Prevalence, sex differences, disability burden, and temporal trends of substance use disorders across twenty-two Arab countries, 2019–2023: a secondary analysis of the Global Burden of Disease Study 2023

Tarik Qassem,[a,b,j] Ahmed Muneer,[a,c,j] Hamad Al Ghaferi,[d] Mohammad Fayek,[e] Hesham Elarabi,[d] Wael Foad,[f] Sahar Helmi,[g,h] Omar Tariq,[b] Syed Ali Bokhari,[i,*] and Darshan Singh[c]

[a]Maudsley Health, Al Amal Psychiatric Hospital, Dubai, United Arab Emirates
[b]College of Medicine, Mohammed Bin Rashid University of Medicine and Health Sciences, Dubai Health, Dubai, United Arab Emirates
[c]Centre for Drug Research, Universiti Sains Malaysia, 11800, Minden, Pulau Pinang, Malaysia
[d]Delmon Consultancy and Health Care Planning, Abu Dhabi, United Arab Emirates
[e]American Hospital Dubai, United Arab Emirates
[f]Erada Center, Dubai, United Arab Emirates
[g]High Institute of Public Health, Alexandria University, Alexandria, Egypt
[h]Quality & Accreditation Directorate, Ministry of Health, Kuwait City, Kuwait
[i]Al Amal Psychiatric Hospital, Emirates Health Services, Dubai, United Arab Emirates

The Lancet Regional Health - Eastern Mediterranean 2026;1: 100002

Published Online 8 October 2026
https://doi.org/10.1016/j.laneme.2026.100002

Summary

Background Comparative epidemiological analyses of substance use disorders across the Arab world remain limited despite variability in sociocultural norms, legal environments, conflict exposure, and health-system capacity. No previous study has examined all Global Burden of Disease (GBD) substance use disorder categories across the 22 Arab League member states by sex and disability burden against an explicit global benchmark.

Methods We analysed GBD 2023 age-standardised prevalence, disability-adjusted life years (DALYs), and mortality-rate estimates for substance use disorders and seven substance-specific categories across the 22 Arab League member states, by sex, from 2019 to 2023. Regional aggregates were unweighted across-country medians; deviation from the global estimate was expressed as the percentage by which each value fell below or above the GBD 2023 global point estimate.

Findings In 2023, regional age-standardised substance use disorder prevalence was 0.78% (median 95% UI 0.66–0.89), approximately 63% below the GBD 2023 global estimate of 2.10%. Alcohol use disorder showed the largest divergence: 0.35% (0.26–0.44), 76% below the global estimate. Opioid use disorder was closest to global levels: 0.19% (0.15–0.24), 11% below the global estimate; the global benchmark was exceeded in the United Arab Emirates. Female opioid use disorder prevalence exceeded male prevalence in 19 of the 22 countries. Four countries (Libya, the United Arab Emirates, Morocco, and Algeria) exceeded the global opioid DALY rate.

Interpretation Burden remains below global levels in most Arab League countries but is not uniformly low, and estimates depend on the quality of primary data input, which varies across countries. Findings could support country-specific planning, sex-disaggregated reporting, targeted opioid agonist therapy, and stronger primary surveillance.

Funding None.

Copyright © 2026 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

Keywords: Substance use disorders; Opioid use disorder; Arab league; Global Burden of Disease; Sex differences; Prevalence

*Corresponding author. Al Amal Psychiatric Hospital, Emirates Health Services, Al Awir, Dubai, United Arab Emirates.
E-mail addresses: sab_191@live.com (S.A. Bokhari), tareq.qassem@ehs.gov.ae (T. Qassem), ahmed.muneer@ehs.gov.ae (A. Muneer).
[j]These authors contributed equally and share first authorship.

Research in context

Evidence before this study

We searched PubMed, Scopus, and Google Scholar for studies published from database inception to 28 February 2026 using combinations of the terms "substance use disorder", "alcohol use disorder", "drug use disorder", "opioid use disorder", "cannabis use disorder", "amphetamine", "cocaine", "Arab world", "Arab League", "Middle East", and the names of individual Arab countries. We also screened reference lists of relevant reports and did not restrict by language. We included regional comparative studies, national epidemiological reports, and burden-of-disease analyses relevant to substance use disorders in Arab populations, and excluded studies limited to non-Arab countries, non-human populations, or non-comparable outcomes. The available evidence was mostly country-specific or limited to small groups of countries, heterogeneous in design, and limited in cross-country comparability. We did not identify a previous study that systematically compared the full 2023 Global Burden of Disease (GBD) substance use disorder profile across all 22 Arab League states against the global benchmark within a single analytic framework.

Added value of this study

This study provides a standardised comparative profile of overall substance use disorders and seven substance-specific categories across all 22 Arab League states using GBD 2023 estimates, with sex-stratified analysis and age-standardised disability-adjusted life years, years lived with disability, and mortality rates alongside prevalence. Four findings emerged. First, low overall regional burden coexists with a marked contrast between alcohol and opioid disorders. Second, opioid use disorder prevalence is higher in females than males in 19 of 22 countries, inverting the male-dominant pattern seen globally. Third, four countries exceed the global opioid disability-adjusted life year (DALY) rate by point estimate. Fourth, other drug use disorders showed a selective regional increase from 2019 to 2023.

Implications of all the available evidence

These findings argue against treating the Arab world as a uniformly low-burden region. Three concrete service-planning priorities follow. Access to opioid agonist treatment should be expanded in countries where opioid use disorder approaches or exceeds the global benchmark. Sex-disaggregated reporting and female-centred access to opioid treatment are needed in settings where opioid use disorder is more prevalent in women. Finally, primary epidemiological surveillance should be strengthened, particularly in fragile-state and other data-sparse contexts, where apparently reassuring estimates may reflect a scarcity of input data rather than a genuinely low burden.

Introduction

Substance use disorders are a major cause of morbidity, disability, premature mortality, and social harm worldwide.[1,2] Global drug use continues to rise; the United Nations Office on Drugs and Crime estimated that about 316 million people used drugs in 2023, up from 292 million in 2022.[3] Cannabis remains the most widely used illicit drug globally, followed by opioids, amphetamine-type stimulants, cocaine, and ecstasy, while treatment coverage for drug use disorders remains limited.[3,4]

The 22 member states of the Arab League form an especially important setting for comparative epidemiology because they span North Africa and the Middle East and encompass diverse legal, sociocultural, economic, and geopolitical contexts.[5–8] Religious norms that prohibit intoxicants, legal restrictions on alcohol in many settings, and strong social stigma may contribute to lower reported prevalence in parts of the region.[5,6] Other drivers have been proposed, although their magnitude of influence across countries is not established. The drivers best-supported by previous evidence are armed conflict and forced displacement: systematic reviews in conflict-affected settings report higher substance use among refugees and people living in war zones.[7,9–12]

Drug trafficking across the region and cannabis cultivation in North Africa are well documented, but their effect on national prevalence varies between countries.[3,4,8] Domestic misuse of pharmaceuticals, particularly tramadol and prescription opioids, has been described in clinical case-series and surveillance reports from a subset of countries, predominantly Egypt and Saudi Arabia, with less systematic evidence reported elsewhere.[8,13] These drivers are therefore best understood as hypothesised contributors whose relative magnitude differs across countries, rather than a uniformly distributed regional risk profile.[5,6,10]

These influences, namely protective factors such as religious prohibition and legal restriction and risk factors such as conflict, displacement, trafficking, and misuse of pharmaceuticals, matter because lower reported prevalence should not automatically be interpreted as lower public-health burden. The same religious, sociocultural, and legal factors that may shape actual substance use also plausibly shape its measurement, through reduced disclosure, lower contact with treatment services, and limited case ascertainment. Lower regional estimates may therefore reflect a combination of genuine epidemiological difference and measurement effects. In parts of the Eastern Mediterranean Region, cannabis, opioids, khat, tramadol, and amphetamine-type stimulants are well documented, yet its epidemiological visibility may be constrained by surveillance weaknesses, legal risk, and under-reporting.[4,8–10,13]

The Global Burden of Disease (GBD) framework provides a standardised basis for cross-national comparison, yet no study has systematically examined the full 2023 substance use disorder profile across all 22 Arab League states while benchmarking the region explicitly against the global estimate.[14–16] We therefore assessed age-standardised prevalence, substance-specific patterns, and short-term temporal trends in substance use disorders across the Arab world.

Methods

Data source

We conducted a secondary analysis of publicly available aggregate estimates from the GBD Study 2023 Results Tool for the 22 Arab League member states and the global benchmark.[16–18] The full long-format analytic dataset, merged from four GBD 2023 Results Tool extracts and tagged with source-extract provenance for every row, is provided in Supplementary Table S1. The analysis focused on age-standardised prevalence estimates for 2023 and annual values from 2019 to 2023.

The underlying GBD 2023 estimates were generated using DisMod-MR 2.1, a Bayesian disease-modelling framework that synthesises heterogeneous epidemiological inputs while preserving internal consistency across age, sex, location, and year.[15,19,20] To improve comparability across non-reference data sources, the GBD analytical pipeline applies MR-BRT crosswalk adjustments to harmonise differences in case definitions, recall periods, and measurement approaches.[20,21] Where primary data are sparse, the model leans more on patterns from neighbouring countries. Uncertainty is carried through the modelling, and the 95% uncertainty intervals (UI) reflect the range of plausible modelled values.[15,20]

GBD 2023 inputs for substance use disorders across the 22 Arab League countries are heterogeneous and include population-based surveys (where they exist), national case-notification systems, treatment-facility data, treatment-demand reports submitted to the United Nations Office on Drugs and Crime, and literature-derived prevalence reports. The amount of primary data varies widely between countries. Countries with few data sources (particularly fragile and conflict-affected states) rely more on the model and on regional patterns than on their own measured data.[22,23] A country-by-country summary of input source types is provided in Supplementary Table S2.

Study design, scope, and outcomes

The analysis covered all 22 Arab League member states: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen. We examined substance use disorders as the parent category and the following substance-specific categories within the GBD 2023 cause hierarchy: alcohol use disorders, drug use disorders, opioid use disorders, cannabis use disorders, amphetamine use disorders, cocaine use disorders, and other drug use disorders. For each cause, we extracted age-standardised prevalence, disability-adjusted life year (DALY) rates, years lived with disability (YLD) rates, and mortality rates per 100,000 population, with 95% UI, from 2019 to 2023. Analyses were performed for both sexes combined and separately for women and men. These estimates were aggregated at the country level. We used the global estimate as a reference point, so that regional values could be interpreted against a recognised global standard.

Analytical approach

For each country and outcome, we extracted point estimates and 95% UI for age-standardised prevalence and burden rates in 2023. The Arab League regional aggregate was computed as the unweighted across-country median of the 22 country point estimates (and the corresponding medians of the lower and upper 95% UI bounds), giving each country equal weight regardless of population size in keeping with the comparative cross-country aim of the analysis. We expressed each country and regional estimate as the percentage by which it fell below the GBD 2023 global point estimate, calculated as $(1 - \text{estimate} \div \text{global}) \times 100$; otherwise, estimates that exceeded the global value are reported as a percentage above the global point estimate. As a robustness check, we additionally computed population-weighted regional means using United Nations World Population Prospects 2024 estimates as weights, and report these alongside the unweighted medians in Supplementary Table S3.

