Preliminary estimates of the economic implications of addiction in the United Arab Emirates

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ABSTRACT This study aimed to provide preliminary estimates of the economic implications of addiction in the United Arab Emirates (UAE). Local and international data sources were used to derive estimates of substance-related healthcare costs, lost productivity and criminal behaviour. From an estimated population of 8.26 million: ~1.47 million used tobacco (20.5% of adults); 380,085 used cannabis (> 5%); 14,077 used alcohol in a harmful manner (0.2%); and 1408 used opiates (0.02%). The cost of addiction was estimated at US$ 5.47 billion in 2012, equivalent to 1.4% of gross domestic product. Productivity costs were the largest contributor at US$ 4.79 billion (88%) followed by criminal behaviour at US$ 0.65 billion (12%). There were no data to estimate cost of: treating tobacco-related diseases, community education and prevention efforts, or social disharmony. Current data collection efforts are limited in their capacity to fully inform an appropriate response to addiction in the UAE. Resources are required to improve indicators of drug use, monitor harm and evaluate treatment.

Estimations provisoires des implications économiques des addictions aux Émirats arabes unis

RÉSUMÉ La présente étude avait pour objectif de fournir des estimations provisoires des implications économiques des addictions aux Émirats arabes unis. Des sources de données locales et internationales ont été utilisées pour produire des estimations sur le coût des soins de santé, la perte de productivité et les comportements criminels liés à la consommation de substances psychoactives. Sur une population estimée de 8,26 millions, ~1,47 étaient consommateurs de tabac (20,5 % des adultes), 380,085 de cannabis (> 5 %), 14,077 consommèrent de l’alcool de façon nocive (0,2 %), et 1408 des opiacés (0,02 %). Le coût des addictions a été estimé à 5,47 milliards de dollars US en 2012, soit 1,4 % du produit intérieur brut. Les coûts de productivité représentaient le facteur contributif le plus important (4,79 milliards de dollars US, soit 88 %), suivis par les comportements criminels (0,65 milliard de dollars US, soit 12 %). Aucune donnée n’était disponible pour estimer les coûts induits par le traitement des maladies dues au tabagisme, par l’éducation communautaire et les efforts de prévention, ou par les perturbations d’ordre social. Les efforts déployés actuellement pour collecter des données sont limités du fait de l’incapacité à mettre en place une réponse appropriée aux addictions aux Émirats arabes unis. Des ressources sont requises pour améliorer les indicateurs de la consommation de drogues, opérer un suivi des effets néfastes et déterminer le traitement.

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Introduction

The use of addictive substances has a wide variety of adverse health and social consequences (1). Substance use affects the ability of individuals to function in a productive capacity; it has negative effects on education and employment; it reduces quality of life and makes people more susceptible to health problems; it affects their self-esteem; and often forces them to engage in criminal behaviour to support their addiction. At the macro level, substance-related crime and corruption affect the Government’s ability to address addiction-related harm effectively (2).

Given the economic ramifications of substance use, policy makers are increasingly interested in understanding the economic burden of addiction. Estimates of the economic costs of substance use serve many purposes. First, economic cost estimates are frequently used to argue that policies on alcohol, tobacco and other drugs should be given a high priority on the public policy agenda. Second, economic cost studies help to identify information gaps, research needs and desirable refinements to national statistical reporting systems. Third, improved estimates of the costs of substance abuse offer the potential to provide baseline measures to determine the efficacy of drug policies and programmes intended to reduce the damaging consequences of addictive substances (3).

The United Arab Emirates (UAE) has become a target for the international illicit drug scene due to its strategic geographic location, openness, economic prosperity and young population. Drugs pass through the Middle East, including the UAE, from drug-producing countries in South East Asia, Pakistan and Afghanistan on their way to meeting the high demand of users in drug-consuming countries in Europe and North America (4). The open market trade policy, a fundamental cornerstone of the economy in the UAE, offers a fertile environment for abuses such as illegal immigration, drug trafficking and money laundering (5). Furthermore, the economic and social changes seen in the UAE since 1971 have catapulted people from a nomadic and isolated life into a luxurious lifestyle. To this extent many of the traditional values of the indigenous people have changed and have been influenced by the values and attitudes of those who come to work in the UAE. The rapid social change has been an important factor behind the appearance of many types of antisocial behaviour, of which drug use is one.

The purpose of this study was to provide preliminary estimates of the economic implications of addiction in the UAE.

