ORIGINAL ARTICLE

Alcohol-Induced Mortality in the USA: Trends from 1999 to 2020

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Abstract

This study comprehensively examined trends in alcohol-induced overdose mortality in the USA between 1999 and 2020 by age, sex, race/ethnicity, census region, and type of injury. Using the CDC WONDER database, 605,948 alcohol-induced deaths were recorded. Mortality increased by 14.1% per year (95% CI 8.2, 20.3) from 2018 to 2020, with the highest rates among males, non-Hispanic Whites, individuals aged 55–64, and the Western census region. Rising trends were observed across racial/ethnic subgroups, except for American Indians/Alaska Natives, with annual increases of 17% among non-Hispanic Blacks, 14.3% among non-Hispanic Whites, 9.5% among Asian/Pacific Islanders, and 12.6% among Hispanics. Males, females, all age groups, and census regions also experienced increasing trends. In conclusion, this study underscores worsening alcohol-induced mortality in the recent two decades and the need for research to identify its determinants. Such research can guide evidence-based public health interventions to reduce excessive alcohol use consequences.

Keywords Alcohol-induced mortality · Alcohol-related mortality · Trends · USA

Alcohol use, as the seventh leading risk factor for both death and disability globally in 2016, poses an undeniable threat to public health (GBD 2016 Alcohol Collaborators, 2018). In the USA, it ranks as one of the most prevalent preventable causes of death, trailing behind cigarette smoking, poor diet, and physical inactivity (Mokdad et al., 2004).

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Chronic alcohol abuse has been linked to a myriad of life-threatening diseases and conditions that amplify mortality risks, such as various malignancies, liver cirrhosis, gastrointestinal complications, and severe cardiovascular and neurological consequences, including stroke (Shield et al., 2013). Furthermore, the role of alcohol as a cause of death remains underreported, as alcohol-induced impairments in processing speed, motor coordination, impulse control, and judgment often lead to violence, crime, or accidents that are not reflected in mortality records (Brumback et al., 2007; Miller & Fillmore, 2014), In 2021, alcohol constituted a staggering 39.33% of all drug-related emergency visits, emerging as the most common cause (Drug Abuse Warning Network, 2021).

Despite the well-documented health risks and potential for substance dependency, alcohol consumption remains widespread in the USA. Over the past two decades, drinking patterns have evolved dramatically, with significant increases observed in women, older adults, and the socioeconomically disadvantaged populations (Grant et al., 2017; White, 2020). The COVID-19 pandemic has further intensified alcohol consumption since its declaration as a national emergency in March 2020 (National Institute on Alcohol Abuse and Alcoholism, 2020; National Institute on Drug Abuse, 2022). However, a comprehensive examination of trends in alcohol-induced mortality spanning two decades (1999–2020) had not been conducted prior to our study. Spillane et al. reported an accelerated increase in alcohol-induced death rates between 2012 and 2016, but trends across sex, age, race/ethnicity, census region, and type of injury subgroups in the US population post-2016 remained unexplored (Spillane et al., 2020).

In this study, we aimed to assess the trends in alcohol-induced mortality by age, sex, race/ethnicity, census region, and type of injury in the USA from 1999 to 2020, while accounting for other determinants of higher risk of mortality. We chose to focus on data from 1999 to 2020 because it provides a robust, two-decade-long baseline to identify trends, while 2021 and 2022 data have not yet been fully validated and may still be subject to ongoing revisions. Moreover, the lag in data collection, processing, and availability is common for nationwide mortality statistics. As alcohol use is a leading cause of premature mortality globally, our findings hold significant implications for public health in the USA and other countries experiencing similar shifts in alcohol consumption (GBD 2016 Alcohol Collaborators, 2018; Stelander et al., 2021). By shedding light on these trends, we hope to inform targeted intervention strategies aimed at reducing the devastating impact of alcohol-induced mortality.

