

# Medicine and Society

## Alcohol: Its health and social impact in India

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### ABSTRACT

Alcoholic beverages have been used in human societies since the beginning of recorded history. The patterns of alcohol intake around the world are constantly evolving, and alcohol is ubiquitous today. Research has contributed substantially to our understanding of the relation of drinking to specific disorders, and has shown that the relation between alcohol consumption and health outcomes is complex and multidimensional. Increases in the average volume of drinking are predicted for the most populous regions of the world in Southeast Asia including India. Cultural differences apparently influence the pattern of alcohol consumption. In addition, alcohol is linked to categories of disease whose relative impact on the global burden is predicted to increase. Therefore, it is appropriate to implement policies with targeted harm reduction strategies. The crucial need, from a public health perspective, is for regular means of coordination whereby prevention of alcohol-related problems is taken fully into account in policy decisions about alcohol control and regulation in the market for alcoholic beverages.

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### INTRODUCTION

Alcohol and tobacco are important products of the global addictive demand and have experienced a rapid increase in per capita consumption. The fastest growth has been in developing countries in the Asian subcontinent where the per capita pure alcohol consumption has increased by over 50% between 1980 and 2000.<sup>1</sup> Alcoholic beverages, and the problems they engender, have been familiar in human societies since the beginning of recorded history. Accompanying the near ubiquity of alcoholic beverages in human history has been an appreciation of the social and health problems caused by drinking. Whether in Greece, Palestine or China, ancient texts speak eloquently of such problems. Scientific attention to problems of alcohol consumption has increased during the past 30 years. Every major world religion has at least some strands that counsel abstinence from alcoholic beverages. Alcohol is no longer viewed as a threat to all, but rather to a small subclass of 'alcoholics' or, in today's technical terms, people who are 'alcohol dependent'. Alcohol is causally related to more than 60 medical conditions.<sup>2</sup> Overall, 3.5% of the global burden of disease

is attributable to alcohol, which accounts for as much death and disability as tobacco and hypertension.<sup>3,4</sup>

### ALCOHOL AND GLOBAL BURDEN

Taking into account both recorded and unrecorded consumption (Tables I and II), the highest amount of alcohol consumed per adult resident is in Europe, especially in Russia and its surrounding countries, and in the established market economies of western Europe and North America. The least amount of alcohol consumed per resident is in the mostly Islamic regions of the Eastern Mediterranean and in the lesser developed region of Southeast Asia, dominated by India. Between the subregion with the highest estimated consumption level (Europe C) and the subregion with the lowest (Eastern Mediterranean D) the difference in consumption is more than 20-fold.<sup>4</sup>

### Indian scenario

Although the recorded alcohol consumption per capita has fallen since 1980 in most developed countries, it has risen steadily in developing countries, alarmingly so in India. The per capita consumption of alcohol by adults  $\geq 15$  years in India increased by 106.7% between 1970–72 and 1994–96!<sup>5</sup> The pattern of drinking in India has changed from occasional and ritualistic use to social use. Today, the common purpose of consuming alcohol is to get drunk.<sup>6</sup> These developments have raised concerns about the health and the social consequences of excessive drinking.<sup>7</sup>

### SOURCES OF DATA

Measuring alcohol use and alcoholic liver disease in an individual or a country has several limitations. Most studies rely on interviews with patients and their families to estimate the amount, frequency and duration of alcohol consumption. However, patients may not accurately report the quantity of alcohol they consume<sup>8</sup> and the definition of a 'standard drink' varies from country to country.<sup>9</sup> Studies of the incidence and prevalence of alcoholic liver disease, rather than decompensated cirrhosis alone, in the general population are difficult to conduct because patients with compensated liver disease usually do not seek medical attention. Financial constraints among patients suffering from excessive alcohol use may hamper the ability to obtain routine healthcare and further delay the diagnosis of alcoholic liver disease. Because of this, alcohol-related problems are usually not detected until hepatic decompensation occurs.<sup>10</sup>

The adult per capita data are available from the Global Status Report on Alcohol<sup>11</sup> and the WHO Global Alcohol Database created by the Marin Institute for the Prevention of Alcohol and Other Drug Problems, and presently maintained by the Swiss Institute for the Prevention of Alcohol Problems. There are three principal sources of data for per capita estimates: national govern-

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TABLE I. Economic development and alcohol consumption

WHO regions	Grouping within regions*	Consumption†		
		Recorded	Unrecorded	Total
<i>Developing countries</i>				
Islamic Middle East and Indian subcontinent	Very high or high mortality; lowest consumption	0.41	1.47	1.88
Poorest countries in Africa and America	Very high or high mortality; low consumption	3.11	2.82	5.93
Better-off developing countries in America, Asia, Pacific	Low mortality; emerging economies	3.79	1.44	5.23
<i>Developed countries</i>				
North America, western Europe, Japan, Australasia	Very low mortality	9.62	1.28	10.90
Former socialist, eastern Europe and central Asia	Low mortality	6.97	4.44	11.42
<i>World</i>		4.22	1.81	6.03

