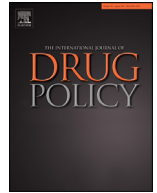




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## Research Paper

## Changes in retrospectively recalled alcohol use pre, during and post alcohol sales prohibition during COVID pandemic in Botswana

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## ABSTRACT

**Background:** The COVID-19 pandemic has seen the implementation of unprecedented legislation and policy, including drug control measures which in some countries, like Botswana, included a temporary full alcohol sales ban. However, the association of such absolute prohibition of alcohol sales on population drinking, including hazardous drinking, during the COVID-19 period has not yet been determined. This study investigated changes in retrospectively recalled alcohol use and hazardous drinking pre (prior 5th August 2020), during (5th August to 3rd September 2020) and post (after 4th September) the second alcohol sales ban in Botswana. Predictors of hazardous drinking across the three time points were also investigated.

**Methods:** An online cross-sectional study involving a convenience sample of 1318 adults with a past 12 months drinking history in Botswana was conducted in October 2020 following a month long alcohol sales prohibition. Participants completed a modified Alcohol Use Disorder Identification Test-Consumption (AUDIT-C) alongside demographic questions. Participants were expected to retrospectively recall their alcohol use pre, during and post the second alcohol sales ban.

**Results:** The prevalence of alcohol use among participants with a past 12 months drinking history was 91.7% (95%CI= 90.1–93.1) before the second ban, 62.3% (95%CI= 59.7–64.9) during the second ban, and 90.4% (95%CI= 88.7–91.8) after the ban. Hazardous drinking temporarily decreased by 30% during the second alcohol sales ban, and rose to the pre-ban levels of about 60% after the ban. Significant predictors of hazardous drinking at any of the three time points (pre, during and post the second ban) were being male (AOR ranging from 1.50 to 2.13 for all time points), earning between P3000-P6000 (AOR= 1.69 prior sales ban), being a student (AOR=0.56 during the sales ban), and being employed (AOR= 1.45 post the sales ban).

**Conclusion:** The alcohol sales ban was associated with short-lived changes in alcohol consumption and hazardous drinking thereby likely contributed in providing the anticipated and much needed temporary relief to the health system sought by COVID-19 pandemic measures.

## Introduction

Unprecedented legislation and policies have been implemented during this novel corona virus (COVID-19) pandemic in order to contain the infections and mortality. The increasing infections and the delays in accessing COVID-19 vaccines, especially put the economic and health systems of Low and Middle Income Countries (LMIC), like Botswana, under significant strain (Li Bassi, 2021). To mitigate this public health pandemic and its consequences, national lockdown measures to restrict non-essential movements and social gatherings have been enacted. As part of these measures, varying forms of restrictions on the sale of alcohol have been put in place in numerous countries (Rehm et al., 2020).

Some countries (e.g. Australia, China, Germany, the UK and USA) have restricted onsite alcohol sales but have allowed off-premise, online alcohol sales, and have even deemed alcohol to be essential (Reynolds & Wilkinson, 2020; Stockwell et al., 2021). These measures can be characterized as partial restrictions. Botswana is among countries like South Africa, Thailand, India, and Greenland which enacted a temporary absolute sales prohibition at some point during the pandemic. Various motives for the alcohol sales restrictions have been raised. The negative impact of alcohol on bacterial and viral immunity (Barr, Helms, Grant, & Messaoudi, 2016; Szabo & Saha, 2015), and the increased risk of respiratory conditions due to heavy alcohol use (Simou, Leonardi-Bee, & Britton, 2018) were among the initial reasons cited by health organisations (World Health Organisation, 2020) in advocating for the restriction in alcohol access. Concurrently, the burden to the health system associated with unintentional injuries from alcohol use was also posited to justify restrictions (Stockwell et al., 2021). This reasoning is not with-

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out relevant evidence as was shown by the decreases in casualty cases and weekly deaths during the absolute alcohol sales ban in South Africa during the COVID pandemic (Reuter, Jenkins, De Jong, Reid, & Vonk, 2020). The other argument advanced, especially in Botswana, was that alcohol consumption would make social distancing and other COVID-19 health protocols difficult to follow (Republic of Botswana, 2020; Stockwell et al., 2021). The success of these well-meaning alcohol control measures rests on their ability to impact alcohol use. Therefore, investigating changes in actual alcohol use following the control measures provides important feedback on their effectiveness and informs policies and interventions during this unique time and beyond.