Estimated annual percentage change (EAPC) was calculated using log-linear regression of annual age-standardised prevalence estimates against calendar year for the 2019 to 2023 window. Specifically, the natural logarithm of the annual prevalence value was regressed on year to estimate slope β; EAPC was then computed as $(\exp(\beta) - 1) \times 100$ and expressed as a percentage per year. 95% confidence intervals for β were derived from the standard error of the slope, and EAPC values whose 95% confidence interval excluded zero were flagged as statistically significant. Because the time frame contained only five annual observations, EAPC values are reported descriptively rather than as formal hypothesis tests.

Software

Data extraction and analysis were performed using Python 3.12 with pandas, NumPy, SciPy, matplotlib, openpyxl, adjustText, geopandas, and shapely. The complete analysis code is provided as Supplementary Material.

Lived experience involvement

People with lived experience of substance use disorders were not involved in the design, conduct, reporting, or

dissemination planning of this study because this was a secondary analysis of publicly available aggregate data.

Role of the funding source
There was no funding source for this study.

Ethics statement
This study was a secondary analysis of publicly available, aggregate Global Burden of Disease 2023 estimates and did not involve identifiable individual-level data. Institutional review board approval and informed consent were therefore not required.

Results
Cross-sectional prevalence in 2023
Table 1 summarises age-standardised prevalence and burden estimates for overall substance use disorders and substance-specific categories across the 22 Arab League countries and the global benchmark in 2023. Regional age-standardised prevalence of substance use disorders was 0.78% (95% UI 0.66–0.89), approximately 63% below the global estimate of 2.10% (1.90–2.35). However, there was substantial between-country variation. Overall prevalence ranged from 0.65% (95% UI 0.57–0.75) in Mauritania to 1.76% (1.50–2.01) in Djibouti, with Comoros and Somalia also clustering at the upper end of the regional distribution, while Mauritania, Yemen, and Sudan remained at the lower end (Table 1). Substance-specific cross-sectional patterns are shown in Figs. 1 and 2 and Supplementary Figure S1.

Alcohol use disorders showed the greatest divergence from global levels. Arab League prevalence was 0.35% (95% UI 0.26–0.44) compared with 1.44% (1.24–1.66) globally, approximately 76% below the global estimate for AUD (Supplementary Figure S1). Even so, alcohol-related burden was not negligible; Djibouti, Comoros, and Somalia recorded the highest estimates regionally and approached the global benchmark more closely than most countries in the Arab League. In contrast, most other Arab League countries remained far below global alcohol prevalence. Drug use disorders were closer to the global benchmark. Arab League prevalence was 0.41% (95% UI 0.34–0.49) vs 0.69% (0.59–0.78) globally, approximately 41% below the global estimate (Fig. 1). The United Arab Emirates had the highest regional drug use disorder prevalence (0.62%, 95% UI 0.55–0.71), followed by Lebanon (0.54%, 0.45–0.63), Libya (0.50%, 0.44–0.58), and Kuwait (0.49%, 0.42–0.57). The lowest estimates were observed in Mauritania (0.25%, 0.20–0.30), Somalia (0.31%, 0.24–0.42), Comoros (0.31%, 0.24–0.43), and Djibouti (0.33%, 0.25–0.44).

Beyond the parent drug use disorder category, substance-specific contrasts remained informative. Opioid use disorder was the category that most closely approximated the global benchmark. Arab League prevalence was 0.19% (95% UI 0.15–0.24) compared with 0.21% (0.19–0.24) globally, and the global benchmark was exceeded in the United Arab Emirates (UAE 0.38%, 95% UI 0.34–0.44 vs global 0.21%, 95% UI 0.19–0.24; the UAE lower UI bound lay above the global upper bound). Three further countries (Lebanon 0.28% [95% UI 0.24–0.32], Libya 0.27% [0.24–0.31], Tunisia 0.22% [0.18–0.25]) had point estimates marginally above the global point estimate, with UI overlapping the global interval. Cannabis use disorder prevalence across the Arab League was 0.15% (median 95% UI 0.09–0.22), approximately 48% below the global estimate of 0.28% (0.21–0.36). Within the region, the highest cannabis use disorder estimates were observed in Djibouti (0.21%, 0.14–0.32), Comoros (0.20%, 0.13–0.31), and Somalia (0.20%, 0.13–0.31), although all 22 countries remained below the GBD 2023 global point estimate and UI for most countries overlapped at the upper end.[4] Amphetamine and cocaine use disorder prevalence remained low across most countries, whereas other drug use disorders showed more variable profiles, with higher values in Libya, Iraq, and Kuwait (Table 1).

Temporal trends, 2019–2023
Table 2 reports estimated annual percentage change for the global benchmark and all 22 Arab League member states over 2019–2023. Most country-level trends were modest, with confidence intervals that included zero; significant increases were observed most consistently for other drug use disorders, and several countries showed significant declines (Table 2; Fig. 3). Overall, short-term regional burden was fairly steady, and the change that did occur was concentrated in a few substance categories rather than spread across all of them.

Global trends were more dynamic. Cannabis use disorder prevalence declined significantly worldwide, while other drug use disorders increased; opioid use disorder also showed a significant positive global trend. Against this relatively stable regional backdrop, country-level changes were heterogeneous. The United Arab Emirates showed declines in several categories, including drug use disorders and opioid use disorder, whereas Saudi Arabia, Jordan, Egypt, Palestine, and Bahrain showed increases in selected categories (Table 2).

The trajectory plots showed that country-level trends were not uniform. Supplementary Figure S2 shows relative change in drug use disorder prevalence from the 2019 baseline, with gradual increases in some countries and stability or decline in a few. Fig. 3 summarises estimated annual percentage change across countries and outcomes. Significant increases were observed most consistently for other drug, and opioid use disorders, and were seen across most member states, including Djibouti, Comoros, Somalia, Saudi

Country	Substance use disorders prevalence % (95% UI)	Alcohol use disorders prevalence % (95% UI)	Drug use disorders prevalence % (95% UI)	Opioid use disorders prevalence % (95% UI)	Cannabis use disorders prevalence % (95% UI)	Amphetamine use disorders prevalence % (95% UI)	Cocaine use disorders prevalence % (95% UI)	Other drug use disorders prevalence % (95% UI)	SUD DALY rate per 100,000 (95% UI)	AUD DALY rate per 100,000 (95% UI)	DUD DALY rate per 100,000 (95% UI)	OUD DALY rate per 100,000 (95% UI)	SUD Death rate per 100,000 (95% UI)	OUD Death rate per 100,000 (95% UI)
Algeria	0.78 (0.68–0.90)	0.34 (0.26–0.43)	0.45 (0.39–0.53)	0.21 (0.18–0.25)	0.16 (0.11–0.23)	0.04 (0.02–0.05)	0.02 (0.02–0.03)	0.03 (0.02–0.03)	244.02 (177.09–322.32)	41.56 (28.65–59.17)	202.46 (142.08–279.75)	161.55 (109.16–219.74)	2.43 (1.44–4.06)	1.64 (0.84–2.81)
Bahrain	0.77 (0.65–0.89)	0.37 (0.28–0.47)	0.40 (0.34–0.49)	0.18 (0.14–0.23)	0.15 (0.09–0.22)	0.04 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.01–0.03)	140.16 (103.16–179.90)	40.08 (27.26–57.40)	100.07 (73.17–131.79)	83.16 (57.09–112.91)	0.45 (0.31–0.65)	0.23 (0.13–0.37)
Comoros	1.58 (1.34–1.84)	1.27 (1.06–1.55)	0.31 (0.24–0.43)	0.06 (0.05–0.07)	0.20 (0.13–0.31)	0.04 (0.03–0.05)	0.01 (0.00–0.01)	0.01 (0.01–0.01)	202.43 (154.17–258.91)	149.17 (107.36–204.56)	53.26 (38.89–68.80)	39.28 (27.74–52.76)	1.21 (0.88–1.73)	0.34 (0.18–0.55)
Djibouti	1.76 (1.50–2.01)	1.44 (1.19–1.73)	0.33 (0.25–0.44)	0.06 (0.05–0.08)	0.21 (0.14–0.32)	0.04 (0.03–0.05)	0.01 (0.00–0.01)	0.01 (0.01–0.01)	319.98 (251.45–411.13)	223.83 (164.63–297.18)	96.15 (68.18–138.15)	78.15 (51.44–118.07)	3.54 (2.53–5.12)	1.06 (0.55–1.87)
Egypt	0.72 (0.62–0.84)	0.32 (0.25–0.41)	0.40 (0.34–0.47)	0.21 (0.18–0.25)	0.12 (0.08–0.18)	0.04 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.01–0.03)	133.97 (94.43–170.57)	31.46 (19.42–47.40)	102.51 (70.55–130.19)	88.19 (58.58–114.64)	0.21 (0.14–0.33)	0.13 (0.08–0.23)
Iraq	0.76 (0.66–0.88)	0.33 (0.25–0.43)	0.43 (0.37–0.50)	0.19 (0.16–0.22)	0.15 (0.10–0.22)	0.03 (0.02–0.05)	0.02 (0.02–0.03)	0.04 (0.03–0.04)	237.89 (175.39–324.31)	31.74 (20.73–46.80)	206.14 (147.51–287.20)	139.14 (96.55–193.13)	2.44 (1.36–3.97)	1.33 (0.63–2.37)
Jordan	0.74 (0.63–0.87)	0.33 (0.25–0.43)	0.41 (0.34–0.48)	0.20 (0.15–0.25)	0.14 (0.09–0.21)	0.03 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.01–0.03)	129.19 (93.17–171.33)	33.25 (22.15–49.50)	95.94 (68.99–126.97)	81.41 (56.18–108.93)	0.19 (0.13–0.28)	0.09 (0.05–0.15)
Kuwait	0.83 (0.71–0.96)	0.35 (0.26–0.45)	0.49 (0.42–0.57)	0.20 (0.17–0.24)	0.19 (0.14–0.27)	0.04 (0.03–0.06)	0.02 (0.02–0.03)	0.03 (0.03–0.04)	167.38 (127.99–209.84)	34.85 (23.94–50.80)	132.53 (101.77–164.22)	99.92 (74.60–127.09)	0.91 (0.65–1.22)	0.49 (0.33–0.70)
Lebanon	0.87 (0.76–1.00)	0.34 (0.25–0.43)	0.54 (0.45–0.63)	0.28 (0.24–0.32)	0.17 (0.11–0.24)	0.06 (0.04–0.08)	0.01 (0.01–0.02)	0.02 (0.01–0.03)	183.60 (136.94–230.42)	35.13 (23.58–50.31)	148.47 (111.99–187.45)	126.31 (92.05–162.52)	0.60 (0.40–0.87)	0.36 (0.22–0.56)
Libya	0.84 (0.74–0.95)	0.34 (0.26–0.43)	0.50 (0.44–0.58)	0.27 (0.24–0.31)	0.14 (0.09–0.20)	0.04 (0.03–0.05)	0.02 (0.02–0.03)	0.04 (0.03–0.04)	271.15 (205.20–347.88)	40.43 (28.74–56.95)	230.72 (167.86–307.12)	183.87 (131.02–245.28)	2.41 (1.41–4.00)	1.57 (0.84–2.69)
Mauritania	0.65 (0.57–0.75)	0.40 (0.33–0.50)	0.25 (0.20–0.30)	0.08 (0.06–0.09)	0.12 (0.08–0.18)	0.04 (0.03–0.05)	0.01 (0.00–0.01)	0.01 (0.01–0.01)	128.93 (95.12–163.04)	84.61 (61.42–112.71)	44.32 (31.46–57.63)	34.14 (24.17–45.95)	1.45 (0.94–2.18)	0.11 (0.05–0.20)
Morocco	0.77 (0.67–0.88)	0.32 (0.24–0.41)	0.45 (0.39–0.53)	0.21 (0.18–0.25)	0.16 (0.12–0.24)	0.03 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.02–0.03)	254.99 (195.20–335.42)	42.94 (31.45–59.74)	212.05 (156.14–288.31)	167.22 (115.46–226.47)	2.70 (1.73–4.22)	1.75 (0.98–2.96)
Oman	0.76 (0.65–0.89)	0.38 (0.28–0.48)	0.39 (0.32–0.47)	0.17 (0.14–0.21)	0.14 (0.09–0.21)	0.04 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.01–0.03)	132.93 (96.19–170.39)	40.82 (27.87–57.21)	92.11 (65.96–120.37)	76.10 (51.73–101.26)	0.36 (0.23–0.54)	0.17 (0.09–0.29)
Palestine	0.78 (0.66–0.92)	0.33 (0.25–0.43)	0.45 (0.37–0.54)	0.19 (0.15–0.24)	0.20 (0.13–0.28)	0.03 (0.02–0.05)	0.02 (0.01–0.02)	0.02 (0.01–0.03)	122.37 (86.40–161.17)	32.48 (21.51–47.93)	89.89 (64.39–119.77)	75.42 (53.30–102.82)	0.06 (0.04–0.09)	0.03 (0.02–0.04)
Qatar	0.79 (0.67–0.93)	0.38 (0.29–0.50)	0.41 (0.34–0.49)	0.18 (0.14–0.22)	0.15 (0.10–0.23)	0.04 (0.03–0.05)	0.02 (0.01–0.03)	0.02 (0.02–0.03)	127.34 (91.91–165.04)	37.78 (24.31–57.23)	89.55 (64.35–118.31)	74.81 (51.32–101.48)	0.17 (0.12–0.24)	0.10 (0.06–0.15)
Saudi Arabia	0.76 (0.64–0.89)	0.35 (0.26–0.46)	0.41 (0.35–0.49)	0.19 (0.15–0.24)	0.15 (0.09–0.22)	0.04 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.01–0.03)	131.17 (92.37–172.63)	34.32 (21.82–50.17)	96.84 (66.53–127.58)	82.17 (55.07–109.47)	0.20 (0.12–0.31)	0.14 (0.08–0.23)
Somalia	1.46 (1.25–1.71)	1.16 (0.97–1.41)	0.31 (0.24–0.42)	0.06 (0.05–0.07)	0.20 (0.13–0.31)	0.04 (0.03–0.05)	0.01 (0.00–0.01)	0.01 (0.01–0.01)	209.73 (159.99–268.53)	155.36 (110.67–207.13)	54.37 (40.58–71.38)	39.13 (26.82–55.14)	1.68 (1.13–2.49)	0.34 (0.17–0.64)
Sudan	0.68 (0.59–0.78)	0.29 (0.22–0.37)	0.39 (0.33–0.46)	0.19 (0.16–0.22)	0.13 (0.09–0.20)	0.03 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.02–0.03)	205.95 (150.49–266.33)	37.59 (26.17–52.58)	168.36 (118.20–232.76)	136.66 (94.80–185.14)	1.93 (1.15–3.12)	1.30 (0.65–2.20)
Syrian Arab Republic	0.73 (0.63–0.82)	0.35 (0.28–0.44)	0.38 (0.32–0.44)	0.19 (0.16–0.23)	0.11 (0.07–0.17)	0.03 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.01–0.02)	160.07 (121.07–196.06)	45.98 (34.29–60.98)	114.09 (86.61–142.40)	97.22 (71.60–122.59)	1.11 (0.82–1.42)	0.60 (0.39–0.86)
Tunisia	0.80 (0.70–0.91)	0.37 (0.29–0.45)	0.43 (0.38–0.51)	0.22 (0.18–0.25)	0.14 (0.09–0.20)	0.04 (0.02–0.05)	0.02 (0.02–0.03)	0.03 (0.02–0.03)	214.80 (168.04–264.41)	45.37 (32.99–62.26)	169.43 (128.40–210.72)	139.88 (104.41–177.50)	2.28 (1.54–3.20)	1.58 (0.99–2.36)