\* defined by WHO<sup>1</sup> on basis of mortality level † estimated total alcohol consumption in litres of pure alcohol per resident aged ≥15 years<sup>2</sup>

TABLE II. Estimated worldwide per capita alcohol consumption<sup>4</sup>

WHO region*	Beverage type: mostly consumed	Alcohol consumption		Drinkers (%)	
		Total†	Per drinker‡	Men	Women
Africa D (e.g. Nigeria, Algeria)	Mainly other fermented beverages	4.9	13.3	47	27
Africa E (e.g. Ethiopia, South Africa)	Mainly other fermented beverages and beer	7.1	16.6	55	30
America A (e.g. Canada, Cuba, USA)	>50% of consumption beer, about 25% spirits	9.3	14.3	73	58
America B (e.g. Brazil, Mexico)	Beer, followed by spirits	9.0	14.1	75	53
Americas D (e.g. Bolivia, Peru)	Spirits, followed by beer	5.1	7.6	74	60
Eastern Mediterranean B (Iran, Saudi Arabia)	Spirits and beer, but scarce data	1.3	11.0	18	4
Eastern Mediterranean D (Afghanistan, Pakistan)	Spirits and beer, but scarce data	0.6	6.0	17	1
Europe A (Germany, France, UK)	Wine and beer	12.9	15.1	90	81
Europe B (Bulgaria, Poland, Turkey)	Spirits	8.3	13.4	72	52
Europe C (Russia, Ukraine)	Spirits	13.9	16.5	89	81
Southeast Asia B (Indonesia, Thailand)	Spirits	3.1	13.7	35	9
Southeast Asia D (India, Bangladesh)	Spirits	2.0	12.9	26	4
Western Pacific A (Australia, Japan)	Beer and spirits	8.5	10.4	87	77
Western Pacific B (China, Philippines, Vietnam)	Spirits	5.0	8.8	84	30

\* Regional subgrouping defined by WHO<sup>1</sup> on basis of mortality level (A: very low child and very low adult mortality; B: low child and low adult mortality; C: low child and high adult mortality; D: high child and high adult mortality; E: very high child and very high adult mortality † estimated total alcohol consumption per resident age of >15 years in litres of absolute alcohol (recorded and recorded) ‡ estimated total alcohol consumption (in litres of absolute alcohol) per adult drinker

ment data, data from international organizations and alcohol industry data. In most cases the best and most reliable source is national government data, which are usually based on sales figures, tax revenues, and/or production data. Generally, sales data are considered the most accurate, provided that sales of alcoholic beverages are separated from sales of any other items sold at the location, and that sales data are beverage-specific.<sup>4</sup>

*Indian sources*

Large or nationally representative epidemiological studies on alcohol consumption have not been conducted in India due to resource constraints. The following agencies collect some data, usually incomplete, regarding alcohol: Ministry of Chemicals, Government of India; Ministry of Welfare, Government of India; Department of Excise, Ministry of Finance, Government of India; Indian Distillery Association, New Delhi; and the All-India Prohibition Council, New Delhi. In addition, the corresponding Ministries at the state level also collect information for their state.<sup>11</sup>

The Indian beer industry currently produces 4.32 million hectolitres of beer per year, and is growing at a annual rate of 17%.<sup>11</sup> The spirits industry in India (Table III) is divided into three segments: 'India-made foreign liquor' (IMFL: whisky, gin, rum, brandy, liqueurs, vodka); 'India-made country liquor' (licensed distilled spirits, made locally); and the illicit liquor sectors.<sup>11,12</sup> The common varieties of 'country liquor' are *arrack*, *desi sharab* and *tari*. An estimated 1.5 million people are employed in the

production and sale of alcoholic beverages.<sup>11</sup> Country liquor and IMFL-whisky accounted for 91.5% of the drinks consumed.<sup>12</sup> Country liquor is the most frequently consumed alcoholic beverage, due to the extensive network of outlets serving country liquor and its low price. Among IMFL, whisky is the most widely consumed alcoholic beverage.<sup>12</sup>

TABLE III. Annual production of distilled spirits in India (April to March)

Year	Amount of absolute alcohol (Thousand hectolitres)
1982-83	2862.55
1983-84	3104.75
1984-85	3310.64
1985-86	3407.49
1986-87	3204.80
1987-88	3432.48
1988-89	4190.45
1989-90	No data available
1990-91	No data available
1991-92	4895.00
1992-93	3467.00
1993-94	3626.00
1994-95	6056.00
1995-96	7888.04

Source: Alcohol and public health in eight developing countries, WHO<sup>11</sup>

## DRINKING PATTERN IN INDIA

A limited number of studies have been conducted on smaller populations in different regions of India. Studies in northern India found the 1-year prevalence of alcohol use to be between 25% and 40%.<sup>6,13,14</sup> In southern India, the prevalence of current alcohol use varies between 33% and 50%, with a higher prevalence among the lesser educated and the poor.<sup>15</sup> Sethi and Trivedi<sup>16</sup> found alcohol misuse to be 11.3% among the 55–64 years' age group and 16.8% among the 65–74 years' age group in a rural population in north India. Varma *et al.*<sup>14</sup> found 18.3% of those >50 years of age to be current users of alcohol and 23.3% to be 'ever' users of alcohol. In Sikkim, nearly 35% of the population >21 years of age are chronic alcoholics. This figure is very high compared to the national average. Relapse rates after deaddiction for alcohol abuse are also very high.<sup>17</sup> The findings of the above studies need to be interpreted with caution, because relatively small samples were used.