Methods

As outlined in the international guidelines for estimating the costs of addiction (3), the key types of costs associated with substance abuse include: consequences to the health system (i.e., treatment costs); productivity (i.e., premature mortality or lost employment or productivity); law enforcement and criminal justice; others (such as costs related to prevention and research); and, intangible costs (i.e., social disharmony).

Consequences to the health system

Healthcare provision in UAE

The structure of health care in the UAE varies from one Emirate to another. In Abu Dhabi, there are 3 main bodies: the National Rehabilitation Center (NRC), the Health Authority of Abu Dhabi (HAAD) and the Abu Dhabi Health Services Company. In Dubai, there are 2 main bodies: the Dubai Health Authority and the Ministry of Health (MOH). The MOH is the regulatory and provisional body for public and private healthcare facilities in Sharjah, Ajman, Fujairah, Ras al-Khaimah, Sharjah and Umm al-Quwain (4).

NRC treatment costs

The NRC is the only specialized addiction centre in the UAE. The first phase of addiction treatment at NRC is detoxification, which can take up to 2 weeks; the second phase is short-term recovery, which lasts for 8 weeks; and the halfway house phase, which takes up to 6 months. The outpatient clinic follows up patients for 1 year after discharge from the halfway house.

A total of 933 patients were admitted to the NRC treatment facility during 2002–2012, with 377 in 2012 (4). Services are provided to local people free of charge. Health statistics from HAAD suggest an average inpatient cost of UAE Dirham (AED) 10 861 (US$ 2957) with an average length of stay of 5.71 days, equivalent to AED 1902 (US$ 517.93) per day. The cost per outpatient visit is AED 300 (US$ 81.69). At the NRC, an inpatient stay requires 3 months and an outpatient visit is twice weekly for a further 9 months. Combining this information provides an estimate of NCR treatment costs for local people [i.e., (US$ 517.93 × 12 weeks × 7 days × 377 patients) + (US$ 81.69 × 9 months × 2 visits per week × 377 patients)].

Health service cost of treating alcohol and substance abuse

Statistics on the number of admissions for alcohol and substance abuse are available from HAAD. In 2012, there were 578 admissions with 486 (84%) originally referred from an outpatient setting (4, 6). With an estimated population in Abu Dhabi in 2010 of 2.32 million (6), this equates to an admission rate of 0.249 per 1000 population. Combining this information with UAE population estimates (8.26 million) (7), assuming the same rate of service delivery and cost as reported in Abu Dhabi, an estimate can be made of hospital and outpatient alcohol and substance abuse treatment costs for the entire UAE [i.e., (US$ 517.93 × 5.71 days × 2292 patients) + (US$ 81.69 × 1926 patients)].
Health service cost of treating tobacco-related diseases

Out of all substances, the evidence relating to tobacco use is perhaps the most advanced with associations between tobacco use and a plethora of diseases well-established (8). In 1994, Lopez et al. suggested a 4-stage model for describing the effects of tobacco smoking on mortality (9) illustrating that smoking-attributed mortality is seen several decades after smoking has occurred. By depicting the epidemic as a continuum spread over many decades, the model allows countries to see themselves as being at a particular stage of an understandable process, spread over a whole century (9, 10). With the prevalence of smoking estimated at > 20% in the adult population (Table 1), the UAE is entering Stage 2 of this model. Given the lag effect between tobacco smoking and disease, deaths from tobacco will inevitably increase. At the time of writing, there was no information available on the treatment costs associated with smoking, therefore no estimate was attempted.

Health service cost of treating problems related to substance abuse

As well as the direct cost of treating alcohol and substance abuse, there are costs associated with the treatment of side effects and comorbidity. For example, certain users inject drugs into their bloodstream using needles. Sharing needles or using unhygienic needles can lead to HIV infections and other blood-borne diseases (11). Given the lack of data on these possible side effects or comorbidity in the UAE, no attempt was made to quantify these costs.

Cost of substance-related lost productivity

Impact on quality and quantity of life

As part of the Global Burden of Disease (GBD) assessment, the Institute for Health Metrics and Evaluation provide disease estimates for the UAE (12). In 2010 for the UAE, drug use, smoking and alcohol use together accounted for almost 10% of the disease burden, equivalent to 140 348 DALYs. (or disability-adjusted life years). A value can be attached to a DALY by using gross domestic product (GDP) per capita. GDP per capita in the UAE was estimated at US$ 34 049 (13).