Much of the available research on alcohol use during the COVID-19 pandemic is from countries which have enacted partial alcohol restrictions (e.g. closure of bars and nightclubs, ban of alcohol sales at restaurants, ban of on-premise alcohol use), and the results are not conclusive. Some studies have found decreases in varying indicators of alcohol consumption in China (Wang et al., 2020), Greece (Panagiotidis, Rantis, Holeva, Parlapani, & Diakogiannis, 2020), and Australia (Callinan et al., 2021) during their respective partial alcohol restrictions. Furthermore, the majority of people who drink in other countries such as the UK (Alcohol Change UK, 2020) and Germany (Koopmann, Georgiadou, Kiefer, & Hillemacher, 2020) are not drinking more alcohol than prior the pandemic during their bans of only on-site alcohol use. However, there is some indication based on studies in the USA of as high as 50% increases in national alcohol sales during the COVID-19 pandemic (The Nielsen Company, 2020), with 29% of people who drink alcohol believing that their drinking had increased (Capasso et al., 2021), and with harmful use and dependence increasing significantly during lockdown restrictions which included bans on onsite alcohol use (Killgore, Cloonan, Taylor, Lucas, & Dailey, 2021).

There is a dearth of research from countries which enacted stricter restrictions like absolute alcohol sales ban. The extant research, for example in Thailand, has found that changes in Thailand’s alcohol control measures from absolute sales ban to lifting of the ban were associated with decreases in number of people abstaining from using alcohol (Wichaidit, Sittisombut, Assanangkornchai, & Vichitkunakorn, 2021). Furthermore, despite an alcohol sales ban in Thailand, 15% and 30% of participants still reported witnessing alcohol sales and drinking in the community, respectively (Wichaidit et al., 2021). This available research suggests that some degree of restrictions in alcohol availability during the COVID-19 pandemic has some impact on alcohol use. While the available studies are instructive, the impact of stricter restrictions in the form of a total alcohol sales ban needs to be examined further. This study addresses this in the context of Botswana.

Botswana is a Southern African country with a population of about two million people (Statistics Botswana, 2015). Alcohol is the most used psychoactive substance in the country, as 30% of the population reports drinking in the past 12 months, and the majority of the people who drink alcohol binge drink (World Health Organization, 2018). Consequently, there has been a political will to enact strict alcohol control policies whose implementation and effectiveness has been questioned (Morojele, Dumbili, Obot, & Parry, 2021). For example, in 2008 the Government initially intended to introduce a 70% excise duty on imported or manufactured alcoholic beverages but settled at 30% (Pitso & Obot, 2011). This tax reached 55% in 2015 but was reduced to 35% in 2018 (Morojele et al., 2021). During the COVID pandemic, Botswana began restricting access to alcohol from March 20th, 2020, by closing on-premise alcohol sale outlets, including nightclubs. A week later, alcohol sales were totally prohibited even before the country registered a COVID case (see Fig. 1). This prohibition was further affirmed when a state of emergency was declared from 2nd April 2020. The first alcohol sales prohibition was effected for 67 days from 28th March to 2nd June 2020, while the second prohibition was enacted from 5th August to 3rd September 2020. It should be noted that from March 2020 and at the time of this current study, nightclubs remained closed. Anyone who contravened the prohibition regulations was liable to a fine of up to P100 000 (about \$9000.00) and/or up to five years imprisonment (Republic of Botswana, 2020).

While prohibition does limit availability of alcohol, alcohol use can persist, for example, through stockpiling of liquor prior the prohibition, home brewing, and through an illegal market. For example, in India, the implementation of the alcohol sales ban was associated with significant increases in internet searches for alternative access methods (Ghosh, e-Roub, Krishnan, Choudhury, & Basu, 2021). In Botswana, 1000 cases of illicit brewing and selling of alcohol were recorded by the police service in the first 28 days of the lockdown and the first prohibition (Motlhoka, 2020). Given these possibilities of continued alcohol use there is a need for an investigation of alcohol use prior, during and post prohibitions which will serve as a measure of policy effectiveness and guide further planning which also incorporates adequate drug rehabilitation services. This study aimed to address this need by specifically: 1. determining if there was a difference in retrospectively recalled alcohol use prior, during and post the second prohibition period (5th August to 3rd September 2020); 2. estimating the prevalence of, and determining the difference in, hazardous alcohol use prior, during, and post the second prohibition; 3. establishing the determinants of hazardous alcohol use prior, during, and post the second prohibition.



