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A syndemic of COVID-19 and methanol poisoning in Iran: Time for Iran to consider alcohol use as a public health challenge?

A B S T R A C T

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Methanol poisoning has been a significant public health challenge for several decades in Iran. Even though alcohol use is highly criminalized, people consume illicit alcohol, which tends to be predominantly homemade and often contains methanol. Consequently, thousands of individual poisonings and hundreds of deaths annually are attributable to methanol poisoning. From February 19, 2020 through April 27, 2020, the 2019 coronavirus disease (COVID-19) epidemic rapidly expanded in Iran, and has been associated with 90,481 confirmed cases and 5710 confirmed deaths. Secondary to misinformation about the potential for alcohol to neutralize SARS-CoV-2, there has also been a significant escalation in methanol-related morbidity and mortality, with over 5000 people poisoned and over 500 confirmed deaths for the same period from February through April 2020. In some provinces, the case-fatality rate of methanol poisoning was higher than that from COVID-19. The high morbidity and mortality associated with methanol poisoning preceding and exacerbated by COVID-19 highlight the potential population level health impacts of the implementation of evidence-based education and harm reduction strategies focused on alcohol use across Iran.

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An outbreak of the 2019 coronavirus diseases (COVID-19) was first identified in Wuhan, China, with the first cases reported in December 2019, and it soon turned into a pandemic infecting thousands of people in China and worldwide. As of April 10, 2020, more than 1.5 million people had been diagnosed with COVID-19, of whom more than 92,000 (case-fatality rate [CFR] = 6.1%) died ([World Health Organization, 2020](#)). Iran became one of the most severely affected countries due to the rapid spread of the virus. At the time of this report on April 27, 2020, Iran was among the top 10 countries reporting COVID-19, with 90,481 total confirmed cases and 5710 total registered deaths (CFR = 6.3%) ([World Health Organization, 2020](#)).

Consistent with other countries, the COVID-19 outbreak in Iran has been associated with significant public fear, given the rapid growth of the epidemic across the country, with all 31 provinces affected ([Bao, Sun, Meng, Shi, & Lu, 2020](#)). The shortage of medical care and diagnostic capacity, inconsistent implementation of COVID-19 prevention and mitigation strategies, sustained international pressures from economic sanctions ([Takian, Raofi, & Kazempour-Ardebili, 2020](#)), and limited public knowledge have resulted in misinformation being highly prevalent in Iran. In response to the rapid surge of the COVID-19 pandemic, Iran has applied several mitigation strategies, including the broader use of alcohol-based hand sanitizers. In Iran, alcohol became more available to people and more accessible for them to buy from drugstores, as justified for sanitization for COVID-19. However, disinformation has circulated, including that gargling or drinking alcohol can prevent COVID-19. Recognizing that alcohol use is banned in Iran,

people are more likely to consume bootleg alcohols that may include higher levels of methanol. Thus, in parallel with the increased number of COVID-19 cases, an alarming number of methanol-poisoning cases, secondary to drinking bootleg alcohol containing methanol, has also been reported in Iran.

The two co-occurring rapidly emerging epidemics represent syndemics where the one has stimulated the increase of the other. Official reports from Iran's Health Ministry Spokesman indicated that more than 3100 poisoning cases were reported throughout the country from the first official announcement of deaths due to COVID-19 on February 19, 2020 through April 7, 2020. Iran's Legal Medicine Organization (LMO) reported 728 deaths (627 men; 101 women) out of the total number of methanol-poisoning cases within this period, with 471 confirmed cases (422 men; 49 women) and 257 people (205 men; 52 women) under further investigation ([Iran's Legal Medicine Organization, 2020a](#)). Updated reports on April 27, 2020 from Iran's Ministry of Health showed that the number of methanol-poisoned individuals increased to 5011 cases, with 525 confirmed deaths. The total number of deaths from February to April 2020 is almost eight times higher than the corresponding number of confirmed deaths for the same time period in 2019 ($n = 66$) ([Iran's Legal Medicine Organization, 2020a](#)). Even reports before 2019 showed a lower number of deaths due to methanol poisoning. For example, only 343 deaths were reported due to methanol poisoning within 29 months from March 20, 2016 to August 22, 2018 ([Iran's Legal Medicine Organization, 2018](#)). Details of the previous outbreaks can be found from the National LMO website ([Iran's Legal Medicine Organization, 2020b](#)).