Opportunity cost of time while incarcerated

While patients are in treatment they are not being productive members of society. Productivity costs of treatment can be estimated by: adjusting GDP per capita to a daily rate (US$ 34 049/48 working weeks/5 working days); combining with the number of admissions to the NRC (i.e., 377 inpatients and 317 outpatients) and the hospitals in the UAE (i.e., 2292 inpatients and 1926 outpatients); and multiplying with average length of stay (i.e., 90 days as NRC inpatient, 5.71 days as hospital inpatient and 1 day per outpatient visit).

Cost of drug-related criminal behaviour

In the UAE, law enforcement is the responsibility of each Emirate. Each Emirate’s police force is responsible for matters within its own borders, but the forces routinely share information with each other on various issues. The police in the UAE come under the Ministry of Interior and are also responsible for maintaining the prisons, and the arm responsible for this is the Corrections Department (14).

Table 1 Estimated prevalence of substance use in the UAE

<table>
<thead>
<tr>
<th>Type of substance</th>
<th>Percentage of population</th>
<th>Number of users</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>0.2%</td>
<td>14 077</td>
<td>(19)</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>No recent data</td>
<td>No estimate</td>
<td>(11)</td>
</tr>
<tr>
<td>Cannabis</td>
<td>5.40%</td>
<td>380 085</td>
<td>(11)</td>
</tr>
<tr>
<td>Cocaine</td>
<td>No recent data</td>
<td>No estimate</td>
<td>(11)</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>No recent data</td>
<td>No estimate</td>
<td>(11)</td>
</tr>
<tr>
<td>Opioids</td>
<td>0.02%</td>
<td>1408</td>
<td>(11)</td>
</tr>
<tr>
<td>Opiates</td>
<td>0.02%</td>
<td>1408</td>
<td>(11)</td>
</tr>
<tr>
<td>Prescription opioids</td>
<td>No recent data</td>
<td>No estimate</td>
<td>(11)</td>
</tr>
<tr>
<td>Tobacco – youth (&lt; 20 yr)</td>
<td>14.0%</td>
<td>80 248</td>
<td>(29)</td>
</tr>
<tr>
<td>Tobacco – adults (20–64 yr)</td>
<td>20.50%</td>
<td>1 388 163</td>
<td>(29)</td>
</tr>
</tbody>
</table>

UAE = United Arab Emirates, WHO = World Health Organization.
The main law regulating drug control in the UAE is the Anti-Drug and Substance Use Law (41/4991). Drug use and possession is considered an offence under this law and penalties vary according to the type of substance (15). The legal process of drug-related crimes and offences is organized in three stages: police (arrested and charged within 48 hours), general prosecution (maximum 30 days) and then court. The punishments imposed on guilty persons in drug cases range from putting the person in a treatment centre, a fine, imprisonment (temporary or life) or capital punishment.

Cost of police resources devoted to combating drug problems

A 2008 United Nations UAE country report suggested that there were: 72,670 recorded crimes; 971 reported drug offences (64 for trafficking); 3688 persons prosecuted; 125 prosecution personnel; 14 adult prisons (with a capacity of 6715); 3295 staff working in the prisons; and, 11,193 people incarcerated in the 14 adult prisons in the UAE 2008. Applying the same growth rate to the number of incarcerated people as that seen in the population between 2006 and 2012 (i.e., 189%) (13) suggests that, in 2012, there could have been 21,113 prisoners. If 15% of this population had been incarcerated for drug offences, this is equivalent to 3170 inmates.

It is costly to employ prison staff and operate a prison. In the absence of any better data, it is assumed that the daily cost of housing an inmate is equivalent to the daily cost of an inpatient stay (i.e., US$ 517.93) (6). Combining the daily cost with the number of prisoners incarcerated for drug offences (i.e., 3170) suggests a daily cost of US$ 1.64 million. This cost can be extrapolated to an annual basis by multiplying with 365 days.

Other costs of substance abuse

There are several other costs to society of substance abuse, including: research on the impact of substance use; public education campaigns to minimize use or abuse; law enforcement programmes to reduce illegal dealing and use; and the cost of social disharmony associated with substance abuse. Development of cost estimates for each of these categories requires extensive data and such information was not available at the time of writing, therefore, no estimates were attempted.

Results

Population estimates

The UAE National Bureau of Statistics estimated a population of 8.26 million people in 2010 (7). Non-nationals accounted for 89% (7.32 million) of the population and nationals for 11% (0.94 million).