In a study conducted among 50 220 middle-aged people in a community in western India, Gupta *et al.*<sup>12</sup> found current alcohol use was reported by 18.8% and past use by 4.9%. More than 76% of the individuals had 'never used' alcohol. The prevalence of current use decreased rather rapidly in the higher age groups (from 21.5% in the 55–59 years' age group to 5.7% in the >85 years' age group). Differences according to the subject's first language were notable: the ever use prevalence was about 15% or less among Gujarati-, Hindi- and Urdu-speaking persons, compared with over 40% among Kannada-, Malayalam-, Tamil- and Telugu-speaking persons. The prevalence by religion showed even wider variations. The highest prevalence for ever use was among Christians (61.2%) followed closely by Buddhists (58.6%). The lowest prevalence was among Muslims (9.4%), which can be explained by the religious teachings of Islam. The prevalence was high among illiterates (25.6%), peaked among those with primary education (27.1%) and then declined to 18.1% among those with college education.

Studies done in the late 1970s and early 1980s found that 12.7% of high school students, 32.6% of university students, and 31.6% of young non-students consumed alcohol. During the same period medical students reported a much higher prevalence of alcohol use of 40%–60%. Studies in the 1990s suggested abstinence rates of 83%–97% in 15–19-year-olds.<sup>11</sup>

Although various epidemiological studies have been done in specific regions of India, whether the findings could be generalized for the entire population is questionable, at least in part because of methodological problems. The most consistent finding in all the studies was that men are the primary consumers of alcoholic beverages. However, the percentage of men who had consumed an alcoholic beverage varied widely among different regions, ranging from 16.7% in Chennai city in southern India to 49.6% in a village in Punjab in northwest India. Conversely, the alcohol consumption rates among women were consistently low (<5%).<sup>18</sup> In another study, Mohan *et al.*<sup>6</sup> reported a prevalence of alcohol use of 20%–38% in men and 10% among women in three districts of central, north and northeast India.

Interestingly, consumption of alcohol among Sikkimese women is very high compared with the national average. Moreover, the percentage of drinkers among women is higher in rural compared to urban areas. This percentage is higher among those in the age group of 41–50 years.<sup>17</sup> Each year, Kerala consumes 8.3 L of liquor per person, the highest in India, and nearly three times the national rate.<sup>19</sup> A study conducted by one of us in the 1980s among a population of 3322 in Kerala showed that 11.68% of the adult population consumed alcohol (unpublished data).

Another epidemiological study conducted in the rural areas of Rajasthan showed that although alcohol consumption had become accepted among men, it was still infrequent among women. However, drinking by women was more accepted in certain castes, particularly on festive occasions such as weddings. In general, by the early 1980s, alcohol consumption had become an accepted leisure activity for men who were married and living in small families (husband, wife and no more than three children) in this rural area.<sup>20</sup>

## PREFERENCE FOR AN ALCOHOLIC BEVERAGE

A study by Bennett *et al.*<sup>21</sup> in Bangalore showed that the following three types of alcoholic beverages were consumed most often:

1. *Arrack*, a traditional drink produced (both legally and illegally) by distilling fermented molasses, raw brown sugar, palm wine, rice or palm sugar; it has an alcohol content ranging from 20% to 40%.
2. Palm wine, another traditional beverage produced from either the coconut tree or other palm trees, has an alcohol content ranging from 20% to 40%.
3. Imported liquors such as whisky, brandy and rum.

Studies among the Rajputs of northwestern India identified three preferred types of alcoholic beverages:<sup>22</sup>

1. *Daru*, a drink distilled from the flowers of the *mahwa* tree, has an alcohol content ranging from 20% to 40%.
2. Spirit produced from solvents, which varies greatly in alcohol content and, at the time of the study, was drunk only by 'untouchables' and members of other lower castes.
3. 'English alcohol,' a distilled liquor—usually whisky or gin—associated with the British rule.