Fig. 1. Timeline of absolute alcohol sales bans, COVID cases, and survey period.

**Table 1**  
Prevalence of hazardous drinking across demographic characteristics of the sample (n = 1318).

	n (%)	Pre Ban Hazardous Drinking (n = 870) % (CI)	During Ban Hazardous Drinking (n = 466) % (CI)	Post Ban Hazardous Drinking (n = 788) % (CI)
Whole Sample	1318	66.0 (63.4–68.6)	35.4(32.8–38.0)	59.8(57.1–62.4)
Gender				
Female	552 (41.9)	56.5 (52.3–60.7)	29.0(25.2–33.0)	48.9 (44.7–53.2)
Male	766 (58.1)	72.8 (69.5–76.0)	39.9(36.5–43.5)	67.6 (64.2–70.9)
Employment Status				
Unemployed	252 (19.1)	62.3 (56.0–68.3)	39.6 (31.8–47.8)	54.8 (48.4–61.0)
Employed	840 (63.7)	71.2 (68.0–74.2)	43.3 (39.1–47.6)	63.8 (60.5–67.1)
Student	226 (17.1)	50.9 (44.2–57.6)	24.3 (17.2–33.2)	50.4(43.7–57.1)
Monthly Income Range				
<= P3000	660 (50.1)	59.1 (55.2–62.9)	35.6 (30.6–40.9)	56.1 (52.2–59.9)
P3001-P6000	129 (9.8)	76.0 (67.7–83.1)	41.9 (31.3–53.3)	63.6(54.6–71.9)
P6001-P9000	108 (8.2)	64.8 (55.0–73.8)	30.4 (20.8–42.1)	54.6 (44.8–64.2)
P9001-P12000	108 (8.2)	71.3 (61.8–79.6)	50.7 (39.2–62.2)	69.4 (59.8–77.9)
>P12000	313 (23.7)	75.1 (69.9–79.8)	45.6 (40.3–51.2)	64.5(59.0–69.8)
Relationship Status				
In Relationship	522 (39.6)	67.8 (63.7–71.7)	42.7 (38.5–47.0)	60.0 (55.7–64.1)
Not in relationship	796 (60.4)	64.8 (61.4–68.0)	38.1 (34.8–41.5)	59.7 (56.2–63.0)

## Methodology

### Design and procedure

A cross-sectional design utilizing an online survey method was used. Although a longitudinal design would have been ideal to assess the level of alcohol use across the three time points, the researchers could not have anticipated the change in the alcohol control policies whose impact we sought to determine. Thus, a cross-sectional design with questions requiring retrospective recall was used. Participants were required to recall their alcohol use pre (prior 5th August 2020), during (5th August to 3rd September 2020) and post (after 4th September) the second alcohol sales ban in Botswana (see Fig. 1 for the time-points).

The online questionnaire was hosted on the Research Electronic Data Capture (REDCap) and it ran for five weeks starting from 1st October 2020 (i.e. one month after lifting of the second alcohol sales prohibition which was from 5th August to 3rd September). REDCap is a secure web application for building and managing online surveys and databases developed by Vanderbilt University (Harris et al., 2009; Patridge & Bardin, 2018). The questionnaire was distributed on Facebook through a study-specific page and through a paid-partnership advertisement on a highly subscribed Facebook page in Botswana. An online survey was further selected given that almost half of the residents in Botswana have internet access (Statistics Botswana, 2018) with a significant number, particularly the youth, using social media (Afrobarometer, 2020). The majority of social media users are youth, who are more vulnerable to excessive alcohol use (World Health Organization, 2018) and alcohol use disorders (Stein et al., 2008). Therefore, the online questionnaire among others, enabled access to an at-risk group of the population. Only Botswana domiciled adults (18 years or older) with a history of alcohol use at any point in the past 12 months were eligible to participate in the study.