(Table 1 continues on next page)

Country	Substance use disorders prevalence % (95% UI)	Alcohol use disorders prevalence % (95% UI)	Drug use disorders prevalence % (95% UI)	Opioid use disorders prevalence % (95% UI)	Cannabis use disorders prevalence % (95% UI)	Amphetamine use disorders prevalence % (95% UI)	Cocaine use disorders prevalence % (95% UI)	Other drug use disorders prevalence % (95% UI)	SUD DALY rate per 100,000 (95% UI)	AUD DALY rate per 100,000 (95% UI)	DUD DALY rate per 100,000 (95% UI)	OUD DALY rate per 100,000 (95% UI)	SUD Death rate per 100,000 (95% UI)	OUD Death rate per 100,000 (95% UI)
(Continued from previous page)														
United Arab Emirates	1.03 (0.91–1.16)	0.41 (0.31–0.52)	0.62 (0.55–0.71)	0.38 (0.34–0.44)	0.15 (0.09–0.21)	0.05 (0.04–0.07)	0.02 (0.02–0.03)	0.02 (0.02–0.03)	253.49 (190.04–313.09)	45.85 (32.35–65.89)	207.64 (153.94–258.08)	180.87 (130.14–229.09)	1.21 (0.80–1.87)	0.73 (0.43–1.21)
Yemen	0.66 (0.57–0.77)	0.31 (0.24–0.38)	0.36 (0.31–0.43)	0.16 (0.13–0.19)	0.13 (0.09–0.20)	0.03 (0.02–0.04)	0.02 (0.01–0.02)	0.02 (0.01–0.02)	150.73 (112.26–192.51)	35.58 (24.30–49.72)	115.15 (85.37–154.00)	94.73 (66.62–124.13)	1.04 (0.63–1.78)	0.68 (0.35–1.27)
Global	2.10 (1.90–2.35)	1.44 (1.24–1.66)	0.69 (0.59–0.78)	0.21 (0.19–0.24)	0.28 (0.21–0.36)	0.12 (0.09–0.16)	0.06 (0.05–0.08)	0.02 (0.02–0.02)	421.92 (348.29–500.81)	209.95 (167.18–268.99)	211.98 (179.25–245.59)	153.71 (127.37–179.98)	3.94 (3.62–4.29)	1.47 (1.27–1.69)
Arab League (unweighted median)	0.78 (0.66–0.89)	0.35 (0.26–0.44)	0.41 (0.34–0.49)	0.19 (0.15–0.24)	0.15 (0.09–0.22)	0.04 (0.02–0.05)	0.02 (0.01–0.03)	0.02 (0.01–0.03)	175.49 (132.46–220.13)	40.26 (27.56–57.22)	108.30 (79.27–140.27)	91.46 (62.60–120.33)	1.16 (0.81–1.76)	0.42 (0.28–0.67)

Note. Values are age-standardised point estimates with 95% UI from the GBD Study 2023, both sexes combined. Prevalence values are reported as percentages of the population. Disability-adjusted life year (DALY) rate and mortality rate are reported per 100,000 population. DALY = Disability-adjusted life year. UI = Uncertainty interval. The Arab League regional aggregate (final row) is the unweighted across-country median of the twenty-two country point estimates; the corresponding median 95% UI bounds are reported in parentheses. Deviation from the global estimate (not shown in the table; reported in the Methods) is computed as the percentage by which the Arab League aggregate falls below the GBD 2023 global point estimate. Other drug use disorders comprises GBD 2023 drug use disorders not classified as opioid, cocaine, amphetamine, or cannabis use disorders, and captures hallucinogen, inhalant, sedative-hypnotic, polysubstance, and unspecified-substance use disorders.

Table 1: **Age-standardised prevalence (%) and burden rates (per 100,000 population) of substance use disorders across the twenty-two Arab League member states and the global benchmark, 2023.**

Arabia, Lebanon, Bahrain, Morocco, Sudan, and Syria. Significant declines were noted in the United Arab Emirates for overall substance use disorders and the drug, opioid, cannabis, and amphetamine use disorder categories. Similarly, significant declines were noted in Libya for overall substance use disorders and the drug, cannabis, amphetamine, cocaine, and other drug use disorder categories. Beyond these, cannabis use disorder also declined significantly in Bahrain, Saudi Arabia, Oman, Qatar, and Jordan. Alcohol use disorder and overall substance use disorder trajectories (Supplementary Figures S3 and S4) showed the same heterogeneity.

Sex-stratified prevalence

Across the 22 Arab League member states, age-standardised substance use disorder prevalence in 2023 was higher in men than women in every country, with regional median values of 0.95% (95% UI 0.80–1.11) in men and 0.58% (0.50–0.66) in women (M:F ratio 1.63). The male-to-female gap was largest for alcohol use disorders (regional median Male 0.46% [95% UI 0.34–0.58], Female 0.21% [0.16–0.27], M:F 2.16) and substantially narrower for drug use disorders (Male 0.44% [95% UI 0.35–0.54], Female 0.36% [0.31–0.43], M:F 1.20). For opioid use disorders, regional median female prevalence (0.23%, 95% UI 0.18–0.29) exceeded male prevalence (0.16%, 0.12–0.19), giving an M:F ratio of 0.69. This contrasts with the male-dominant pattern observed globally (global Male 0.22%, Female 0.21%, M:F 1.08). Female opioid use disorder prevalence exceeded male prevalence in 19 of the 22 Arab League countries; only Lebanon, Libya, and the United Arab Emirates retained a male-dominant pattern. The female-dominant pattern was particularly strong in Oman (M:F 0.60), Bahrain (0.61), Palestine (0.63), Qatar (0.63), and Syria (0.64; Fig. 4a and b). Country-level age-standardised prevalence by sex for all eight substance categories is provided in Supplementary Table S4.

Geographic patterning

Fig. 5 illustrates marked geographic variation across the Arab League. Djibouti (1.76%, 95% UI 1.50–2.01), Comoros (1.58%, 1.34–1.84), and Somalia (1.46%, 1.25–1.71) recorded the highest overall substance use disorder prevalence, driven largely by alcohol use disorders. Among the remaining countries, the United Arab Emirates had the highest overall prevalence (1.03%, 0.91–1.16), driven by drug and opioid use disorders, followed by Lebanon (0.87%, 0.76–1.00), Libya (0.84%, 0.74–0.95), and Kuwait (0.83%, 0.71–0.96); the lowest overall prevalence was in Mauritania (0.65%, 0.57–0.75), Yemen (0.66%, 0.57–0.77), and Sudan (0.68%, 0.59–0.78). Cannabis use disorder prevalence was highest in Djibouti, Comoros, and Somalia (Fig. 5; Table 1).