Methods

Study Design and Data Source

We conducted a cross-sectional study using the Underlying Cause of Death files from the Centers for Disease Control and Prevention's (Wide-ranging Online Data for Epidemiologic Research (WONDER) database, 2021) which covers the years 1999–2020. The national mortality data in WONDER is provided by the National Center for Health Statistics and is based on death certificate records for US residents.

To identify alcohol-induced deaths, we focused on instances where alcohol was listed as an underlying cause. This was determined using the following International Classification of Diseases, 10th revision (ICD-10) codes: E24.4 (alcohol-induced pseudo-Cushing syndrome), F10 (alcohol related disorders), G31.2 (degeneration of the nervous system due

to alcohol), G62.1 (alcoholic polyneuropathy), G72.1 (alcoholic myopathy), I42.6 (alcoholic cardiomyopathy), K29.2 (alcoholic gastritis), K70 (alcoholic liver disease), K85.2 (alcohol-induced acute pancreatitis), K86.0 (alcohol-induced chronic pancreatitis), R78.0 (finding of alcohol in the blood), X45 (accidental poisoning by and exposure to alcohol), X65 (intentional self-poisoning by and exposure to alcohol), and Y15 (poisoning by and exposure to alcohol, undetermined intent).

We then abstracted crude and age-adjusted mortality rates (AAMR) based on factors such as type of injury (alcohol poisoning (overdose) and all other alcohol-induced causes), age groups (15–24; 25–34; 35–44; 45–54; 55–64; 65–74; 75–84; ≥ 85), sex (male; female), race/ethnicity (non-Hispanic White; non-Hispanic Black; Asian/Pacific Islander; American Indian/Alaska Native; Hispanic), and census region (Northeast; Midwest; South; West).

Since the WONDER database is de-identified and publicly available, our study was exempt from Institutional Review Board review.

Statistical Analysis

We examined the distribution of alcohol-induced mortality by type of injury and regional and sociodemographic characteristics using counts, percentages, and age-adjusted mortality rates. To assess temporal trends, we initially estimated a 5-year simple moving average (SMA) for AAMR. While SMA smooths inter-year variations in rates, it does not provide annual or average annual percentages for trends over time.

To address this limitation, we employed a joinpoint regression model. This model begins by assuming a linear trend in AAMR without joinpoints. It then includes a joinpoint, representing a change in trend, and performs a statistical test to assess the significance of the model with one joinpoint compared to the null model with no joinpoints. Additional joinpoints are incorporated using Monte Carlo permutation, and statistical tests are repeated until the optimal number of joinpoints is identified.

In the joinpoint model, we fitted the log-transformed AAMR as the dependent variable and the year of death as the independent variable. We selected "annual" for the interval type and used an uncorrelated error model suitable for constant standard error variance in the data. Default settings were applied for the grid search method, number of joinpoints (0–4), model selection method (permutation test), AAPC segment ranges (entire range), and APC confidence interval (parametric method).

Our results were reported as average annual percentage changes (AAPC) in AAMR and annual percentage changes (APC), along with their corresponding 95% confidence intervals (CIs). All statistical analyses were conducted using Stata 17.0 (College Station, Texas).

Results

A total of 605,948 alcohol-induced deaths were recorded from 1999 through 2020 (AAMR = 8.3 per 100,000; 95% CI 8.3–8.3). The largest mortality was observed among males (AAMR = 12.7; 95% CI 12.7–12.7), American Indian/Alaska Native Non-Hispanic Whites (AAMR = 38.7; 95% CI 38.1–39.2), persons aged 55 to 64 years (AAMR = 24.7; 95% CI 24.6–24.8), and decedents from the Western census region (AAMR = 12.4; 95% CI 12.3–12.4) (Table 1). A description of the characteristics of decedents in the joinpoint with a remarkable impact on mortality rates is presented in eTable 1 in the Supplement.