The consumption of alcoholic beverages in India predates colonization by the British. However, in contrast to other countries, alcohol consumption was not considered central to normal social life or daily meals in pre-colonial India. Nevertheless, in certain tribal groups throughout the country, alcoholic beverages still are considered 'a gift to humankind and, in turn, were reverently offered to the nature gods and other sacred powers'.<sup>23</sup>

One reason for the specific drinking patterns in India (Table IV) may be the strong advocacy of abstinence by Indian religious groups. For example, among the Hindus, alcoholic beverages are forbidden for Brahmins and other upper caste groups who are strict vegetarians. Drinking is acceptable for members of all other caste groups who are meat-eaters (the warrior, farmer and scavenger-untouchable castes).<sup>21</sup> Muslims are also not supposed to drink, although some Muslim men consume alcohol.<sup>12,21</sup> Finally, Buddhists and Jains, who are strict vegetarians, are forbidden to

TABLE IV. Drinking practices among Indians

Drinking practices	Indian context
Women	Predominantly abstinent (about 95%)
Men	Highly variable across regions
Young persons'	Increasing concern
Most commonly consumed beverage	Arrack, palm wine, beer, imported liquor
Predates European contact	Yes, not central to social life
Context of drinking occasions	No regular context established; not part of daily life or rituals
Extent of major concerns about alcohol-related problems	Increasingly seen in health, social and economic areas

drink. In addition, political prohibition policies in certain states may contribute to the drinking patterns seen in India.<sup>21</sup>

India is a diverse nation with cultural variations among ethnic, religious and linguistic groups, and there are major differences between the urban and rural areas. One cannot accurately characterize the drinking patterns of all Indian ethnic and cultural groups based on the findings from just one of these groups.<sup>21</sup> Indian attitudes to drinking include both permissive and abstinent features, especially when different population groups are considered.<sup>23</sup>

**EPIDEMIOLOGY**

Alcohol abuse can be found among all age groups,<sup>24</sup> predominantly in men.<sup>25</sup> Notable ethnic differences observed were in the prevalence of alcohol-related liver disease and associated mortality.<sup>26</sup> Overall consumption or the average volume of alcohol consumption has been the usual measure of exposure linking alcohol to disease in recent decades.<sup>3,27</sup> The average volume of consumption works as a risk factor mainly through biological and biochemical effects, including dependence, to produce long term health consequences. Although research shows that the average volume of alcohol consumption is correlated with measures of acute consequences such as injury and injury-related death, several studies indicate that the ability to predict these injury measures is improved by taking patterns of drinking into account.<sup>28</sup> There is an exponential relationship between the amount of alcohol consumed and criminal behaviour, including drunken driving and legal arrests.<sup>29</sup> The Food and Agriculture Organization (FAO) of the United Nations observed that with increasing marginalization and alienation, excessive alcohol consumption has become widespread among tribal men in Madhya Pradesh and Bihar. Not only do the men's incomes decline but they also forcibly use up even the women's earnings. Resistance invites domestic violence and abuse. Household food security becomes a major casualty.<sup>30</sup> Social functioning is also affected by the amount of alcohol consumed per day.<sup>31,32</sup> Gupta *et al.*<sup>12</sup> noted that, among the study subjects, the number of people consuming alcohol was lower than, for example, in developed countries; but the amount of alcohol consumed by drinkers was high, which suggests the risk of serious public health problems.

The volume of consumption as well as the patterns of drinking, especially irregular heavy drinking, have been shown to determine the burden of disease.<sup>28,33,34</sup> In other words, the impact of the average volume of consumption on mortality or morbidity is partly moderated by the way alcohol is consumed by the individual, which in turn is influenced by the cultural context.<sup>35</sup> Patterns of drinking have been linked not only to acute health outcomes (Table V) such as injuries,<sup>36</sup> but also to chronic diseases such as coronary heart disease (CHD) and sudden cardiac death.<sup>34,37</sup>

There is general agreement that excessive alcohol consumption is associated with an increased risk of cirrhosis. However, there is no consensus on the exact dose or a specific dose-response relationship for cirrhosis.<sup>38</sup> Evidence suggests that there is an increased risk with ingestion >60–80 g/day of alcohol in men and >20 g/day in women. However, 6%–41% of those drinking these amounts will develop cirrhosis.<sup>25,38,39</sup> Bellentani *et al.*<sup>25</sup> showed that even in patients with an extremely high daily alcohol intake (>120 g/day), only 13.5% developed alcohol-induced liver damage. It is believed that other factors such as genetic susceptibility and dietary intolerance may be co-factors in alcohol-induced liver damage.

TABLE V. Major disease and injury conditions (%) attributable to alcohol worldwide<sup>1</sup>

Condition	Men	Women	Both
<i>Malignant neoplasms</i>			
Mouth and oropharynx	22	9	19
Oesophageal	37	15	29
Liver	30	13	25
Breast	na	7	7
<i>Neuropsychiatric disorders</i>			
Unipolar depressive	3	1	2
Epilepsy	23	12	18
Alcohol use: Dependence and harmful use	100	100	100
<i>Diabetes mellitus</i>	-1	-1	-1
<i>Cardiovascular disorders</i>			
Ischaemic heart disease	4	-1	2
Haemorrhagic stroke	18	1	10
Ischaemic stroke	3	-6	-1
<i>Cirrhosis of the liver</i>	39	18	32
<i>Unintentional injury</i>			
Motor vehicle accidents	25	8	20
Drowning	12	6	10
Fall	9	3	7
Poisoning	23	9	18
<i>Intentional injury</i>			
Self-inflicted	15	5	11
Homicide	26	16	24