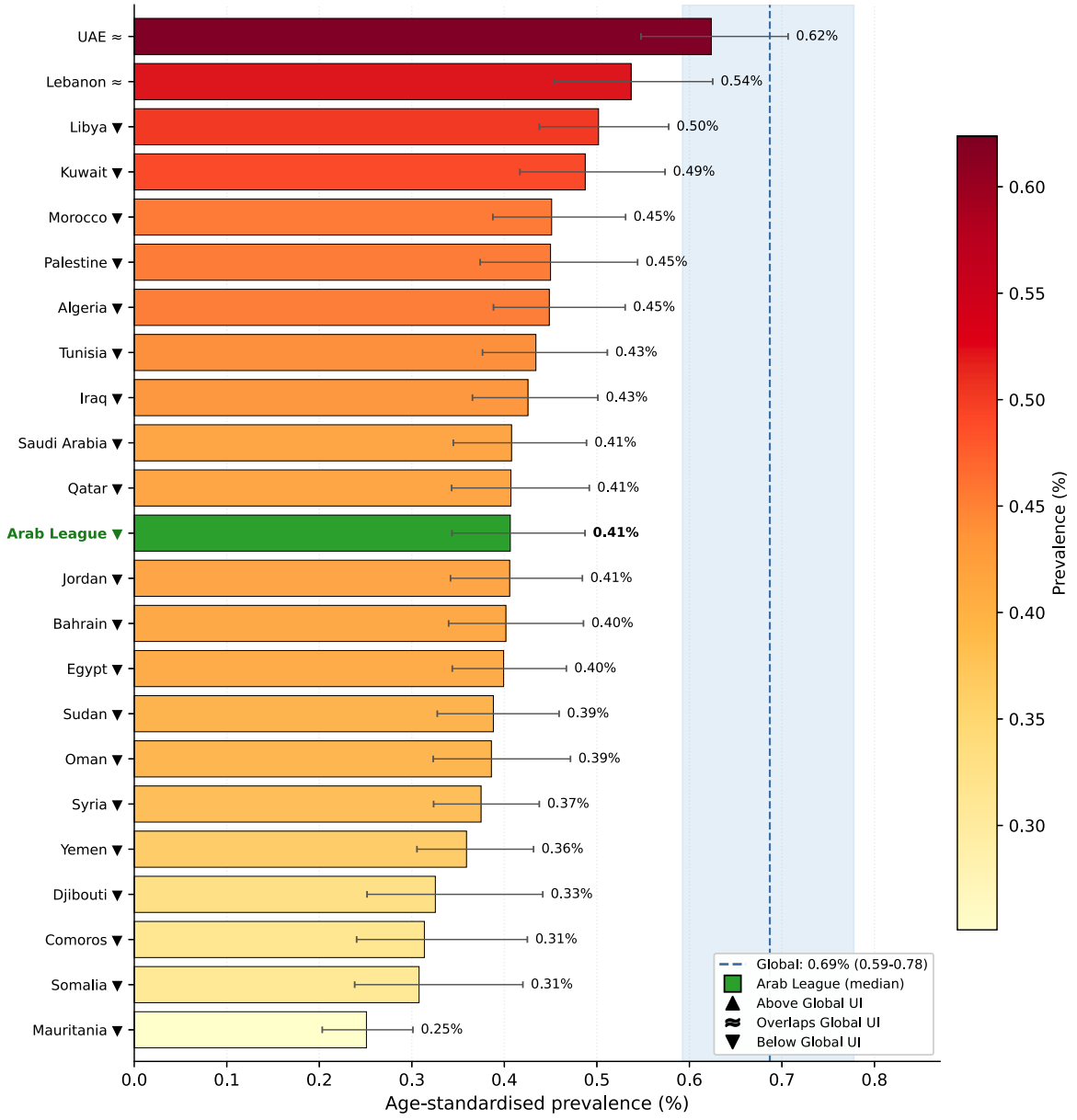


Fig. 1: Age-standardised prevalence (%) of drug use disorders across 22 Arab League member states and the global benchmark, 2023. **Note**. Horizontal bars represent point estimates with 95% UI. Dashed blue line indicates the global estimate (0.69%; 95%UI: 0.59–0.78). Green bar = Arab League aggregate. Triangle markers denote relationship to global 95% UI. Countries ranked by descending prevalence.

Disability and mortality burden

The Arab League regional median age-standardised DALY rate for substance use disorders in 2023 was 175.5 per 100,000 (95% UI 132.5–220.1), approximately 58% below the GBD 2023 global estimate (421.9, 348.3–500.8) (Table 1; Fig. 6). The disability-burden pattern matched the prevalence pattern in three ways: alcohol use disorder showed the largest gap (81% below the global estimate), the opioid DALY rate was closest to the global estimate (40% below), and Djibouti had the highest absolute substance use disorder DALY rate. It also differed in two informative ways. First, the country ranking shifted between the prevalence and DALY framings: countries whose SUD profile is alcohol-dominated (Comoros, Somalia) moved down in the DALY rank because alcohol carries a lower per-case disability weight than opioids in the GBD weighting scheme, while countries whose profile is opioid-dominated (Morocco, Algeria,

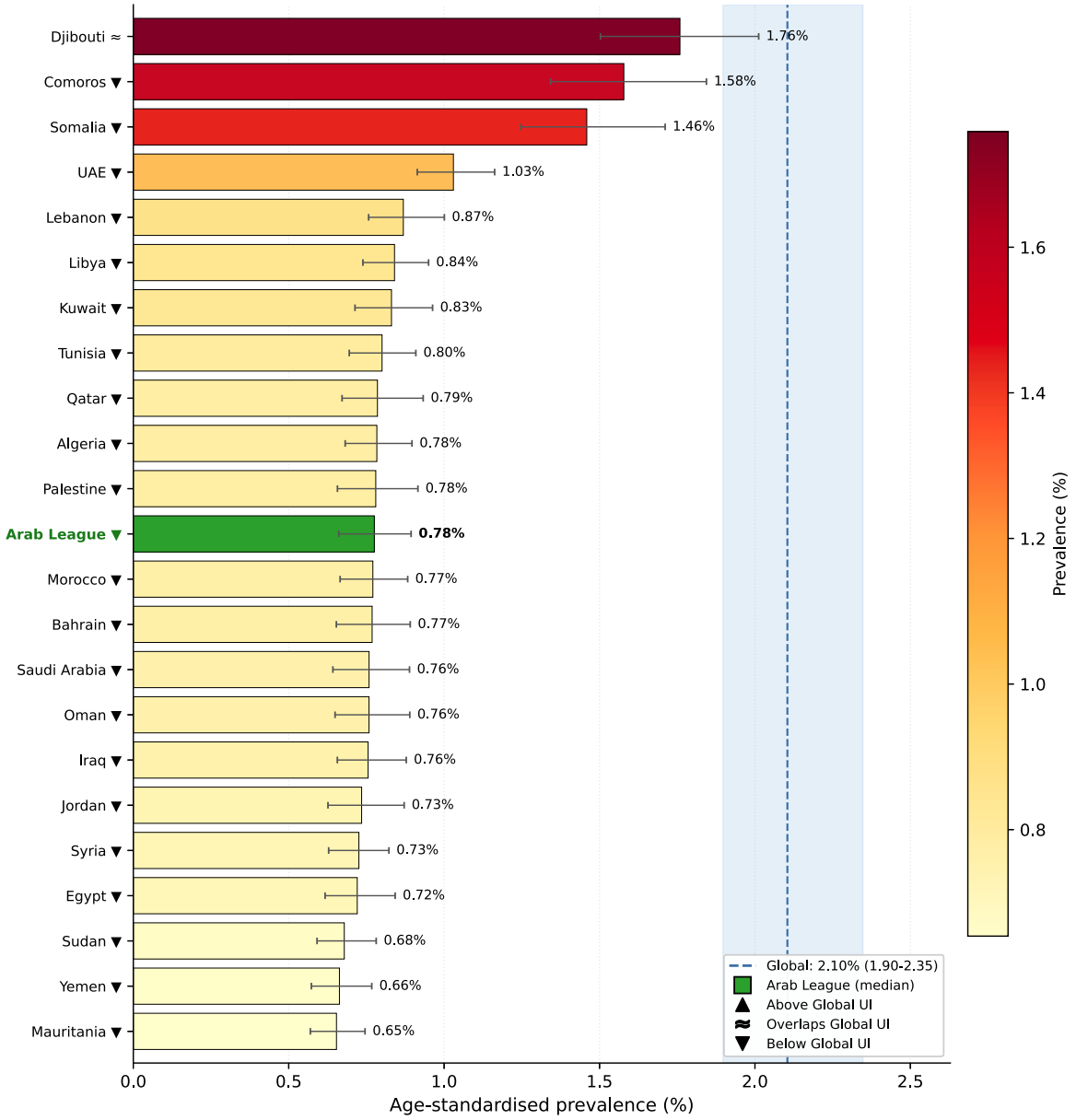


Fig. 2: Age-standardised prevalence (%) of substance use disorders across 22 Arab League member states and the global benchmark, 2023. **Note**. Horizontal bars represent point estimates with 95% UI. Dashed blue line indicates the global estimate (2.10%; 95% UI: 1.90–2.35). Green bar = Arab League aggregate. Triangle markers denote relationship to global 95% UI: ▲ above, ≈ overlaps, ▼ below. Countries ranked by descending prevalence.

Libya, the United Arab Emirates) moved up. Second, four countries exceeded the global opioid use disorder DALY rate by point estimate: Libya (183.9, 95% UI 131.0–245.3), the United Arab Emirates (180.9, 130.1–229.1), Morocco (167.2, 115.5–226.5), and Algeria (161.5, 109.2–219.7), although 95% UI overlapped the global interval in each case (Fig. 6d). Mortality rate estimates were small in absolute terms for most substance categories (regional median SUD mortality rate 1.16 per 100,000) but showed substantial sex differences, particularly for alcohol use disorder (Male 0.24, Female 0.08 per 100,000). Burden rates by country and cause are provided in Supplementary Table S5, and by sex in Supplementary Table S6.

Discussion

This comparative analysis of GBD Study 2023 estimates shows that substance use disorder prevalence across the