Prevalence of substance use

There are publically available local data on the prevalence of substance use in the UAE. These rely on data reported in the World Drug Report (11, 18). Table 1 provides an estimate of the number of substance users in the UAE. Tobacco use was the most common substance used, with an estimated 1.47 million smokers (20.5% of adults); 380,085 people (5.4% of the population) used cannabis and an estimated 14,077 consumed alcohol in a harmful manner (i.e., ≥ 60 g pure alcohol on at least one occasion in the past 30 days) (19). To date, there are no accurate estimates on the use, if any, of amphetamines, cocaine, ecstasy, prescription opioids or injecting drugs (18, 20).

Preliminary estimates of the economic cost of addiction in the UAE

The economic cost of addiction in the UAE is estimated at US$ 5.47 billion; equivalent to 1.4% of GDP in 2012 (Table 2). Substance-related lost productivity accounted for the majority of costs, 87.6% of the total or US$ 4.79 billion, followed by the cost of drug-related criminal behaviour at 11.9% of total costs or US$ 0.65 billion.

Discussion

This study attempted to provide preliminary estimates of the economic implications of addiction in the UAE. For those categories for which estimates were made, several assumptions were
required. First, cost data obtained from HAAD were used to derive treatment cost estimates. Treatment at the NRC was intensive, resulting in a high cost for this particular specialist treatment setting. If costs were less expensive in other Emirates compared with Abu Dhabi, derived healthcare costs would be inflated. Conversely, there were no

### Table 2 Summary of estimated costs of addiction in the UAE

<table>
<thead>
<tr>
<th>Category</th>
<th>US$</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consequences to health and welfare system</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NRC treatment costs</td>
<td>16 956 175</td>
<td>Based on limited data from NRC</td>
</tr>
<tr>
<td>Health service cost of treating alcohol and substance abuse</td>
<td>6 937 071</td>
<td>Based on limited data from HAAD and extrapolation to UAE</td>
</tr>
<tr>
<td>Health service cost of treating tobacco-related diseases</td>
<td>No estimate</td>
<td>significant given the prevalence of tobacco use</td>
</tr>
<tr>
<td>Health service cost of treating problems related to substance abuse</td>
<td>No estimate</td>
<td>No available data</td>
</tr>
<tr>
<td><strong>Cost of substance-related lost productivity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact on quality of life and longevity</td>
<td>4 785 451 016</td>
<td>Places a dollar value on disability adjusted life years from global burden</td>
</tr>
<tr>
<td>Opportunity cost of time while in treatment for substance abuse</td>
<td>6 988 807</td>
<td>Based on limited data from NRC, HAAD and extrapolated to UAE</td>
</tr>
<tr>
<td>Opportunity cost of time while in treatment for tobacco conditions</td>
<td>No estimate</td>
<td>significant given the prevalence of tobacco use</td>
</tr>
<tr>
<td>Opportunity cost of time while in treatment for substance abuse related problems</td>
<td>No estimate</td>
<td>No available data</td>
</tr>
<tr>
<td>Opportunity cost of time while incarcerated for substance abuse offences</td>
<td>No estimate</td>
<td>No available data but likely to be significant</td>
</tr>
<tr>
<td><strong>Cost of substance-related criminal behaviour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of police force devoted to combating drug problems</td>
<td>51 072 776</td>
<td>Based on limited data – 5% of police force (assumed to be 30 000) devoted to drug control</td>
</tr>
<tr>
<td>Cost of prosecution and operating courts</td>
<td>No estimate</td>
<td>No available data but likely to be significant</td>
</tr>
<tr>
<td>Incarceration annual cost</td>
<td>599 274 078</td>
<td>Based on limited data – 15% inmates incarcerated for drug offenses, daily cost of US$ 517.93</td>
</tr>
<tr>
<td>Salary of prison staff</td>
<td>No estimate</td>
<td>No available data – partially included in daily cost of keeping inmates in gaol</td>
</tr>
<tr>
<td>Other police costs in strategic alliances</td>
<td>No estimate</td>
<td>No available data but likely to be significant</td>
</tr>
<tr>
<td><strong>Other costs of substance use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of community education and prevention around substance abuse</td>
<td>No estimate</td>
<td>No available data but likely to be significant</td>
</tr>
<tr>
<td>Education implications</td>
<td>No estimate</td>
<td>No estimate – likely to be significant given high drug use among youth</td>
</tr>
<tr>
<td>Employment implications</td>
<td>No estimate</td>
<td>No estimate – likely to be significant as school drop-outs increase</td>
</tr>
<tr>
<td>Social disharmony</td>
<td>No estimate</td>
<td>No estimate – likely to be significant as increase in crime and violence affects community sense of security</td>
</tr>
<tr>
<td>Total cost substance use</td>
<td>5 466 679 923</td>
<td></td>
</tr>
<tr>
<td>GDP (2012)</td>
<td>383 799 194 081</td>
<td></td>
</tr>
<tr>
<td>% substance cost/GDP</td>
<td>1.4%</td>
<td></td>
</tr>
</tbody>
</table>