Table 1 Descriptive statistics of select variables on alcohol-induced mortality, USA, 1999–2020

Variable	n (%)	Age-adjusted mortality rate per 100,000 (95% CI)
Total	605,948 (100.0)	8.3 (8.3–8.3)
Sex		
Male	445,791 (73.6)	12.7 (12.7–12.7)
Female	160,157 (26.4)	4.3 (4.3–4.3)
Age group (years)		
15–24	3241 (0.5)	0.3 (0.3–0.4)
25–34	23,244 (3.8)	2.6 (2.5–2.6)
35–44	80,124 (13.2)	8.6 (8.5–8.6)
45–54	180,457 (29.8)	19.3 (19.2–19.4)
55–64	189,178 (31.2)	24.7 (24.6–24.8)
65–74	91,578 (15.1)	17.7 (17.6–17.9)
75–84	31,399 (5.2)	10.6 (10.5–10.7)
≥ 85	6511 (1.1)	5.4 (5.3–5.5)
[a]Race		
Non-Hispanic White	438,968 (72.4)	8.4 (8.4–8.4)
Non-Hispanic Black	58,428 (9.6)	7.1 (7.1–7.2)
Asian/Pacific Islander	6946 (1.1)	2.0 (1.9–2.0)
American Indian/Alaska Native	20,308 (3.4)	38.7 (38.1–39.2)
Hispanic	77,998 (12.9)	9.7 (9.6–9.8)
US census region		
Northeast	83,925 (13.9)	6.2 (6.1–6.2)
Midwest	119,391 (19.7)	7.5 (7.5–7.5)
South	199,951 (33.0)	7.4 (7.3–7.4)
West	202,681 (33.4)	12.4 (12.3–12.4)
Type of injury		
Alcohol poisoning (overdose)	35,182 (5.8)	0.5 (0.5–0.5)
All other alcohol-induced causes	570,766 (94.2)	7.8 (7.8–7.8)

[a]Hispanics could be of any race; all other categories are non-Hispanic

Overall Mortality Trends

Between 1999 and 2020, alcohol-induced mortality overall increased by 50%, from 7.0 to 10.5 deaths per 100,000. Joinpoint analysis revealed an average annual increase of 2.9% (95% CI 2.3, 3.4) during the entire two decades of the study (Table 2). However, upon detailed examination, three distinct trends were noted: AAMR was stable from 1999 to 2007 (APC=0.0; 95% CI − 0.6, 0.6) but increased at an annual rate of 3% (95% CI 2.6, 3.5) from 2007 to 2018. Between 2018 and 2020, the AAMR increased at an annual of 14.1% (95% CI 8.2, 20.3).

Trends by Race/Ethnicity

The 5-year SMA for non-Hispanic Whites increased by 73.3%, from 6.52 to 11.30, corresponding to an average annual increase in AAMR of 3.7% (95% CI 3.2, 4.2) from 1999 to 2020. Joinpoint analysis revealed three segments: AAMR increased by 1.3% per year (95%

Table 2 Annual percentage changes and average annual percentage changes in alcohol-induced mortality rates, USA, 1999–2020