**Sampling Method & Sample Characteristics:** A convenience sampling method was used to select participants through Facebook. During the five-week duration of the survey, 2303 clicks were made to the Facebook advertisements. Of this number, 985 (42.8%) did not meet the inclusion criteria or did not fully complete the survey. The demographic characteristics of the final sample are presented in Table 1. The sample has a mean age of 31.1 years (SD= 8.6, range = 18–71), with 58.1% being male, 63.7% gainfully employed, and 60% earning less than P6000 monthly (P6000 -\$544- or more is a marker for Middle class; Republic of Botswana (2019)) In terms of relationship status, 60.4% were unmarried or not involved in any romantic relationship.

### Instruments

A fourteen item self-report questionnaire was used. Alcohol consumption across the three points was measured by a modified Alcohol Use Disorder Identification Test- Consumption (AUDIT-C, see Supplementary Table 1). The AUDIT-C is a three item validated measure of alcohol use based on frequency and quantity, and it can also be used to delineate hazardous use from normative use (Bush, 1998). The modifications for this proposed study were the insertion of time periods to all three items to fit the objectives of the study. These modifications alongside the original version of the tool are shown in Table 1. The three items are scored from 0 to 4 points, giving a possible score range of 0–12, where a total of 4 points or 5 points or more for females and males, respectively, can indicate hazardous alcohol use. In addition to the AUDIT-C, the following demographic variables were collected: age, gender (female or male), marital status (single, in a romantic relationship, married, divorced, widowed), employment status (unemployed, employed, self-employed, student, retired), and monthly income (Less than P3000, P3001 to P6000, P6001 to P9000, P9001 to P12 000, More than P12 000).

### Analysis

Data was extracted from REDCap and saved in the Statistical Package for Social Sciences- Version 27 (IBM Corp, 2020) for analysis. The prevalence of alcohol use and hazardous drinking were estimated together with their confidence intervals. The Friedman Test was computed to determine differences in alcohol consumption (total AUDIT-C score) across the three time points. The prevalence of hazardous alcohol use (AUDIT-C score of 4 and 5 or more for females and males, respectively) at the respective three time points was determined from frequency calculations with their associated confidence intervals. Cochran's Q Test was computed to determine differences in hazardous drinking at the three time points of interest (pre, during, and post prohibition). Post-hoc analyses (Wilcoxon signed-rank test and McNemar's Test) were conducted following the Friedman Test and Cochran's Q Test. To establish the determinants of hazardous drinking at the three time points, three multivariable logistical regression models were computed. Statistical significance was set at the 0.05 level, two tailed.

### Ethical considerations

This study received ethical clearance from the Republic of Botswana's Ministry of Health and Wellness (HPDME:13/18/1). An electronic page was presented to participants prior their participation. This

**Table 2**  
Predictors of hazardous drinking pre, during, and post sales prohibition in sample ( $n = 1318$ ).

Predictor	Pre Ban Hazardous Drinking		During Ban Hazardous Drinking		Post Ban Hazardous Drinking	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Gender (ref= Female)	1.92***	1.52–2.43	1.51***	1.19 –1.92	2.13***	1.69–2.68
Age	1.01	.99–1.03	1.01	.99–1.03	1.00	.98–1.01
Income <sup>b</sup> (ref= <P3000)						
P3000-P6000	1.69*	1.05–2.73	1.19	.77 –1.85	1.01	.65 –1.58
P6000-P9000	.91	.56–1.47	.65	.40 –1.07	.66	.41 –1.06
P9000-P12000	1.24	.75–2.04	1.41	.88 –2.25	1.25	.76–2.06
>=P12000	1.37	.91 –2.06	1.18	.81 –1.73	.97	.66 –1.44
Relationship <sup>a</sup> (ref= not in relationship)	1.01	.79 –1.29	.98	.77 –1.25	.95	.76–1.22
Employment (ref= unemployed)						
Employed	1.17	.81–1.68	1.25	.87 –1.81	1.45*	1.03 –2.10
Students	.06	.47 –1.02	.56*	.36 – 0.87	.85	.58 –1.25

Notes:

<sup>a</sup> Relationship status was computed by grouping those in relationships (married and in romantic relationships) and those not in relationships (single, divorced and widowed).

