys,<sup>4</sup> we showed that Coloured women had higher rates of all forms of femicide than any other racial group until 2017, when similar rates were seen among both Black and Coloured women.<sup>4</sup>

We used imputation to deal with missing data. This approach was strengthened by information from a large number of cases, but errors might have been introduced. The analysis of the non-imputed data is included in the appendix (pp 13–15). We also considered the role of missing data in our estimates. The strength of our analysis is in our use of an established and replicated primary data collection method and our non-reliance on administrative data.

South Africa has a high per-capita level of alcohol consumption among the population who drink.<sup>33</sup> The role of alcohol use in intimate partner femicide is likely to differ in countries where alcohol consumption is much less common, or banned, or where the volumes consumed are much lower.

The COVID-19 lockdown period has provided insights on the association between alcohol use and intimate partner femicide in South Africa. This study has shown that lower numbers of women were killed by intimate partners during the country's alcohol bans—a trend that was not explained by coinciding movement restrictions. Our findings suggest a relationship between alcohol use and intimate partner femicide in South Africa, where alcohol consumption is highly prevalent. Alcohol use must be recognised as a salient risk factor for femicide in South Africa, and policy interventions to prevent violence against women should embrace the need to reduce the very high alcohol consumption reported in the country.

#### Contributors

The conceptualisation of this Article and the data analysis were led by NA, EC, and RJ, with input from all other authors. Project implementation and management was led by NA and supported by BD and AK. Data curation was done by EC, SMh, CL, and AK. Formal analysis was done by EC, SMh, CL, NA, and RJ, with initial interpretation done by the same team. SMh, EC, AK, and NA accessed and verified the raw data. The original draft manuscript was written by NA, and all authors contributed to the writing, reviewing, and editing of the final manuscript. All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

#### Declaration of interests

We declare no competing interests.

#### Data sharing

Access to a de-identified dataset is available on reasonable request. Requests should be sent to the corresponding author for consideration. A period of 24 months after publication of these results should elapse before requests are made to allow the authors to publish substudies and further analyses.

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