Variable	Trend segment	Segment endpoints		APC (95% CI)	Five-year simple moving average	AAPC
		Lower	Upper			
Overall	1	1999	2007	0.0 (−0.6, 0.6)	7.00, 10.50	*2.9 (2.3, 3.4)
	2	2007	2018	*3.0 (2.6, 3.5)		
	3	2018	2020	*14.1 (8.2, 20.3)		
Race/ethnicity						
Non-Hispanic White	1	1999	2007	*1.3 (0.8, 1.8)	6.52, 11.30	*3.7 (3.2, 4.2)
	2	2007	2018	*3.7 (3.3, 4.1)		
	3	2018	2020	*14.3 (9.1, 19.9)		
Non-Hispanic Black	1	1999	2007	*−6.2 (−7.0, −5.3)	8.74, 7.58	−0.3 (−1.2, 0.6)
	2	2007	2018	*1.2 (0.5, 1.9)		
	3	2018	2020	*17.0 (7.3, 27.5)		
Asian/Pacific Islander	1	1999	2015	*1.1 (0.1, 2.0)	1.60, 2.48	*3.0 (1.6, 4.4)
	2	2015	2020	*9.5 (3.6, 15.6)		
American Indian/Alaska Native	1	1999	2018	*3.2 (2.7, 3.7)	28.78, 52.58	*4.5 (2.9, 6.1)
	2	2018	2020	17.9 (−0.3, 39.3)		
Hispanic	1	1999	2004	*−3.8 (−6.0, −1.5)	9.96, 10.62	0.7 (−0.4, 1.8)
	2	2004	2018	*0.7 (0.2, 1.3)		
	3	2018	2020	*12.6 (1.3, 25.1)		
Sex						
Male	1	1999	2009	−0.0 (−0.5, 0.4)	11.22, 15.50	*2.4 (1.8, 3.0)
	2	2009	2018	*3.0 (2.4, 3.6)		
	3	2018	2020	*12.5 (6.4, 19.1)		
Female	1	1999	2007	*1.0 (0.4, 1.5)	3.26, 5.90	*4.0 (3.5, 4.5)
	2	2007	2018	*4.3 (3.9, 4.8)		
	3	2018	2020	*14.7 (9.1, 20.5)		

Table 2 (continued)

Variable	Trend segment	Segment endpoints		APC (95% CI)	Five-year simple moving average	AAPC
		Lower	Upper			
Type of injury						
Alcohol poisoning (overdose)	1	1999	2005	*−2.7 (−4.2, −1.2)	0.10, 0.72	*9.6 (8.2, 11.0)
	2	2005	2008	*98.9 (81.7, 117.9)		
	3	2008	2020	0.3 (−0.3, 0.8)		
All other alcohol-induced causes	1	1999	2009	*−0.4 (−0.8, −0.1)	6.88, 9.76	*2.6 (2.1, 3.0)
	2	2009	2018	*3.5 (3.0, 4.0)		
	3	2018	2020	*14.4 (9.7, 19.2)		
Age (years)						
15–24	1	1999	2008	*8.3 (5.1, 11.6)	0.24, 0.34	3.0 (−0.3, 6.5)
	2	2008	2012	−9.1 (−22.8, 7.1)		
	3	2012	2020	*3.7 (0.0, 7.5)		
25–34	1	1999	2005	−0.6 (−3.2, 2.2)	1.56, 4.24	*6.4 (4.6, 8.2)
	2	2005	2018	*7.2 (6.2, 8.2)		
	3	2018	2020	*24.2 (5.9, 45.8)		
35–44	1	1999	2011	*−1.4 (−1.8, −0.9)	8.28, 11.20	*2.9 (2.1, 3.8)
	2	2011	2018	*4.7 (3.3, 6.1)		
	3	2018	2020	*24.9 (15.5, 35.0)		
45–54	1	1999	2020	*1.8 (1.4, 2.1)	16.8, 22.52	*1.8 (1.4, 2.1)
55–64	1	1999	2006	0.4 (−0.3, 1.1)	18.48, 32.7	*3.5 (3.0, 4.1)
	2	2006	2018	*4.3 (4.0, 4.7)		
	3	2018	2020	*10.3 (4.7, 16.2)		
65–74	1	1999	2011	−0.5 (−1.0, 0.0)	15.5, 22.32	*2.3 (1.8, 2.7)
	2	2011	2020	*6.0 (5.1, 6.9)		

Table 2 (continued)