*Breast cancer*

Meta-analyses have shown a linear increase in the risk of breast cancer with increasing average volumes of consumption of alcohol.<sup>40-43</sup>

*Coronary heart disease*

A meta-analysis on the average volume of alcohol consumption and CHD yielded a J-shaped curve.<sup>44</sup> Compared with not drinking, low-to-moderate consumption of alcohol is associated with lower CHD incidence and mortality. For higher average volumes of alcohol consumption, the risk reverses.<sup>44,45</sup> Several studies confirming the cardioprotective effect of regular light-to-moderate drinking found an increased risk for major coronary events in drinkers with an episodic heavy drinking pattern compared with abstainers, even when the overall volume of alcohol consumption was low.<sup>46,47</sup> In addition to its effect on CHD, an irregular pattern of heavy drinking appears to be related to other types of cardiovascular problems such as stroke or sudden cardiac death.<sup>48,49</sup> This association is consistent with increased clotting, lowered threshold for ventricular fibrillation and elevation of low-density lipoproteins after heavy drinking.<sup>34,50</sup>

*Intentional injury (violence)*

Alcohol has been consistently associated with violent crime,<sup>51</sup> although the association might not always be causal.<sup>52</sup>

*Liver disease*

Worldwide alcohol is one of the main causes of end-stage liver disease. For many decades, alcohol was considered the primary cause of cirrhosis. Alcoholic liver disease occurs in patients who consume excessive amounts of alcohol. Alcoholic cirrhosis occurs in the setting of alcoholism; mortality from alcoholic liver disease closely follows the per capita alcohol consumption.<sup>24</sup>

Up to 90% of alcoholics have fatty liver, a disorder that is

seldom fatal and usually resolves within 2 weeks if alcohol consumption is discontinued. In the past it was assumed that alcoholic fatty liver was a benign process and did not lead to fibrosis or cirrhosis.<sup>39</sup> However, 5%–15% of patients with alcoholic fatty liver develop cirrhosis.<sup>53</sup> Fatty liver typically occurs after short term binge drinking and is the hallmark of acute ingestion. It is rare to actually diagnose alcoholic fatty liver as patients are usually asymptomatic and have normal to mildly abnormal liver tests. Physical examination may reveal mild liver enlargement and stigmata of chronic liver disease are rarely seen.<sup>54</sup> Once alcohol ingestion ceases, the steatosis usually resolves.

The clinical presentation of alcoholic hepatitis is reflective of the inflammatory features characteristic of this disorder. Classically, alcoholic hepatitis presents with fever, jaundice, hepatomegaly and occasionally signs of decompensated liver disease, such as ascites, portal hypertensive bleeding and hepatic encephalopathy.<sup>55</sup> However, patients with alcoholic hepatitis may be entirely asymptomatic.

#### *Alcoholic cirrhosis*

Patients with alcoholic cirrhosis have clinical features similar to those of other causes of cirrhosis. The diagnosis of cirrhosis may be suspected in patients with stigmata of chronic liver disease found on examination or laboratory abnormalities suggestive of liver synthetic dysfunction such as coagulopathy, hypoalbuminaemia and hyperbilirubinaemia. Ultrasound imaging of the liver may show features of cirrhosis.<sup>56</sup> Splenomegaly may be present. Upper gastrointestinal endoscopy may reveal oesophageal and gastric varices.

#### *Morbidity*

Although most liver cirrhosis in India may not be alcohol-related, a review of Indian studies of biopsy-proven cases of liver cirrhosis from 1933 to 1975 found a cumulative mean of 16% of patients with alcohol dependence.<sup>11</sup> However, in recent years, the prevalence of alcohol-related cirrhosis is increasing. In a recent study in Kerala, in 60% of patients with cirrhosis in a large tertiary hospital, alcohol consumption was the cause. Nearly 80% of the alcoholics were also smokers. Almost all alcoholics develop fatty liver, which is reversible following abstinence from alcohol. Many alcoholics develop alcoholic hepatitis, which may be sub-clinical, and may be diagnosed only on biopsy. Only one-third of alcoholics develop liver cirrhosis; the vulnerability is probably decided by genetic and dietary factors. Hepatocellular cancers develop in about 5% of cases of alcoholic cirrhosis. Viral infections of the liver, chronic hepatitis B and C, especially the C virus, are co-factors in the development of hepatocellular carcinoma. Although the incidence of cancer in India, at the rate of 75 per 100 000 population is lower than that in many developed countries, both oesophageal and oral cancer are particularly common. A 1989 study of 187 cases of gingival cancers and 895 controls showed a positive association with alcohol use; in 1994 a study of 713 oral cancer patients from Mumbai reported a relative risk of 1.42 with alcohol use. Case-control studies have found that alcohol use increases the relative risk of oesophageal cancer.<sup>11</sup>

#### ALCOHOL AND THE ECONOMY

Alcoholic beverages normally serve both the interest of public health and welfare, and simultaneously gain extra revenue for the Government. The total revenue from excise on alcoholic beverages and sales taxes for 1995–96 was approximately Rs 180 000 million (US\$ 5 billion).<sup>11</sup> In Karnataka, it is approximately