GDP = gross domestic product; HAAD = Health Authority of Abu Dhabi; NRC = National Rehabilitation Center; UAE = United Arab Emirates.
estimates of treating tobacco-related
diseases or other problems related to
substance abuse, which suggests that
healthcare costs are generally conserva-
tive. Second, most of the cost associated
with lost productivity related to sub-
stance abuse was derived by combining
the current global burden of disease
estimates, using the DALY metric,
with estimates of economic output per
capita. DALY estimates are subject to
a high degree of uncertainty due to a
lack of local data and the subsequent
need for statistical inferences about the
UAE compared to other high-income
countries (12). Furthermore, the as-
sumption that the per capita income
of the whole population in the UAE
is applicable to non-locals might skew the
estimates towards the higher end of the
cost spectrum. Third, due to a lack of
data, no estimates were made of costs
associated with efforts to educate the
population to prevent the uptake of
substance abuse.

In spite of the methodological chal-
enges, this analysis has demonstrated
that substance abuse is a problem in the
UAE with an estimated cost of addiction
placed at US$ 5.467 billion, equiva-
 lent to 1.4% of total economic output.
This estimate is conservative given that
not all costs were quantified.

Despite the apparent importance
of costing studies, few researchers have
examined the economic impact of
addiction. Most efforts to date have
considered costs associated with the
use and abuse of alcohol, tobacco and
illicit drugs (21). Single et al. quantified
the economic costs of alcohol, tobacco
and illicit drugs to Canadian society at
US$ 18.4 billion, representing US$ 649
per capita (22). In Australia, Collins and
Lapsley estimated the social costs of
alcohol, tobacco and illicit drugs at US$ 34.4 billion (23). Mark et al. estimated
the economic cost of heroin addiction
in the United States of America at US$ 21.9 billion (24). García-Altés estimate-
ed the social cost of the consumption
of illegal drugs in Spain at US$ 0.467
billion (25).

Drug addiction is ubiquitous and a
significant economic burden on UAE
society. Although the data may not be
available at the moment to consider
the full spectrum of costs, the limited
information that is available points to
a significant problem that may worsen
unless effective solutions are proposed
and implemented. In other developed
countries, the ways in which govern-
ments respond to drug addiction usu-
ally represent a blend of options across
different government portfolios, in-
cluding policing and law enforcement,
education, community and welfare
services and health services. For ex-
ample, in Australia, one of the aims of the
National Drug Strategy is ‘to achieve a
balance between harm-reduction, de-
mand-reduction and supply-reduction
measures to reduce the harmful effects
of drugs’ (26). This approach has been
echoed worldwide (11). The National
Drugs Policy in Switzerland emphasizes
‘the four pillar model as a pragmatic
middle way’, and aims to increase the
interchange between prevention, treat-
ment, harm reduction and law enforce-
ment (27). The latest American drug
control strategy also emphasizes a bal-
ance between prevention, treatment,
law enforcement and international
cooperation (28). In the UAE, the
primary focus to date has been on de-
mand reduction with less attention on
treatment and harm reduction. Various
government agencies work closely with
international entities like the United
Nations, Interpol and other countries
to stop the activities of drug traffickers.
The government has also enacted laws
that regulate drug control (4).

Conclusion

Governments are increasingly rely-
ing on evidence to inform policy. The
changes in drug use that are being re-
ported in the UAE require a swift and
sustained response. Such responses will
be best developed using solid evidence
that can be collected and disseminated
quickly to inform strategic policy re-
sponses. Resources need to be devoted
to improving the ability to identify,
analyse and evaluate indicators of drug
use, associated harm and treatment op-
tions. Current data collection efforts are
limited in their capacity to fully inform
appropriate prevention, treatment and/
or harm reduction responses.

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