Variable	Trend segment	Segment endpoints		APC (95% CI)	Five-year simple moving average	AAPC
		Lower	Upper			
75–84	1	1999	2002	−3.7 (−7.7, 0.6)	9.74, 12.56	*1.3 (0.5, 2.0)
	2	2002	2011	0.5 (−0.5, 1.4)		
	3	2011	2020	*3.8 (2.9, 4.6)		
≥85	1	1999	2002	−6.2 (−12.8, 0.8)	4.98, 6.34	0.8 (−0.4, 2.1)
	2	2002	2013	*1.2 (0.1, 2.4)		
	3	2013	2020	*3.5 (1.5, 5.5)		
Census region						
Northeast	1	1999	2005	*−1.8 (−2.6, −1.1)	5.30, 7.90	*2.6 (2.1, 3.1)
	2	2005	2018	*3.2 (2.9, 3.5)		
	3	2018	2020	*13.4 (8.2, 18.8)		
Midwest	1	1999	2007	0.4 (−0.5, 1.3)	5.78, 10.48	*4.0 (3.1, 4.9)
	2	2007	2018	*4.4 (3.7, 5.1)		
	3	2018	2020	*17.3 (8.0, 27.4)		
South	1	1999	2009	*−0.9 (−1.3, −0.4)	6.60, 9.30	*2.5 (1.8, 3.1)
	2	2009	2018	*3.9 (3.2, 4.6)		
	3	2018	2020	*13.4 (6.8, 20.3)		
West	1	1999	2018	*1.6 (1.4, 1.8)	10.62, 14.56	*2.5 (1.8, 3.2)
	2	2018	2020	*11.8 (4.0, 20.2)		

*Significant at $p < 0.05$; confidence interval does not include zero

[a]Trends were not assessed for persons less than 15 years of age due to unstable rates from low death counts

APC annual percentage changes, *AAPC* average annual percentage changes

CI 0.8, 1.8) from 1999 to 2007; 3.7% per year (95% CI 3.3, 4.1) from 2007 to 2018; and 14.3% (95% CI 9.1, 19.9) from 2018 to 2020.

Among non-Hispanic Blacks, the SMA decreased by 13.27%, from 8.74 to 7.58 deaths per 100,000. Based on a more detailed analysis, the trend declined at an annual rate of 6.2% (95% CI − 7.0, − 5.3) from 1999 to 2007 but increased at an annual rate of 1.2% (95% CI 0.5, 1.9) from 2007 to 2018 and further increased at a yearly rate of 17.0% (95% CI 7.3, 27.5) from 2018 to 2020.

Trends among Asian/Pacific Islanders increased by 55%, from 1.60 to 2.48. There was an initial annual rate increase of 1.1% (95% CI: 0.1, 2.0) from 1999 to 2015 and a larger yearly rate increase of 9.5% (95% CI 3.6, 15.6) from 2015 to 2020. Among American Indians/Alaska Natives, mortality trends increased by 3.2% per year (95% CI 2.7, 3.7) from 1999 to 2018 and stabilized from 2018 to 2020 (APC = 17.9; 95% CI − 0.3, 39.3). SMA increased by 6.6% among Hispanics, from 9.96 to 10.62 deaths per 100,000. In a more detailed analysis, AAMR decreased by 3.8% per year (95% CI − 6.0, − 1.5) from 1999 to 2004; increased by 0.7% per year (95% CI 0.2, 1.3) from 2004 to 2018; and increased by 12.6% per year (95% CI 1.3, 25.1) from 2018 to 2020.

Trends by Sex

The SMA increased by 38.1% among males, from 11.22 to 15.50 deaths per 100,000, and by 80.9% among females, from 3.26 to 5.90 deaths per 100,000. Based on the latest joinpoint segment, recent death trends in males increased at an annual rate of 12.5% (95% CI 6.4, 19.1) from 2018 to 2020. Similarly, the latest trend in females increased at an annual rate of 14.7% (95% CI 9.1, 20.5) from 2018 to 2020 (Fig. 1).