Rs 2400 crore per year. States derive as much as 25% of their annual budgetary revenue from sales of alcohol.<sup>5</sup> Duties on alcohol constitute as much as 23% of some Indian states' revenues. Household expenditure studies in the 1960s found families spending 3%–45% of their income on alcohol. More recent data are not available.<sup>11</sup> Besides the generation of legal revenues for the Government, the alcohol industry is thought to create an approximately equal sum in 'black money'.<sup>5</sup>

#### ALCOHOL AND GOVERNMENT POLICIES

Drinking is often portrayed as a response to poverty and misery, but global patterns suggest that drinking is also associated with relative affluence. Currently, there is a cross-sectional association of alcohol consumption levels and per capita income. The rise in consumption per adult has accompanied economic development. As with heart disease and disorders of obesity, alcohol disorders are to some extent disorders of developed societies. Therefore, where countries are on a path to successful economic development, there is a need to put in place policies that are able to counteract the trend toward increased alcohol consumption and corresponding alcohol-related problems.<sup>57</sup> Although it is important to recognize that alcohol consumption typically increases with affluence, it should be kept in mind that some of the adverse effects related to drinking are aggravated by poverty. For example, malnutrition and infections common among the poor interact with alcohol in the development of liver disease.<sup>58</sup> As a result, alcohol-related mortality is often highest among the poorest in a society.<sup>59</sup>

The Constitution of India states, 'The State shall endeavor to bring about prohibition of the consumption of intoxicating drinks.' Growing awareness of the problem of alcohol consumption in India has been reflected in several recent policy initiatives.<sup>60</sup> Overall, there is increasing liberalization in alcohol production and availability, except for a few states, which have promulgated prohibition. Prohibition was undertaken in some states, but it largely failed to reduce alcohol-related problems and gave rise to some additional problems.<sup>12</sup> Mahal<sup>61</sup> examined the alcohol policy in some Indian states, and included a prohibition dummy for Gujarat in his analysis. He found that prohibition has considerable negative effects on alcohol consumption and stimulated declines in consumption rates of 30%–67% for those >25 years of age and of 90% for those 15–25 years of age.

Alcohol prohibition is a state subject in India with each state having full control of alcohol legislation, state excise rates and organization of the production and sale of alcohol. There are 3 main types of prohibition policies: complete prohibition of production and consumption; partial prohibition where one or more types of liquor (usually *arrack*) is prohibited; and dry days where consumption is prohibited for certain days of the week or month. There is thus major variation in prohibition policies across states and over time within states. Since the trade liberalization in 1992–93, the attitudes of the Central and State governments to alcohol have changed dramatically with the previous restrictions on consumption and production being relaxed. Most states enforce a few 'days' in the year as 'dry' (no alcohol sales) and restrict the time for sale on other days.<sup>11</sup>

#### CONCLUSION

The pattern of alcohol intake around the world is constantly evolving. There is thus a strong justification for the health profession to step up its health advocacy with respect to policies to reduce rates of alcohol consumption. Although India is generally considered a dry country, drinking practices differ considerably

among people living in the southern and northern areas, and even among members of different castes residing in the same region. As a result of the cultural and ethnic variations in drinking practices, no single definition of 'problem drinking' or alcohol dependence exists that can be uniformly applied in all countries or cultures. Therefore, researchers, clinicians and public health officials attempting to develop effective prevention and treatment approaches must consider the population's attitudes and expectations regarding alcohol consumption and its effects.