Country	SUD	AUD	DUD	Opioid	Cannabis	Amphetamine	Cocaine	Other Drug
Global	0.17 (−0.27 to 0.61)	0.15 (−0.68 to 0.98)	0.24 (−0.20 to 0.69)	1.21 ▲ (0.29–2.13)	−0.35 ▼ (−0.45 to −0.26)	−0.18 (−0.91 to 0.55)	0.77 ▲ (0.46–1.08)	0.38 ▲ (0.15–0.61)
Djibouti	0.20 ▲ (0.11–0.28)	0.19 ▲ (0.06–0.32)	0.24 ▲ (0.06–0.42)	0.74 ▲ (0.11–1.37)	0.07 ▲ (0.03–0.11)	0.20 (−0.28 to 0.69)	0.00 (−0.13 to 0.13)	1.04 ▲ (0.89–1.20)
Comoros	0.17 ▲ (0.01–0.34)	0.16 (−0.02 to 0.34)	0.23 ▲ (0.09–0.36)	0.53 ▲ (0.06–1.01)	0.07 ▲ (0.04–0.10)	0.47 (−0.02 to 0.96)	−0.14 (−0.46 to 0.18)	1.04 ▲ (0.73–1.36)
Somalia	0.05 (−0.16 to 0.25)	0.00 (−0.23 to 0.23)	0.22 ▲ (0.06–0.38)	0.60 ▲ (0.07–1.14)	0.06 ▲ (0.05–0.06)	0.33 (−0.13 to 0.80)	0.20 (−0.07 to 0.47)	1.19 ▲ (0.67–1.71)
UAE	−0.54 ▼ (−0.88 to −0.19)	−0.31 (−1.12 to 0.50)	−0.69 ▼ (−0.82 to −0.55)	−0.64 ▼ (−0.80 to −0.48)	−0.58 ▼ (−0.73 to −0.44)	−2.00 ▼ (−2.58 to −1.42)	−0.22 (−0.58 to 0.15)	0.47 ▲ (0.32–0.62)
Lebanon	0.42 ▲ (0.14–0.70)	0.28 (−0.85 to 1.42)	0.51 ▲ (0.19–0.84)	0.87 ▲ (0.37–1.38)	−0.15 (−0.31 to 0.01)	0.64 ▲ (0.05–1.22)	0.33 ▲ (0.09–0.56)	0.98 ▲ (0.38–1.58)
Libya	−0.16 ▼ (−0.31 to −0.00)	−0.15 (−0.65 to 0.34)	−0.16 ▼ (−0.25 to −0.08)	−0.10 (−0.27 to 0.08)	−0.06 ▼ (−0.11 to −0.01)	−0.28 ▼ (−0.52 to −0.03)	−1.18 ▼ (−1.82 to −0.53)	−0.27 ▼ (−0.54 to −0.00)
Kuwait	0.33 (−0.11 to 0.77)	0.70 (−0.34 to 1.74)	0.08 ▲ (0.00–0.15)	0.27 (−0.21 to 0.75)	0.43 ▲ (0.36–0.50)	−0.19 (−0.58 to 0.20)	0.20 ▲ (0.07–0.33)	−2.77 ▼ (−4.43 to −1.09)
Tunisia	0.17 (−0.05 to 0.40)	0.04 (−0.45 to 0.54)	0.29 ▲ (0.07–0.51)	0.64 ▲ (0.16–1.12)	0.03 (−0.05 to 0.12)	−0.04 (−0.22 to 0.13)	−0.54 ▼ (−0.94 to −0.15)	−0.06 ▼ (−0.11 to −0.02)
Qatar	0.06 (−0.56 to 0.69)	−0.35 (−1.59 to 0.90)	0.45 (−0.05 to 0.96)	2.03 ▲ (0.97–3.09)	−1.04 ▼ (−1.18 to −0.91)	−0.46 ▼ (−0.92 to −0.01)	0.27 (−0.37 to 0.92)	0.45 ▲ (0.37–0.54)
Algeria	0.22 (−0.11 to 0.55)	0.26 (−0.66 to 1.19)	0.19 ▲ (0.03–0.35)	0.39 ▲ (0.06–0.73)	0.03 (−0.02 to 0.07)	0.21 (−0.16 to 0.58)	−0.21 (−0.44 to 0.02)	−0.17 (−0.35 to 0.02)
Palestine	0.51 ▲ (0.16–0.87)	0.42 (−0.68 to 1.54)	0.58 ▲ (0.03–1.14)	1.17 ▲ (0.16–2.19)	−0.02 (−0.23 to 0.19)	0.48 (−0.25 to 1.23)	0.62 (−0.15 to 1.40)	1.29 ▲ (0.65–1.94)
Morocco	0.39 (−0.01 to 0.79)	0.42 (−0.69 to 1.54)	0.37 ▲ (0.07–0.66)	0.65 ▲ (0.09–1.21)	0.09 ▲ (0.04–0.14)	0.36 (−0.20 to 0.92)	−0.03 (−0.11 to 0.05)	0.15 ▲ (0.11–0.19)
Bahrain	0.42 ▲ (0.02–0.81)	0.21 (−0.57 to 1.00)	0.60 ▲ (0.05–1.17)	1.56 ▲ (0.39–2.75)	−0.44 ▼ (−0.62 to −0.26)	0.20 (−0.42 to 0.83)	0.30 (−0.14 to 0.75)	0.83 ▲ (0.64–1.02)
Saudi Arabia	0.57 ▲ (0.01–1.13)	0.54 (−0.73 to 1.82)	0.60 ▲ (0.08–1.13)	1.14 ▲ (0.11–2.18)	−0.16 ▼ (−0.26 to −0.05)	0.61 ▲ (0.02–1.20)	0.62 ▲ (0.10–1.14)	1.04 ▲ (0.70–1.38)
Oman	0.33 (−0.03 to 0.68)	−0.03 (−0.56 to 0.51)	0.68 ▲ (0.16–1.21)	1.43 ▲ (0.36–2.51)	−0.06 ▼ (−0.10 to −0.03)	0.29 (−0.19 to 0.78)	0.44 (−0.02 to 0.90)	0.78 ▲ (0.57–1.00)
Iraq	0.13 (−0.46 to 0.73)	0.36 (−1.03 to 1.77)	−0.04 (−0.12 to 0.03)	−0.07 (−0.27 to 0.13)	0.02 (−0.04 to 0.08)	0.23 (−0.31 to 0.77)	−0.18 (−0.38 to 0.03)	−0.38 (−0.93 to 0.17)
Jordan	0.48 (−0.14 to 1.10)	0.38 (−0.98 to 1.75)	0.56 ▲ (0.07–1.04)	1.04 ▲ (0.15–1.94)	−0.10 ▼ (−0.18 to −0.03)	0.11 (−0.25 to 0.48)	0.66 ▲ (0.03–1.29)	1.23 ▲ (0.70–1.77)
Syria	0.26 (−0.03 to 0.54)	−0.11 (−0.39 to 0.18)	0.60 ▲ (0.28–0.92)	0.69 ▲ (0.16–1.22)	0.56 ▲ (0.11–1.00)	0.23 ▲ (0.00–0.47)	0.13 (−0.16 to 0.42)	1.20 ▲ (0.65–1.75)
Egypt	0.45 (−0.03 to 0.92)	0.56 (−0.91 to 2.05)	0.36 ▲ (0.04–0.68)	0.32 (−0.10 to 0.74)	0.34 (−0.13 to 0.80)	0.01 (−0.49 to 0.51)	0.72 ▲ (0.04–1.41)	1.34 ▲ (0.90–1.77)
Sudan	0.13 (−0.14 to 0.41)	−0.10 (−0.92 to 0.72)	0.31 ▲ (0.06–0.57)	0.57 ▲ (0.10–1.04)	0.03 ▲ (0.01–0.04)	0.20 (−0.28 to 0.68)	−0.00 (−0.13 to 0.13)	0.38 ▲ (0.26–0.51)
Yemen	0.24 (−0.16 to 0.65)	0.12 (−0.85 to 1.10)	0.35 ▲ (0.06–0.63)	0.67 ▲ (0.21–1.14)	−0.01 (−0.05 to 0.03)	0.33 (−0.06 to 0.72)	0.18 (−0.28 to 0.64)	0.22 (−0.29 to 0.74)
Mauritania	0.26 (−0.03 to 0.55)	0.18 (−0.30 to 0.67)	0.39 ▲ (0.09–0.69)	0.88 ▲ (0.14–1.62)	0.08 ▲ (0.02–0.14)	0.39 (−0.21 to 0.99)	0.09 (−0.26 to 0.44)	0.87 ▲ (0.65–1.08)

Note. Estimated annual percentage change (EAPC) was calculated by log-linear regression of annual age-standardised prevalence on calendar year, 2019–2023, with 95% confidence intervals derived from the slope standard error (Student's t distribution, df = 3). Values represent percentage change per year. ▲ indicates a statistically significant increase (lower 95% confidence interval bound >0); ▼ indicates a statistically significant decrease (upper 95% confidence interval bound <0); cells without an arrow are non-significant. Because the window contains only five annual observations, trends are interpreted descriptively rather than as formal hypothesis tests. Countries are ordered by descending substance use disorder prevalence. SUD = substance use disorders; AUD = alcohol use disorders; DUD = drug use disorders.

***Table 2*: Estimated annual percentage change (EAPC) in age-standardised prevalence of substance use disorders across twenty-two Arab League member states and the global benchmark, 2019–2023.**

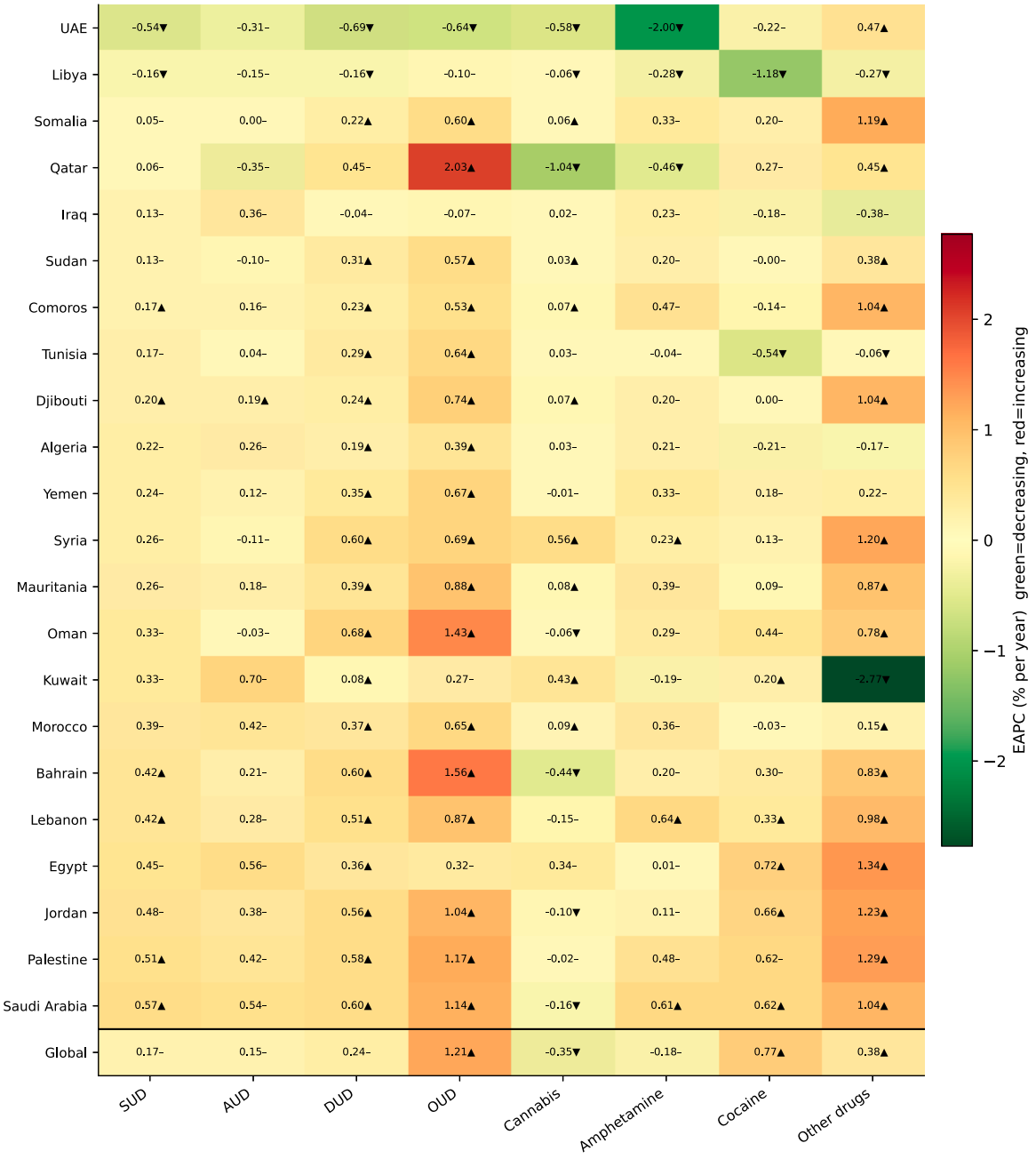


Fig. 3: Estimated annual percentage change (EAPC) in age-standardised prevalence (both sexes) by country and substance category, 2019–2023. **Note**. Cell values represent EAPC (% per year). Green shading indicates decreasing trends; red/orange shading indicates increasing trends. ▲ = statistically significant increase; ▼ = statistically significant decrease; – = non-significant. Countries ranked by overall SUD EAPC (ascending).