Trends by Age

Recent mortality trends increased across all age groups. AAMR increased by 3.7% per year (95% CI 0.0, 7.5) among persons aged 15 to 24 years, by 24.2% per year (95% CI 5.9, 45.8) among persons aged 25 to 34 years, by 24.9% per year (95% CI 15.5, 35.0) among persons aged 35 to 44 years, by 1.8% per year (95% CI 1.4, 2.1) among persons aged 45 to 54 years, by 10.3% per year (95% CI 4.7, 16.2) among persons aged 55 to 64 years, by 6.0% per year (95% CI 5.1, 6.9) among persons aged 65 to 74 years, by 3.8% per year (2.9, 4.6) among

Fig. 1 Trends by sex
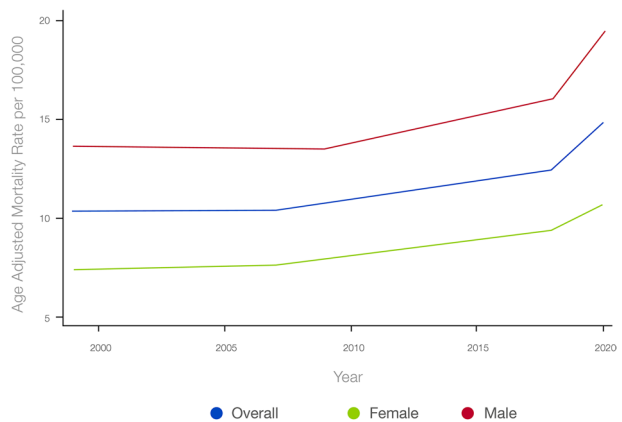
persons aged 75 to 84 years, and by 3.5% per year (95% CI 1.5, 5.5) among persons aged at least 85 years (Table 2).

Trends by Type of Injury

Trends in alcohol-overdose deaths declined by 2.7% per year (95% CI − 4.2, − 1.2) from 1999 to 2005, increased by 98.9% per year (95% CI 81.7, 117.9) from 2005 to 2008, and stabilized from 2008 to 2020 (APC = 0.3; 95% CI − 0.3, 0.8). Trends in other alcohol-induced deaths—e.g., alcoholic gastritis—declined at an annual rate of 0.4% (95% CI − 0.8, − 0.1) from 1999 to 2009 but then increased by 3.5% per year (95% CI 3.0, 4.0) from 2009 to 2018 and by 14.4% per year (95% CI 9.7, 19.2) from 2018 to 2020.

Trends by Census Region

Recent death trends from alcohol-induced causes increased across all census regions of the USA. The latest trends increased in the Northeast at an annual rate of 13.4% (95% CI 8.2, 18.8) from 2018 to 2020. A similar finding was recorded in the Midwest, where the trends increased at an annual rate of 17.3% (95% CI 8.0, 27.4) from 2018 to 2020; the south, where the rate increased by 13.4% per year (95% CI 6.8, 20.3) from 2018 to 2020, and the West, where the rate increased by 11.8% per year (95% CI 4.0, 20.2) from 2018 to 2020 (Fig. 2).

Discussion

This study observed a substantial increase in alcohol-induced deaths from 1999 to 2020, with the average mortality rate rising notably among women. Consistent with earlier findings, this increase aligns with the significant growth in women's alcohol consumption (White, 2020; White et al., 2015). The highest mortality rates occurred among males,

Fig. 2 Trends by census region
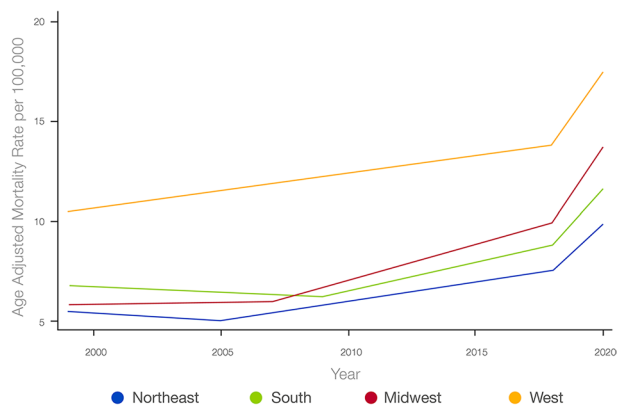
non-Hispanic Whites, individuals aged 55–64, and residents of the US Census Bureau West Region.