<sup>b</sup> In Pula (currency in Botswana). \$1 = +- P11\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

page outlined the purpose of the study and ethical considerations including the voluntary nature of the study, the opportunity to withdraw at any time during the course of the administration, and steps taken to maintain participants' confidentiality. Compliance with the Declaration of Helsinki ([World Medical Association Declaration of Helsinki, 2013](#)) was ensured in the development and implementation of the study.

## Results

### Alcohol consumption over time

Among participants with a past 12 months drinking history, 91.7% (95%CI= 90.1–93.1), 62.3% (95%CI= 59.7–64.9), and 90.4% (95%CI= 88.7–91.8) reported drinking pre, during and post the alcohol sales ban. Furthermore, there was a statistically significant difference in total AUDIT-C across the three time points.  $\chi^2(2, n = 1318) = 596.7, p < .001$ . The median AUDIT-C scores were highest prior the prohibition (median score=6), and decreased during the prohibition (median score = 2), and increased following the prohibition (median score=5) albeit not reaching pre-prohibition levels. Pairwise comparisons showed large effects ( $r = 0.58$  &  $0.56$ , respectively) in the decrease in AUDIT-C scores from pre to during prohibition, and in the increase from during the prohibition to post prohibition.

### Prevalence of hazardous drinking over time

As shown in [Table 1](#), the prevalence of hazardous alcohol use pre, during and post the alcohol sales ban was 66.0% (95%CI= 63.4–68.6%), 35.4% (95%CI=32.8–38.0%), and 59.8% (95%CI=57.1–62.4), respectively. This difference in hazardous drinking across the time points was statistically significant  $\chi^2(2) = 482.6, p < .001$ . Post hoc analyses showed statistically significant differences in the prevalence rates between all respective time periods ( $p < .001$  across comparisons). The greatest difference (30.4%) was between prevalence prior prohibition and during prohibition.

### Predictors of hazardous drinking

The predictors of the hazardous drinking at each of the three time points are displayed in [Table 2](#). Being male was associated with about twofold increased odds of hazardous drinking at all three time points. Prior the sales ban, participants earning between P3000 (nearly \$300) and P6000 (nearly \$600) had increased odds of hazardous drinking compared to those earning less than P3000. During the alcohol sales ban, university students had a reduced odds of hazardous drinking compared to unemployed participants. Following the lifting of the alcohol

sales ban, employed participants had nearly twice the odds of hazardous drinking compared to unemployed participants.

## Discussion

This study investigated changes in self-reported, retrospectively recalled alcohol use and hazardous drinking following the second alcohol sales ban in Botswana. Among participants with a history of past 12 months drinking, 30% did not drink during the four week sales ban but 60% continued to drink during the same period. While this temporary decrease in prevalence is significant, there is indication of access to alcohol during the pandemic among a majority of participants who drink alcohol. Given that the sales ban investigated in this current study was the second ban in the country, it is likely that stockpiling of alcohol in anticipation of further bans may have contributed to the continued use of alcohol during the ban. Also, police reports indicate increases in home brewing and illegal sales of alcohol during the sales ban in the country ([Motlhoka, 2020](#); [Sunday Standard, 2020](#)). This persistence of alcohol use in Botswana despite an absolute sales bans, has also been found during Thailand's absolute alcohol sales ban ([Wichaidit et al., 2021](#)). The rate of hazardous drinking pre and post the alcohol sales ban is relatively consistent with previous findings within the drinking population in Botswana ([Lama, Kumoji, Ketlogetswe, Anderson, & Brahmhatt, 2016](#); [World Health Organization, 2018](#)). Therefore, the decrease in hazardous drinking during the sales ban, albeit short-lived, is uncharacteristic of people who drink in Botswana, and suggests the likely contribution of the sales ban.