Arab League remains below global levels overall, but the regional profile is not one of uniformly low overall burden.[15–17,24,25] The most striking divergence was seen for alcohol use disorders, whereas opioid use disorder lay much closer to the global benchmark, which was exceeded in the United Arab Emirates. Cross-country heterogeneity was substantial, with the highest overall substance use disorder prevalence in Djibouti, Comoros, and Somalia, and with distinct substance-specific profiles across individual countries. The

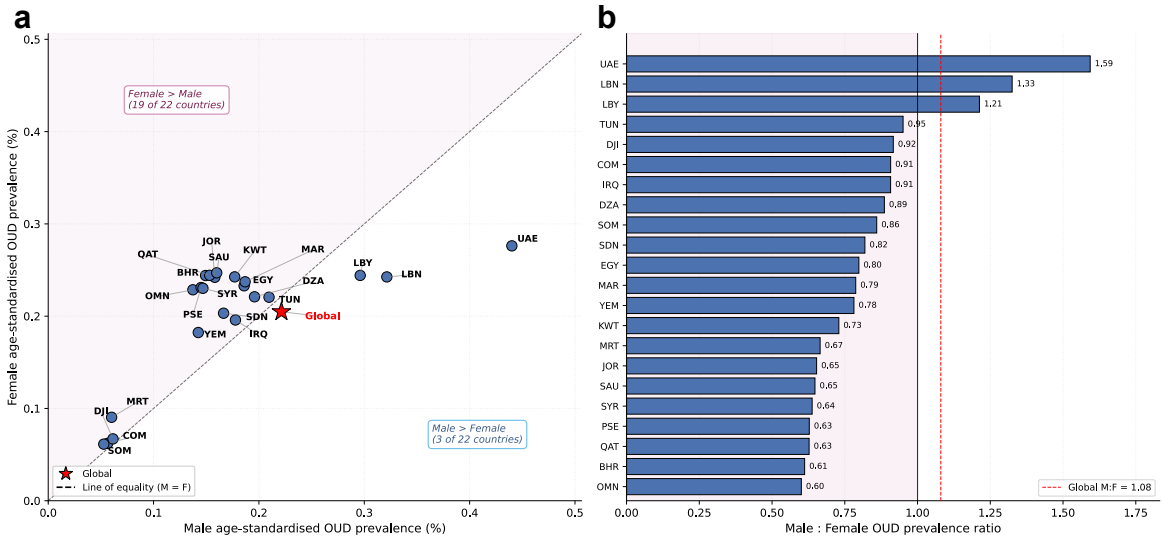


Fig. 4: Sex differences in age-standardised opioid use disorder prevalence across the Arab League, 2023. **Note**. **(a)** Male vs female age-standardised opioid use disorder prevalence for each of the 22 Arab League member states, with the global benchmark plotted as a red star. Country abbreviations follow ISO 3166–1 alpha-3: DZA = Algeria; BHR = Bahrain; COM = Comoros; DJI = Djibouti; EGY = Egypt; IRQ = Iraq; JOR = Jordan; KWT = Kuwait; LBN = Lebanon; LBY = Libya; MAR = Morocco; MRT = Mauritania; OMN = Oman; PSE = Palestine; QAT = Qatar; SAU = Saudi Arabia; SDN = Sudan; SOM = Somalia; SYR = Syria; TUN = Tunisia; UAE = United Arab Emirates; YEM = Yemen. The dashed line indicates equality between male and female prevalence. The shaded region above the line of equality marks the female-dominant area, occupied by 19 of 22 Arab League countries. **(b)** Male-to-female prevalence ratio for opioid use disorder by country, sorted ascending. The vertical dashed line at male-to-female ratio = 1.08 indicates the global benchmark. Pink shading marks the female-dominant region (ratio <1). Numeric ratios are labelled next to each bar.

temporal analysis added an important second layer: although regional trends were broadly stable from 2019 to 2023, increases in some countries and the rise in other drug use disorders show that there is substantial heterogeneity between countries. Taken together, Table 1 and Fig. 2 indicate that regional burden was not simply shifted downward uniformly; instead, specific countries and substances drove the higher end of the regional distribution: alcohol use disorders in Djibouti, Comoros, and Somalia, and opioid and other drug use disorders in the United Arab Emirates, Libya, Morocco, and Algeria. These regional-global differences likely reflect both genuine epidemiological variation and measurement effects from sparse surveillance, legal context, and stigma-related under-ascertainment.

These findings extend prior regional work in three ways. First, they align with the pattern of lower recorded alcohol use disorder in settings with religious and legal restrictions on alcohol, reported by Al-Ansari and colleagues for Muslim-majority countries[5] and with the regional drug-related burden pattern reported in a 2023 systematic review in *The Lancet Psychiatry* of drug use and treatment services in the Eastern Mediterranean Region by Rostam-Abadi and colleagues[8]; our GBD 2023 estimates are consistent with both. Second, they extend prior work by providing a full 22-country parallel comparison with substance-specific country-level rankings, by reporting temporal change from 2019 to 2023 (thus covering the COVID-19-affected period), and by adding the disability-adjusted life year framing that a 2026 analysis in Nature Medicine of amphetamine, cannabis, cocaine, and opioid burden across 204 countries[16] and earlier GBD-derived analyses had not applied to the Arab League grouping. Third, they add two findings not previously reported: a female-dominant opioid use disorder prevalence pattern present in 19 of 22 Arab League countries, and the exceedance of the global opioid disability-adjusted life year rate in four countries (Libya, the United Arab Emirates, Morocco, and Algeria).

Several factors plausibly contribute to the lower overall prevalence observed across much of the Arab world. Religious and sociocultural norms are likely to be especially relevant for alcohol use, because prohibition, legal restriction, and strong social disapproval may reduce population-level use and therefore alcohol use disorder prevalence.[5,6,26] This interpretation is consistent with evidence from the Eastern Mediterranean Region showing lower alcohol use than in many other parts of the world, while also confirming that alcohol-related burden persists despite prohibition.[8,26] The key point is not that alcohol use disorder is absent, but that the region appears to occupy a different position on the consumption spectrum than many high-consumption settings.

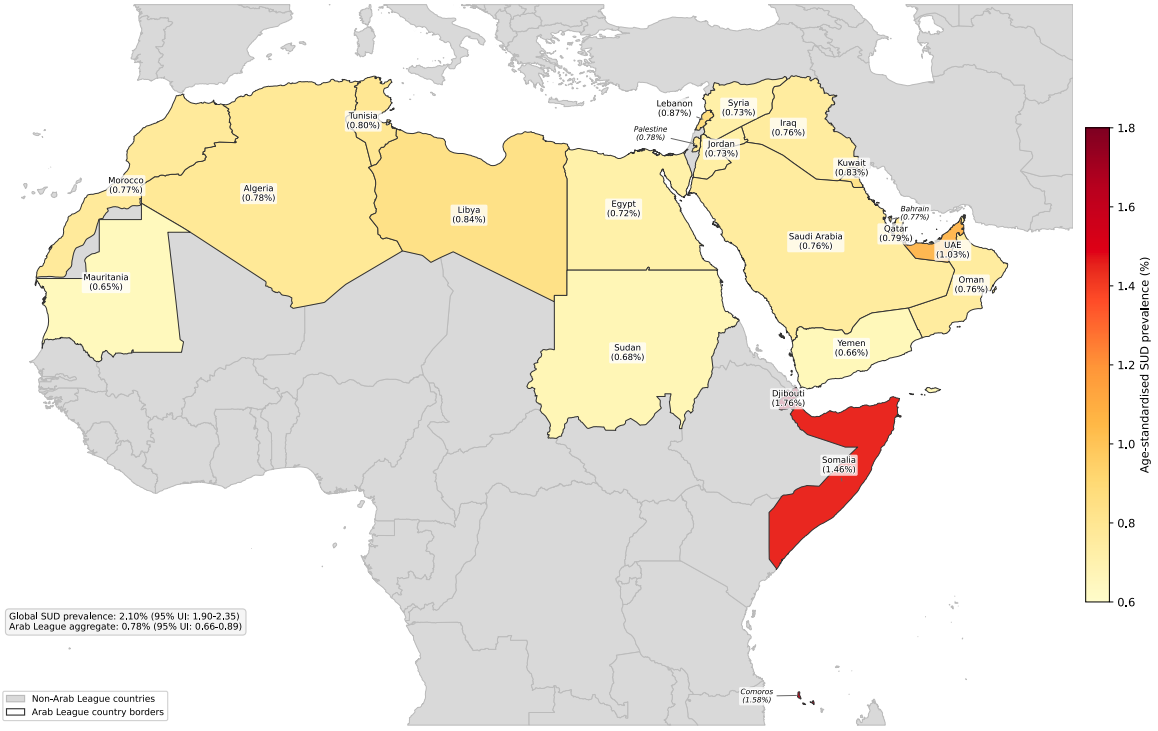


Fig. 5: Geographic distribution of age-standardised prevalence (%) of substance use disorders across 22 Arab League member states, 2023. **Note**. Colour intensity represents age-standardised SUD prevalence (%), with darker shading indicating higher prevalence. Country labels include point estimates. The highest prevalence estimates were observed in Djibouti (1.759%), Comoros (1.578%), and Somalia (1.459%), driven predominantly by alcohol use disorders. The United Arab Emirates (1.030%) exhibited a comparatively high prevalence, driven by drug use disorders. Grey shading denotes non-Arab League countries. The global SUD prevalence was 2.104% (95% UI: 1.897–2.347); the Arab League aggregate was 0.78% (95% UI: 0.66–0.89). Bahrain and Comoros are indicated by annotations owing to their small geographic area. KSA = Kingdom of Saudi Arabia; UAE = United Arab Emirates.

The same factors may affect both actual substance use and how well it is measured. Religious disapproval, legal consequences, and stigma can all discourage disclosure, reduce contact with treatment services, and limit how many cases are recorded. The lower regional estimates therefore likely reflect a combination of genuine epidemiological difference and measurement effects, and the relative contribution of each cannot be quantified from GBD 2023 modelled estimates alone. These issues matter because opioid-related harm may remain visible even where alcohol-related burden appears comparatively lower in regional estimates.[8,13,27]

Potential under-ascertainment also deserves emphasis. In settings where surveillance is limited, legal consequences are substantial, or stigma discourages disclosure, measured prevalence may underestimate underlying burden, particularly among women, young people, displaced populations, and socially marginalised groups.[7,9–12] This concern is especially relevant for the lowest-prevalence settings, where sparse epidemiological inputs may contribute to apparently reassuring estimates. It also helps explain why regional averages should be interpreted as public-health signals rather than literal counts of identified cases.