From 2018 to 2020, alcohol-induced overall mortality rates sharply increased, corroborating other studies using multiple causes of death data that demonstrated a significant rise in alcohol-related deaths during this period (White et al., 2022; Yeo et al., 2022). This trend was consistent across races (highest among American Indian/Alaska Native), both genders (slightly higher in women), and all census regions (highest in the Midwest). Intriguingly, the increase was most prominent among those aged 25–34 and 35–44, with a 25% surge in annual mortality. This period coincided with a sharp rise in synthetic opioid-related deaths, primarily involving illicitly manufactured fentanyl (Centers for Disease Control and Prevention, 2022) Although the link between increased mortality rates and these opioids remains unclear, polysubstance abuse is common, making it highly probable for someone with opioid abuse problems to also use or abuse alcohol. Both alcohol and opioids are central nervous system depressants, amplifying the risk of overdose when used simultaneously.

In the context of the rapid narrowing of the alcohol consumption gap between women and men in the USA and worldwide (White, 2020), the World Health Organization (WHO) reported that women's total alcohol per capita consumption in the USA was about a little less than one-third of men's in 2019 (World Health Organization, 2022). Our results suggest that changes in women's drinking behavior have led to disproportionate increases in mortality rates. Although men consistently have higher age-adjusted mortality rates in the USA, the average mortality rate increased by 80.9% among women compared to a 38.1% increase among men between 1990 and 2020 (Erol & Karpyak, 2015). This supports evidence suggesting women are more vulnerable to the harmful effects of alcohol consumption due to biological differences in alcohol metabolism.

Over the past three decades, several factors have directly impacted the chronicity and severity of alcohol consumption in the USA. Increased life expectancy and reduced fertility rates have led to an aging population, with the percentage of adults over 65 growing from 12% in 1990 to 16% in 2020 (United States Census Bureau, 2020). Alcohol's effects on the body and central nervous system change with age, which may be due to metabolic efficiency changes and a decline in metabolic rate in older adults (Eckardt et al., 1998; Squeglia et al., 2014; Meier & Seitz, 2008; Pontzer et al., 2021). Indeed, the harmful effects of heavy drinking could increase even if the amount of drinking itself does not change, with older individuals presenting with higher blood ethanol concentrations compared to younger individuals (Jones & Neri, 1985; Lucey et al., 1999).

Additionally, exposure to alcohol advertisements has become more prevalent in the 2010s compared to the 1990s, mainly due to technological advances leading to the development of social media platforms and advancements in traditional media platforms. Although exposure to alcohol advertising among US adults shows a weak positive association with alcohol drinking behavior and total consumption (Niederdeppe et al., 2021; Wilcox et al., 2015), among youth, longitudinal studies have shown that advertising increases the likelihood of alcohol use onset and augments more drinking among those already using alcohol, particularly on social media (Anderson et al., 2009; Berey et al., 2017).

This study has limitations, including its focus on alcohol as the underlying cause of death, excluding other contributing factors. As a result, the overall death burden may be underestimated. Future studies should consider multiple causes of death involving alcohol use (Polednak, 2016). Potential misclassification bias in death certificate data cannot be ruled out, but underrecognition of alcohol use disorders would likely result in lower recorded death rates (Castle et al., 2014).

Conclusions

Trends in alcohol-induced mortality have consistently increased in recent decades, emphasizing the urgent need for further research to identify the determinants of these trends. A deeper understanding of these determinants will enable the development of evidence-based public health interventions, tailored strategies for the prevention of alcohol-induced deaths, and targeted intervention programs catering to diverse populations and risk groups. Taking into account the unique sociodemographic and regional characteristics of affected communities will ensure more effective and responsive interventions. Collaborative efforts from policymakers, healthcare providers, and community organizations are essential in implementing and promoting these strategies, ultimately contributing to a comprehensive approach to combat this pressing public health issue, reducing the burden of alcohol-induced mortality, and improving the overall well-being of society.

Declarations

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