Mass methanol-poisoning outbreaks have been previously reported in Iran (Hassanian-Moghaddam et al., 2015). However, a key feature of the recent mass poisoning amid the COVID-19 epidemic is the involvement of many provinces at the same time. For example, as of March 18, 2020 in Khuzestan, a province in southwest Iran, the total number of methanol-poisoning cases ($n = 647$) was almost 2-fold higher than the total confirmed number of COVID-19 cases ($n = 359$), with a slightly lower CFR – 9.12% vs. 12.53%. The same pattern was also observed in Ardabil, a province in northwest Iran (methanol poisoning: $n = 200$, CFR = 9.5%; vs. COVID-19: $n = 213$, CFR = 12.68%). Fars, a province in southwest Iran, reported 383 cases of methanol poisoning with CFR = 15.93%, compared to 386 total confirmed cases of COVID-19, with CFR = 3.37%. Reports from a referral hospital for poisoning and drug intoxications in Tehran, the capital, show a rise in the number of methanol-poisoning cases following the start of the COVID-19 epidemic (no numerical data reported). While 26 out of 31 provinces reported methanol poisoning, Table 1 shows the total number of cases and deaths for these two epidemics in eight selected provinces being affected by methanol poisoning more severely.

In Iran, like many Muslim majority countries (MMCs) where alcohol consumption is prohibited, a low prevalence of alcohol use has been reported (Al-Ansari, Thow, Day, & Conigrave, 2016), even though increasing trends in the prevalence of alcohol consumption have been documented (Al-Ansari et al., 2016; Al-Ansari, Thow, Mirzaie, Day, & Conigrave, 2019; Lankarani & Afshari, 2014). The increased accessibility and consumption of mainly methanol-containing homemade and bootleg types of alcohol have turned alcohol poisoning into a public health challenge in Iran (Al-Ansari et al., 2019; Lankarani & Afshari, 2014; Shokoohi, Rahimi-Movaghar, Noroozi, & Karamouzian, 2019). Although Iran has adopted a national strategy to reduce alcohol-related harms (Al-Ansari et al., 2019; Shariatirad et al., 2016), alcohol-related problems have not been viewed through the lens of public health perspectives (Shokoohi et al., 2019). Instead, strategies have predominantly focused on palliative care and treating alcohol poisoning secondary to the consumption of bootleg methanol at individual levels. For example, Iran developed a national program on alcohol use (2013–2017) and integrated alcohol treatment units into the current illicit drug treatment programs (Shariatirad et al., 2016). However, such interventions have not yet been fully implemented in the primary health care system, and their public health goals have consistently been overlooked.

The syndemics of alcohol and COVID-19-related mortality provide an opportunity to revisit policies surrounding alcohol use. Ongoing discussions surrounding the issue of alcohol use, in

particular, methanol poisoning in Iran, are now more visible (Al-Ansari et al., 2019; Shokoohi et al., 2019). These discussions are encouraging, with national programs on alcohol treatment services being developed (Iranian National Committee for NCDs Prevention and Control, 2015). Given difficulties in the implementation, policy-makers in Iran could consider the development and support of alcohol use-related public health models to better support public education and increase awareness (Al-Ansari et al., 2020). Education policies do represent a key harm reduction strategy in response to alcohol use issues, without which the increased risks of morbidity and mortality associated with alcohol poisoning will continue. The increasing number of methanol-poisoning cases that have maximized pressures to the health system while trying to contain the COVID-19 epidemic is an example of the reasons why Iran could benefit from more prevention and mitigation services for alcohol use disorders. However, in addition to the development of national guidelines in managing mass methanol-poisoning outbreaks (Hassanian-Moghaddam et al., 2015), the development and implementation of public health programs can also support Iran to better respond to ongoing alcohol use disorders, as well as better responding during times of crisis, including COVID-19.

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Declaration of competing interest

The author declares no competing interests.

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Table 1

Statistics of methanol poisoning and COVID-19 in Iran (selected provinces) from February 20, 2020 through March 18, 2020.

Provinces	Methanol poisoning		COVID-19	
	Cases	Deaths	Total cases	Deaths
Khuzestan	647	59 (9.12%) ^a	359	45 (12.53%)
Fars	383	61 (15.93%)	386	13 (3.37%)
Ardabil	200	19 (9.5%)	213	27 (12.68%)
East Azarbaijan	98	12 (12.24%)	571	46 (8.06%)
Alborz	70	15 (21.43%)	906	150 (16.55%) ^b
Razavi Khorasan	26	3 (11.54%)	661	55 (8.32%)
Kordestan	23	1 (4.35%)	189	20 (10.58%)
Kermanshah	16	1 (6.25%)	152	13 (8.55%)

^a Percentages indicate case-fatality ratio (CFR), defined as the proportion of individuals with a particular condition who die from that condition, e.g., CFR for COVID-19 was calculated by dividing the total number of deaths due to COVID-19 (numerator) by the total number of COVID-19 cases (denominator).

^b Official number in Alborz province appeared to be between 150 and 200 cases.

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