Sex-stratified and burden estimates added two main findings. First, age-standardised opioid use disorder prevalence was higher in women than men in 19 of 22 Arab League countries (regional median M:F 0.69), whereas the global pattern was male-dominant (Global M:F 1.08). This female-dominant pattern was strongest in Oman, Bahrain, Palestine, Qatar, and Syria. Possible explanations include the regional prominence of tramadol and prescription-opioid use, and greater detection of women through formal prescribing or treatment pathways; sex-specific data for the region remain limited.[8,13] These mechanisms could not be tested in this descriptive analysis and should be examined in primary studies. DALY patterns were different: men had higher opioid DALY rates in 13 countries, suggesting that women had higher estimated prevalence in many settings, while men often carried greater disability burden. Second, DALY rates changed the country ranking. Countries with alcohol-dominated

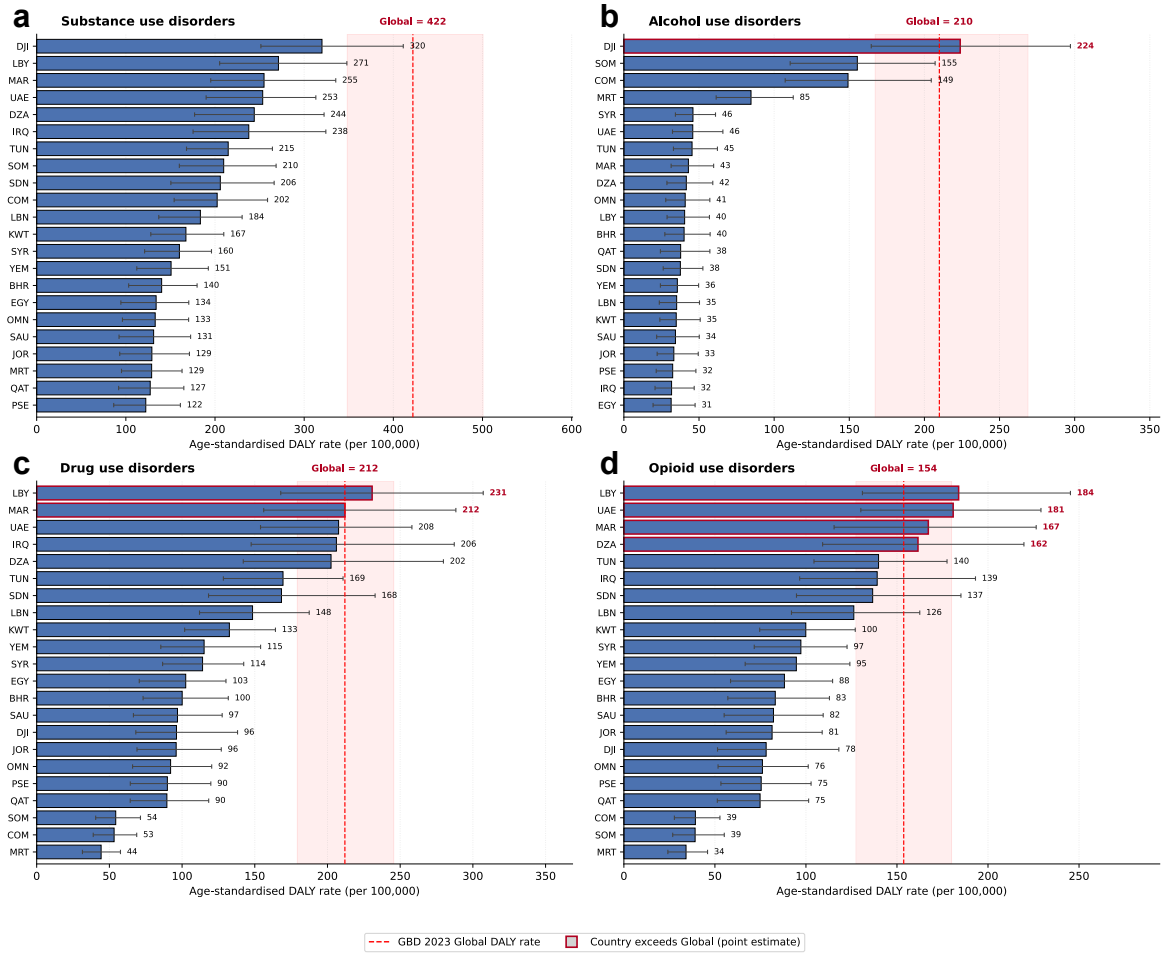


Fig. 6: Age-standardised disability-adjusted life year (DALY) rate per 100,000 population by substance use disorder category and country, 2023. **Note**. **(a)** Substance use disorders; **(b)** Alcohol use disorders; **(c)** Drug use disorders; **(d)** Opioid use disorders. Bars show country age-standardised DALY rates per 100,000 population, with 95% UI as error bars. Country abbreviations follow ISO 3166–1 alpha-3 (with UAE denoting the United Arab Emirates): DZA = Algeria; BHR = Bahrain; COM = Comoros; DJI = Djibouti; EGY = Egypt; IRQ = Iraq; JOR = Jordan; KWT = Kuwait; LBN = Lebanon; LBY = Libya; MAR = Morocco; MRT = Mauritania; OMN = Oman; PSE = Palestine; QAT = Qatar; SAU = Saudi Arabia; SDN = Sudan; SOM = Somalia; SYR = Syria; TUN = Tunisia; UAE = United Arab Emirates; YEM = Yemen. The vertical red dashed line and shaded band indicate the GBD 2023 global age-standardised DALY rate point estimate and 95% UI for the respective substance category. The Arab League regional median DALY rate was 175.5 per 100,000 for substance use disorders, 40.3 for alcohol use disorders, 108.3 for drug use disorders, and 91.5 for opioid use disorders.

profiles, including Djibouti, Comoros, and Somalia, ranked lower by DALY rate than by prevalence, whereas countries with opioid-dominated profiles, including Libya, the United Arab Emirates, Morocco, and Algeria, ranked higher. Libya, the United Arab Emirates, Morocco, and Algeria exceeded the global opioid DALY rate by point estimate, supporting the need for country-specific opioid service planning.

The contrast between alcohol and opioid patterns was one of the most policy-relevant findings. Alcohol use disorders were markedly lower than global levels across almost the whole region, whereas opioid use disorder approached the global benchmark and did not show the same magnitude of regional-global divergence. Several factors may explain this contrast. Alcohol and opioid medicines differ in cultural and legal acceptability. Opioids also reach the region through trafficking routes and through prescription supply.[8] People may be more willing to disclose prescription-opioid use than alcohol use. Finally, the quality of the underlying GBD data differs between the two substance groups. This descriptive analysis cannot weigh these factors against one another. Opioid-related services should therefore not be deprioritised merely because

overall substance use disorder prevalence appears low.[8,16,27,28] It also illustrates why aggregate parent-category estimates can mask clinically important substance-specific priorities. The gap between drug use disorder patterns in the Arab world and global patterns is smaller than that for alcohol, although the underlying reasons for this cannot be attributed to any single factor. The same caution applies to the time trends. A flat regional trend does not mean that nothing has changed within countries. A stable regional average can mask differences in national trends.

Findings relating to cannabis and other drug use disorders provided further nuance. Cannabis use disorder prevalence remained below the global benchmark across the Arab League. The highest modelled cannabis use disorder estimates were in Djibouti, Comoros, and Somalia, not in the North African countries where cannabis is most cultivated, where prevalence was mid-range (Morocco and Algeria, 0.16% each).[8] In other words, where a drug is grown or traded does not predict where modelled use-disorder prevalence is highest. These rankings should be read with caution: the 95% UI for cannabis overlap across most Arab League countries, so apparent differences between countries are not statistically significant. Where a country has few primary data sources, its estimate depends more on the GBD model than on local measurement.[8] Other drug use disorders were the only category showing a significant aggregate increase over time, suggesting a need for closer monitoring of changing local drug markets, misuse of pharmaceuticals, and shifting patterns of poly-substance use. Because this category aggregates substances that are epidemiologically diverse, upward movement may also indicate the importance of more granular surveillance in the future.

Geographic heterogeneity also argues against a single regional narrative. Djibouti (1.76%, 95% UI 1.50–2.01), Comoros (1.58%, 1.34–1.84), and Somalia (1.46%, 1.25–1.71) showed the highest overall substance use disorder prevalence, plausibly reflecting alcohol-related burden; the lower recorded estimates in other conflict-affected states such as Sudan and Yemen may instead reflect sparse surveillance and under-ascertainment rather than genuinely low burden.[7,9,11,12] By contrast, the United Arab Emirates, Bahrain, and Kuwait showed comparatively high opioid and drug use disorder estimates, where better service access and case detection might coexist with distinct market exposures, while Morocco and Algeria showed relatively stronger cannabis signals. These differences support a country-specific rather than a monolithic view of regional burden.

Temporal findings also deserve cautious interpretation. The five-year window overlapped with the coronavirus disease 2019 period, during which mobility restrictions, service disruption, changes in illicit supply chains, and shifts in prescribing and health-care access may have altered both actual substance use and the probability of detection. Short-term stability at the regional level should therefore not be read as evidence that the underlying epidemiology was static; rather, the flat regional trend may reflect increases in some countries being offset by decreases in others over the short, five-year window.

The practical implication of these study findings is that country-specific planning matters more than regional averages. Low overall prevalence should not justify low prioritisation of addiction services, because even modest prevalence can translate into substantial absolute need across a population of roughly 450 million people. Strengthening surveillance, expanding evidence-based treatment, particularly for opioid use disorder, and improving data sharing across health, policy, and research systems are central priorities.[8,27–29]

Three concrete service-expansion targets are recommended based on the cross-country and substance-specific findings. First, opioid agonist treatment access (methadone, buprenorphine, and depot buprenorphine where regulatory frameworks permit) should be prioritised in settings where opioid use disorder prevalence approaches or exceeds the global estimate, in particular the United Arab Emirates, Lebanon, Libya, and Tunisia. Second, prescription monitoring of opioid analgesics, benzodiazepines, and stimulants is recommended in countries with high pharmaceutical availability and high estimated opioid burden, particularly the United Arab Emirates, Bahrain, and Kuwait. Third, harm reduction and combined addiction and mental-health services are most needed in conflict-affected states (Djibouti, Comoros, Somalia, Sudan, and Yemen), where conflict and displacement add further risk and surveillance is weakest. Cross-cutting all three is the need for country-level GBD-aligned reporting at sub-national levels where feasible, so that regional averages do not obscure these distinct service-planning targets.

Investment in epidemiological surveys, treatment registries, emergency presentations, mortality surveillance, and standardised reporting would improve both direct service planning and the quality of future burden estimation.[18,29–31] More detailed sex-specific, age-specific, and treatment-coverage analyses are also needed, because aggregate prevalence alone cannot show where unmet need is concentrated.

This analysis has several strengths. It used the most recent GBD 2023 release, which estimates burden consistently across countries. It compared every value against an explicit global benchmark, so regional figures can be read against a familiar standard. It also reported a pre-specified population-weighted sensitivity analysis alongside the main unweighted-median estimates (Supplementary Table S3).

The study also has limitations. First, it used modelled estimates rather than direct measurement, so

the values should be read as structured estimates rather than exact counts; no individual-level data were accessed or analysed, and because the study did not reconstruct the underlying GBD models, it should be interpreted as a secondary analysis of published epidemiological estimates rather than a de novo burden estimation study.[18,20,21,24] Second, the analysis was ecological and conducted at the country level, so it cannot identify individual-level risk factors for substance use disorders. Third, the 2019–2023 window was short and may not capture longer-term changes. Fourth, we examined prevalence and disability burden by sex but not by age group or treatment coverage, which limits what can be said about inequalities and unmet needs within countries. Furthermore, because GBD reports sex rather than gender, gender-related determinants could not be examined, while the sex-specific estimates carry the same limitations with respect to the amount and quality of data available as the overall estimates. Fifth, the estimates were not disaggregated by race, ethnicity, or migration status; each reflects a country's total resident population as modelled by GBD and cannot be broken down into these subgroups. This matters across the Arab League, where several countries host large migrant and expatriate populations whose substance-use burden may differ from that of local citizens, and unmeasured socioeconomic and structural factors may contribute to the patterns observed. Sixth, GBD severity estimates are often derived from higher-income settings and may not fully apply to lower-resource ones Finally, people with lived experience of substance use disorders were not involved in this secondary analysis.