REFERENCES

- 1 World Health Organization. *The world health report 2002—Reducing risks, promoting healthy life*. Geneva: World Health Organization; 2002.
- 2 Room R, Babor T, Rehm J. Alcohol and public health. *Lancet* 2005;**365**:519–30.
- 3 Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. *Lancet* 1997;**349**:1436–42.
- 4 Rehm J, Rehn N, Room R, Monteiro M, Gmel G, Jernigan D, et al. The global distribution of average volume of alcohol consumption and patterns of drinking. *Eur Addict Res* 2003;**9**:147–56.
- 5 Rajendran SD (ed). *Globalization and increasing trend of alcoholism*. Community Health Cell, for the Asia Social Forum, 2–7 January 2003, Hyderabad, India.
- 6 Mohan D, Chopra A, Ray R, Sethi H. Alcohol consumption in India: A cross sectional study. In: Demers A, Room R, Bourgault C (eds). *Surveys of drinking patterns and problems in seven developing countries*. Geneva: World Health Organization; 2001:103–14.
- 7 Saxena S. Country profile on alcohol in India. In: Riley L, Marshall M (eds). *Alcohol and public health in eight developing countries*. Geneva: World Health Organization; 1999:37–60.
- 8 Bloomfield K, Stockwell T, Gmel G, Rehn N. International comparisons of alcohol consumption. *Alcohol Res Health* 2003;**27**:95–109.
- 9 Pearson H. Public health: The demon drink. *Nature* 2004;**428**:598–600.
- 10 Kim WR, Brown RS Jr, Terrault NA, El-Serag H. Burden of liver disease in the United States: Summary of a workshop. *Hepatology* 2002;**36**:227–42.
- 11 World Health Organization. *Global status report on alcohol*. Geneva: World Health Organization; 1999.
- 12 Gupta PC, Saxena S, Pednekar MS, Maulik PK. Alcohol consumption among middle-aged and elderly men: A community study from western India. *Alcohol Alcohol* 2003;**38**:327–31.
- 13 Mohan D, Sharma HK, Darshan S, Sundaram KR, Neki JS. Prevalence of drug abuse in young rural males in Punjab. *Indian J Med Res* 1978;**68**:689–94.
- 14 Varma VK, Singh A, Singh S, Malhotra A. Extent and pattern of alcohol use and alcohol related problems in North India. *Indian J Psychiatr* 1980;**22**:331–7.
- 15 Chakravarthy C. Community workers estimate of drinking and alcohol-related problems in rural areas. *Indian J Psychol Med* 1999;**13**:49–56.
- 16 Sethi BB, Trivedi JK. Drug abuse in a rural population. *Indian J Psychiatr* 1979;**21**: 211–16.
- 17 Gyatso TR, Bagdass BB. *Health status in Sikkim*. Gangtok: Department of Health and Family Welfare, Government of Sikkim; 1998:33–4.
- 18 Isaac M. India. In: Grant M (ed). *Alcohol and emerging markets: Patterns, problems and responses*. Philadelphia: Brunner/Mazel; 1998:145–75.
- 19 Kerala Distillers and Bottlers Federation, April 2003
- 20 Sundaram KR, Mohan D, Advani GB, Sharma HK, Bajaj JS. Alcohol abuse in a rural community in India. Part I: Epidemiological study. *Drug Alcohol Dependence* 1984;**14**:27–36.
- 21 Bennett LA, Campillo C, Chandrashekar CR, Gureje O. Alcoholic beverage consumption in India, Mexico, and Nigeria: A cross-cultural comparison. *Alcohol Health Res World* 1998;**22**:243–52.
- 22 Dorschner J. Rajput alcohol use in India. *J Stud Alcohol* 1983;**44**:538–44.
- 23 Mohan D, Sharma HK. India. In: Heath DB (ed). *International handbook on alcohol and culture*. Westport, CT: Greenwood Press; 1995.
- 24 Mandayam S, Jamal MM, Morgan TR. Epidemiology of alcoholic liver disease. *Semin Liver Dis* 2004;**24**:217–32.
- 25 Bellentani S, Saccoccio G, Costa G, Tiribelli C, Manenti F, Sodde M, et al. Drinking habits as cofactors of risk for alcohol induced liver damage. The Dionysos Study Group. *Gut* 1997;**41**:845–50.
- 26 Stinson FS, Grant BF, Dufour MC. The critical dimension of ethnicity in liver cirrhosis mortality statistics. *Alcohol Clin Exp Res* 2001;**25**:1181–7.
- 27 Bruun K, Edwards G, Lumio M, Makela K, Pan L, Popham R, et al. *Alcohol control policies in public health perspective*. Helsinki: Finnish Foundation for Alcohol Studies; 1975.
- 28 Rehm J, Ashley MJ, Room R, Single E, Bondy S, Ferrence R, et al. On the emerging paradigm of drinking patterns and their social and health consequences. *Addiction* 1996;**91**:1615–21.
- 29 Midanik LT, Tam TW, Greenfield T K, Caetano R. *Risk functions for alcohol-related problems in a 1988 US national sample. Working paper*. Berkeley, CA: Alcohol Research Group; 1994.
- 30 Food and Agriculture Organization Investment Centre. *Socio-economic and production*