The association between the temporary sales ban and temporary changes in alcohol consumption, including hazardous drinking, found in the current study is consistent with alcohol control policy research hypotheses on the effects of alcohol availability on actual alcohol consumption ([Rehm et al., 2020](#)). Taking trends in Australia for comparison, a time series analysis of per capita beer consumption in the country found immediate shifts in response to changes to alcohol sales restrictions enacted during the COVID pandemic ([Vandenberg, Livingston, & O'Brien, 2021](#)). In the latter study, enacting partial sales restrictions led to decreased consumption while relaxing of restrictions led to increases in consumption at on-premise outlets but not off-premise outlets which were unaffected by restrictions. While the level of self-reported alcohol consumption, AUDIT-C, during the partial restrictions (no onsite sales but off-site allowed) decreased in Australia ([Callinan et al., 2021](#)), the mean difference of 0.30 points is much lower than the 4 point (on a scale ranging from 0 to 12) difference found in the current study. This indicates to the impact of different degrees of sales restrictions, that is, stricter restrictions are associated with greater changes in consumption. However, this study suggests that the impact is likely short-lived and



does not persist beyond the sales ban, thus questions about the sustainability of enacting such a policy may be raised.

Alcohol sales restrictions target alcohol availability, and there is well-documented pre-COVID evidence consistent with the current findings. For example, there are consistent findings on the impact of alcohol outlet density and operation hours on actual alcohol consumption (Popova, Giesbrecht, Bekmuradov, & Patra, 2009). Prohibition is the most restrictive of drug control measures as it aims to eliminate availability (Rogeberg et al., 2018). While attempts at pre-COVID implementation of prohibition have come at great social and economic costs there is evidence of reduction in alcohol consumption during the periods of prohibition (Hall, 2010). This current study found that, notwithstanding social and economic costs, the temporary alcohol sales prohibition in Botswana was associated with the intended decreases in consumption and hazardous drinking to manage the pandemic. It is likely that the sales ban provided the much needed albeit temporary relief to the health system in Botswana just as it was found to have done in South Africa during their total sales ban In South Africa, an evaluation of hospital admissions during two week periods of lock down restrictions without a sales ban and during the sales ban found a 60% decrease in assault cases and road traffic accidents from the former to the latter period (Reuter et al., 2020).

Hazardous drinking across the retrospectively investigated three time points was associated with different variables. Being male was the only variable associated with hazardous drinking at all the time points. The increased odds of males drinking hazardously is consistent with much of the existing research (Nolen-Hoeksema, 2004). The positive association between income and hazardous drinking in this study is consistent with previous studies (Keyes & Hasin, 2008; Martin et al., 2009) and also reflects the curvilinear relationship posited between the two variables (Heien, 1996). During the sales ban, university students had reduced odds of hazardous drinking likely due to the fact that the prohibition occurred when schools were closed and they were home. The decrease in alcohol use, including bingeing, among young adults, including university students, during this COVID period with restrictions has been found in other studies (Clare et al., 2021; White, Stevens, Hayes, & Jackson, 2020) and is attributed to limited drinking opportunities and being away from the heavy drinking culture characteristic of university campuses or independent living (Jackson, Merrill, Stevens, Hayes, & White, 2021). The increased odds of hazardous drinking post the prohibition among employed participants may be a function availability of funds to finance their habits.

### Implications

This study provides law and policy makers with the much needed feedback of policy effectiveness. While it is acknowledged that alcohol control policies in general, and during the pandemic in particular, will require complex trade-offs (OECD, 2021), this study indicates that policies that restrict access are likely associated with decreases in alcohol use and hazardous drinking, however short-lived. The anticipated gains of reduced health system strain, better physical health, and greater adherence to COVID health protocol or mandates are more likely to have been achieved during the prohibition. However, the gains are likely not sustained after the lifting of the prohibition. This study also highlights the need for ensuring the provision of mental health and drug rehabilitation services during this pandemic. This need is even more important for Botswana given the very the limited mental health and drug rehabilitation services already available.

### Limitations

The results of this study are exploratory and should be considered with the study's inherent limitations. The study is cross-sectional, and the sampling is non-random. The accuracy of the self-reported drinking at the three time periods is susceptible to recall biases. The sampling

methods and data collection procedure limits the representativeness of the sample given disparities in economic status and access to digital platforms (device and data). While the audience specified in the Facebook advertisement were persons aged 18 years or older and domiciled in Botswana, it is likely that, the method of recruitment and data collection may have led to more inclusion of persons of higher socioeconomic status, urban dwellers, and the youth.

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### Ethics approval

The authors declare that they have obtained ethics approval from an appropriately constituted ethics committee/institutional review board where the research entailed animal or human participation.

Ministry of Health and Wellness- Health Research & Development Committee (HPDME/13/18/1).

### Declarations of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.drugpo.2022.103590.

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