The amount of underlying data also deserves emphasis. For several countries, GBD had only a few primary data sources, and for some fragile and conflict-affected states these are very sparse. Three points follow. First, in countries with little primary data (notably Comoros, Mauritania, Somalia, and Yemen), differences between countries are best treated as hypotheses rather than firm, service-planning-grade findings. Second, when we report that a value is 'approximately X% below the global estimate', this describes the modelled regional median relative to the global estimate; it is not a directly measured count of cases in the region. Third, the 2019–2023 trends are only as reliable as the data collected during that window. Because the period included the COVID-19 pandemic, when routine data collection fell across much of the region, the trends for categories with little primary data (notably 'other drug use disorders') should be interpreted with caution. Stronger primary data collection (such as representative surveys, standardised treatment records, and harmonised case notification) is the key step needed before these estimates can support operational planning rather than broad comparison.

The quality of the underlying data also affects the accuracy of the estimates from the GBD model. For substance use disorders in this region, primary sources are often small surveys, treatment-service records, or indicator studies that differ in case definition, sampling, and time period. GBD harmonises these inputs statistically, but harmonisation cannot fully remove bias when the original data are sparse, dated, or unrepresentative, as is the case for several Arab League countries. Where primary data are incomplete or absent, the model relies more heavily on covariates and on data borrowed from neighbouring countries, which pulls estimates toward broader regional patterns and widens the uncertainty intervals. In low-prevalence settings with little primary data, this most plausibly leads to under-estimation of the true burden, particularly for stigmatised or under-surveilled substances. Estimates for countries with little recent primary data should therefore be read as model-based approximations rather than measured rates, and country rankings that rest on overlapping uncertainty intervals should not be over-interpreted. This is a limitation of the evidence base itself, and it sets a ceiling on the precision of any regional comparison built on these data.

One aggregation issue also deserves emphasis. The GBD 2023 'other drug use disorders' category is a catch-all that combines hallucinogens, inhalants, sedative-hypnotics, polysubstance use, and unspecified substances. Across the Arab League it is a small share of drug use disorders, yet it was the only category whose regional median exceeded the global estimate in 2023, and the only one with a significant regional increase from 2019 to 2023. Because it combines substances that behave very differently and are used in different settings, a single trend for this category cannot be tied to any one drug, which makes it hard to identify what is changing or to design a specific policy response. Its local relevance differs across countries, so the combined figure can mask distinct and even opposing country-level signals. Interpreting these findings therefore needs more granular, substance-specific surveillance at a country level.

Conclusion

Using GBD 2023 estimates, this study provides a comparative assessment of substance use disorder prevalence, substance-specific patterns, and temporal trends across all 22 Arab League member states. Overall, regional reported prevalence was lower than the global benchmark, especially for alcohol use disorders, but opioid use disorder approached global levels and exceeded them in the United Arab Emirates. Aggregate regional stability from 2019 to 2023 coexisted with increases in some countries and a significant regional rise in other drug use disorders. Marked between-country heterogeneity, substance-specific divergence, and potential under-ascertainment in data-sparse

settings support stronger surveillance, improved treatment coverage, and country-specific planning. Future work should move beyond aggregate prevalence toward granular age-specific, sex-specific, and treatment-coverage analyses that can better identify unmet need within and between countries.

Contributors

TQ and AM contributed equally to this work and share first authorship. AM: conceptualisation, data curation, formal analysis, methodology, software, visualisation, writing—original draft. TQ: conceptualisation, methodology, data interpretation, supervision, writing—review and editing, project administration. HAG: data interpretation, writing—review and editing. MF: data interpretation, writing—review and editing. HE: data interpretation, writing—review and editing. WF: data interpretation, writing—review and editing. SH: data interpretation, writing—review and editing. OT: data interpretation, writing—review and editing. SAB: conceptualisation, methodology, data curation, formal analysis, visualisation, writing—original draft, writing—review and editing. DS: conceptualisation, supervision, writing—review and editing. TQ, AM, and SAB directly accessed and verified the underlying data reported in this manuscript. All authors had full access to the data, reviewed and approved the final manuscript, and accept responsibility for the decision to submit for publication.

Data sharing statement

The aggregate-level data analysed in this study were obtained from the publicly available Global Burden of Disease 2023 Results Tool (https://vizhub.healthdata.org/gbd-results/). No individual participant data were used. No additional unpublished data are held by the authors. Data are available from the Institute for Health Metrics and Evaluation subject to the GBD data use agreement, with no end date for availability. The complete analytic dataset, comprising 15,295 rows merged from four GBD 2023 Results Tool extracts with source-extract provenance retained for each row, is provided as Supplementary Table S1. No study protocol or statistical analysis plan was pre-registered; the analytic approach is fully described in the Methods section of the manuscript.

Editor note

The Lancet Group takes a neutral position with respect to territorial claims in published maps and institutional affiliations.

Declaration of interests

We declare no competing interests.

Acknowledgements

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.laneme.2026.100002.

References

1 Rehm J, Shield KD. Global Burden of Disease and the impact of mental and addictive disorders. *Curr Psychiatry Rep*. 2019;21:10.
2 Santo T, Campbell G, Gisev N, et al. Prevalence of mental disorders among people with opioid use disorder: a systematic review and meta-analysis. *Drug Alcohol Depend*. 2022;238:109551.
3 United Nations Office on Drugs and Crime. *World Drug Report 2025*. United Nations Office on Drugs and Crime; 2025. https://www.unodc.org/unodc/data-and-analysis/world-drug-report-2025.html. Accessed February 28, 2026.
4 United Nations Office on Drugs and Crime. *World Drug Report 2024*. United Nations Office on Drugs and Crime; 2024. https://www.unodc.org/unodc/en/data-and-analysis/world-drug-report-2024.html. Accessed February 28, 2026.
5 Al-Ansari B, Thow A-M, Day CA, Conigrave KM. Extent of alcohol prohibition in civil policy in Muslim majority countries: the impact of globalization: alcohol policy in Muslim majority countries. *Addiction*. 2016;111:1703–1713.
6 Room R, Babor T, Rehm J. Alcohol and public health. *Lancet*. 2005;365:519–530.
7 Fouad FM, Soares L, Diab JL, Abouzeid A. The political economy of health in conflict: lessons learned from three states in the Eastern Mediterranean Region during COVID-19. *J Glob Health*. 2022;12:07001.
8 Rostam-Abadi Y, Gholami J, Jobehdar MM, et al. Drug use, drug use disorders, and treatment services in the Eastern Mediterranean region: a systematic review. *Lancet Psychiatry*. 2023;10:282–295.
9 Kazemitabar M, Nyhan K, Makableh N, et al. Epidemiology of substance use and mental health disorders among forced migrants displaced from the MENAT region: a systematic review and meta-analysis protocol. *PLoS One*. 2023;18:e0292535.
10 Kteily-Hawa R, Hawa AC, Gogolishvili D, et al. Understanding the epidemiological HIV risk factors and underlying risk context for youth residing in or originating from the Middle East and North Africa (MENA) region: a scoping review of the literature. *PLoS One*. 2022;17:e0260935.
11 Carpiniello B. The mental health costs of armed conflicts—a review of systematic reviews conducted on refugees, asylum-seekers and people living in war zones. *Int J Environ Res Public Health*. 2023;20:2840.
12 Mesa-Vieira C, Haas AD, Buitrago-Garcia D, et al. Mental health of migrants with pre-migration exposure to armed conflict: a systematic review and meta-analysis. *Lancet Public Health*. 2022;7:e469–e481.
13 Tobaiqy M, Al-Asmari AI. Substance misuse disorder in Saudi Arabia: a comprehensive examination of current demographic patterns, trends, and intervention requirements. *Saudi Pharm J*. 2024;32:102163.
14 Darijani SR, Seyedmirzaei H, Nakhostin-Ansari A, et al. Burden of Substance Use Disorders in the Middle East and North Africa from 1990 to 2019. *Balkan Med J*. 2025;42:138–149.
15 Vos T, Allen C, Arora M, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388:1545–1602.
16 Kang J, Kim HJ, Kim MS, et al. Global burden of amphetamine, cannabis, cocaine and opioid use in 204 countries, 1990–2023: a Global Burden of Disease Study. *Nat Med*. 2026;32:527–544.
17 Murray CJL, Aravkin AY, Zheng P, et al. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396:1223–1249.
18 Stevens GA, Alkema L, Black RE, et al. Guidelines for accurate and transparent health estimates reporting: the GATHER statement. *Lancet*. 2016;388:e19–e23.
19 Zeng T, Jia T. [Progress in methodology of the Global Burden of Disease Study and its impact on the disease burden of parasitic diseases]. *Zhongguo Xue Xi Chong Bing Fang Zhi Za Zhi*. 2023;35:299–306.
20 Flaxman AD, Vos T, Murray CJL, eds. *An integrative Metaregression Framework for Descriptive Epidemiology*. Seattle: University of Washington Press; 2015.
21 Zheng P, Barber R, Sorensen RJD, Murray CJL, Aravkin AY. Trimmed constrained mixed effects models: formulations and algorithms. *J Comput Graph Stat*. 2021;30:544–556.
22 World Bank. *FY24 List of Fragile and Conflict-Affected Situations*. World Bank; 2023. https://thedocs.worldbank.org/en/doc/608a53dd83f21ef6712b5dfef050b00b-0090082023/fy24-list-of-fragile-and-conflict-affected-situations. Accessed February 28, 2026.
23 The Organisation for Economic Co-operation and Development (OECD). *Full Report: States of Fragility 2025*. The Organisation for Economic Co-operation and Development (OECD); 2025. https://www.oecd.org/en/publications/states-of-fragility-2025_81982370-en/full-report.html. Accessed February 28, 2026.
24 Vos T, Lim SS, Abbafati C, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396:1204–1222.
25 Whiteford HA, Ferrari AJ, Degenhardt L, Feigin V, Vos T. The global burden of mental, neurological and substance use disorders: an analysis from the global burden of disease study 2010. *PLoS One*. 2015;10:e0116820.
26 Rostam-Abadi Y, Gholami J, Shadloo B, et al. Alcohol use, alcohol use disorder and heavy episodic drinking in the Eastern Mediterranean region: a systematic review. *Addiction*. 2024;119:984–997.

27 Lintzeris N, Dunlop AJ, Haber PS, et al. Patient-reported outcomes of treatment of opioid dependence with weekly and monthly subcutaneous depot vs daily sublingual buprenorphine: a randomized clinical trial. *JAMA Netw Open*. 2021;4:e219041.
28 Compton MT, Rudisch BE, Craw J, Thompson T, Owens DA. Predictors of missed first appointments at community mental health centers after psychiatric hospitalization. *Psychiatr Serv*. 2006;57:531–537.
29 Vigo D, Jones W, Dove N, et al. Estimating the prevalence of mental and substance use disorders: a systematic approach to triangulating available data to inform health systems planning. *Can J Psychiatry*. 2022;67:107–116.
30 Otorkpa OJ, Otorkpa CO, Emmanuel S, et al. Review of global burden of disease studies: trends, challenges, and future directions. *Int J Public Health Sci*. 2024;13:766.
31 Stovner LJ, Hagen K, Linde M, Steiner TJ. The global prevalence of headache: an update, with analysis of the influences of methodological factors on prevalence estimates. *J Headache Pain*. 2022;23:34.