- systems studies. India: Overview of socio-economic situation of the tribal communities and livelihoods in Madhya Pradesh and Bihar*. FAO Investment Centre Studies and Reports; 1998. [www.fao.org/documents/show\\_cdr.asp?url\\_file=/docrep/007/ae393e/ae393e00.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/ae393e/ae393e00.htm)
- 31 Room R, Bondy S, Ferris J. *Drinking and risk of alcohol related harm in a 1989 Canadian National Sample. Working Paper*. Toronto: Addiction Research Foundation; 1994.
- 32 Klingemann H, Gmel G. *Mapping the social consequences of alcohol consumption*. Dordrecht: Kluwer Academic Publishers; 2001.
- 33 Rehm J, Room R, Graham K, Monteiro M, Gmel G, Sempos CT. The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease: An overview. *Addiction* 2003;**98**:1209–28.
- 34 McKee M, Britton A. The positive relationship between alcohol and heart disease in eastern Europe: Potential physiological mechanisms. *J R Soc Med* 1998;**91**:402–7.
- 35 Room R, Makela K. Typologies of the cultural position of drinking. *J Stud Alcohol* 2000;**61**:475–83.
- 36 Greenfield TK. Individual risk of alcohol-related disease and problems. In: Heather N, Peters TJ, Stockwell T (eds). *International handbook of alcohol dependence and problems*. New York: Wiley; 2001:413–17.
- 37 Puddey IB, Rakic V, Dimmitt SB, Beilin LJ. Influence of pattern of drinking on cardiovascular disease and cardiovascular risk factors—A review. *Addiction* 1999;**94**:649–63.
- 38 Day CP. Who gets alcoholic liver disease: Nature or nurture? *J R Coll Physicians Lond* 2000;**34**:557–62.
- 39 Teli MR, Day CP, Burt AD, Bennett MK, James OF. Determinants of progression to cirrhosis or fibrosis in pure alcoholic fatty liver. *Lancet* 1995;**346**:987–90.
- 40 Smith-Warner SA, Spiegelman D, Yaun SS, van den Brandt PA, Folsom AR, Goldbohm RA, et al. Alcohol and breast cancer in women: A pooled analysis of cohort studies. *JAMA* 1998;**279**:535–40.
- 41 Bagnardi V, Blangiardo M, La Vecchia C, Corrao G. A meta-analysis of alcohol drinking and cancer risk. *Br J Cancer* 2001;**85**:1700–5.
- 42 Ellison RC, Zhang Y, McLennan CE, Rothman KJ. Exploring the relation of alcohol consumption to risk of breast cancer. *Am J Epidemiol* 2001;**154**:740–7.
- 43 Ridolfo B, Stevenson C. *The quantification of drug-caused mortality and morbidity in Australia, 1998. Australian Institute of Health and Welfare Cat. No. PHE 29. Drug Statistics Series No. 7*. Canberra: Australian Institute of Health and Welfare; 2001.
- 44 Corrao G, Rubbiati L, Bagnardi V, Zambon A, Poikolainen K. Alcohol and coronary heart disease: A meta-analysis. *Addiction* 2000;**95**:1505–23.
- 45 Rehm JT, Bondy SJ, Sempos CT, Vuong CV. Alcohol consumption and coronary heart disease morbidity and mortality. *Am J Epidemiol* 1997;**146**:495–501.
- 46 McElduff P, Dobson AJ. How much alcohol and how often? Population based case-control study of alcohol consumption and risk of a major coronary event. *BMJ* 1997;**314**:1159–64.
- 47 Murray RP, Connett JE, Tyas SL, Bond R, Ekuma O, Silversides CK, et al. Alcohol volume, drinking pattern, and cardiovascular disease morbidity and mortality: Is there a U-shaped function? *Am J Epidemiol* 2002;**155**:242–8.
- 48 Wannamethee G, Shaper AG. Alcohol and sudden cardiac death. *Br Heart J* 1992;**68**:443–8.
- 49 Kauhanen J, Kaplan GA, Goldberg DE, Salonen JT. Beer binging and mortality: Results from the Kuopio ischaemic heart disease risk factor study, a prospective population based study. *BMJ* 1997;**315**:846–51.
- 50 Rehm J, Sempos CT, Trevisan M. Alcohol and cardiovascular disease—more than one paradox to consider: Average volume of alcohol consumption, patterns of drinking and risk of coronary heart disease—A review. *J Cardiovasc Risk* 2003;**10**:15–20.
- 51 Graham K, West P. Alcohol and crime: Examining the link. In: Heather N, Peters TJ, Stockwell T (eds). *International handbook of alcohol dependence and problems*. Sussex, England: John Wiley; 2001:439–70.
- 52 Room R, Rossow I. The share of violence attributable to drinking. *J Substance Use* 2001;**6**:218–28.
- 53 Worner TM, Lieber CS. Perivascular fibrosis as precursor lesion of cirrhosis. *JAMA* 1985;**254**:627–30.
- 54 French SW, Nash J, Shitabata P, Kachi K, Hara C, Chedid A, et al. Pathology of alcoholic liver disease. VA Cooperative Study Group 119. *Semin Liver Dis* 1993;**13**:154–69.
- 55 Mendenhall CL. Alcoholic hepatitis. *Clin Gastroenterol* 1981;**10**:417–41.
- 56 Cohen JA, Kaplan MM. The SGOT/SGPT ratio—An indicator of alcoholic liver disease. *Dig Dis Sci* 1979;**24**:835–8.
- 57 Room R, Graham K, Rehm J, Jernigan D, Monteiro M. Drinking and its burden in a global perspective: Policy considerations and options. *Eur Addict Res* 2003;**9**:165–75.
- 58 Room R, Jernigan D, Carlini-Marlatt B, Gureje O, Mäkelä K, Marshall M, et al. *Alcohol in developing societies: A public health approach*. Finnish Foundation for Alcohol Studies in collaboration with the World Health Organization. Helsinki: Hakapaino Oy; 2002.
- 59 Makela P. Alcohol-related mortality as a function of socio-economic status. *Addiction* 1999;**94**:867–86.
- 60 Saxena S. Alcohol problems and responses: Challenges for India. *J Substance Use* 2000;**5**:62–70.
- 61 Mahal A. What works in alcohol policy? Evidence from rural India. *Economic Political Weekly* 2000;**2**:3959–68.