

## HARMFUL ALCOHOL USE IN GOA, INDIA, AND ITS ASSOCIATIONS WITH VIOLENCE: A STUDY IN PRIMARY CARE

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**Abstract** — **Aims:** To determine (i) the prevalence and characteristics of harmful alcohol consumption in general practice attendees; (ii) social and psychological associations with harmful drinking and (iii) recognition of harmful drinking by GPs. **Methods:** A cross-sectional study of ten general practices in Goa, India. A total of 1567 general practice attendees were recruited. **Results:** A total of 338 men (41%) and 597 women (81%) reported that they never consumed alcohol. One hundred and twenty-eight people or 8.2% scored  $\geq 8$  on the AUDIT [123 (15%) men and five (0.7%) women] and were classified as harmful or dependent drinkers. The population attributable fraction of harmful drinking in the perpetration of any physical violence by men over 12 months was 0.36. The population attributable fraction of moderate drinking (vs abstinence) in the perpetration of any physical violence by women over 12 months was 0.27. Doctors identified almost 60% of problem drinkers but misidentified  $\sim 5\%$  of moderate drinkers as problem drinkers. **Conclusions:** The male pattern of drinking in Goa is one of the high rates of abstinence coupled with relatively high rates of harmful and dependent drinking in those who consume alcohol. Most women are abstainers. These data provide the first evidence in India on (i) the role of the GP in identification of harmful alcohol use and (ii) the contribution of harmful drinking to the perpetration of physical violence from the perspective of the alcohol user.

### INTRODUCTION

Alcohol has been consumed in India at least since the Vedic period of 2000–800 BC (Isaac, 1998) and was allowed in Hinduism, particularly among the ruling classes. However, Buddhism, Jainism, and Islam did not allow their followers to drink. Although alcohol became more freely available in the Indian subcontinent under British rule, Indians did not generally incorporate drinking alcohol into their social or religious activities (Bennett *et al.*, 1998). When India became independent in 1947, Mahatma Gandhi and the Indian National Congress Party campaigned against liquor production and sales on the grounds that it was injurious to health (Isaac, 1998). However, the Indian states were able to set their own legal frameworks (Rahman, unpublished thesis 2003) and by the mid-1960s several states had lifted prohibition orders until by 1970 only Gujarat had prohibition. Although, several states enacted prohibition again during the 1990s as a response to pressure from lobby groups concerned about the social and health consequences of consumption, the result has been mixed at best (Patel, 1998). Despite this emphasis on the restriction of sale and consumption of alcohol in India and evidence of the impact of harmful alcohol use (Benegal, 2005), little is known about prevalence of alcohol problems in people attending their primary care doctor or the role of the doctor in identifying and managing the problem.

Goa is India’s smallest, but richest per capita, state in India with a population of 1.3 million people. For  $\sim 450$  years from the 16th century until 1961, when it became a part of India, it was governed directly from Portugal. The only study of drinking in Goa has been in industrial worker populations, in which

reported rates were 21% for harmful drinking and 2% for alcohol dependence (Silva *et al.*, 2003).

Our objectives were to describe (i) the prevalence and characteristics of harmful alcohol consumption in general practice attendees in Goa; (ii) the social and psychological associations with harmful drinking and (iii) recognition of harmful drinking by GPs.

### PARTICIPANTS AND METHODS

Ten general practices across Goa participated. Practices were selected on the basis of their interest in taking part in research. All were single-handed, urban and rural private practitioners serving people from a spectrum of socio-economic circumstances. Although there is a public system of primary care, free at the point of delivery, 80% of the population of India uses private general practitioners (Bhat, 1993; Brugh and Zwi, 1998) in addition to or instead of the public system. Recruitment was conducted over a 2–3 weeks in each practice. All attendees were invited to take part while they waited to see their doctor or immediately after the consultation. The total numbers approached in the practices determined the study denominator. Those offering consent participated in a standardized interview conducted in their own language (English, Konkani, Hindi, or Marathi) either before they saw the doctor (if time allowed) or after their consultation with the doctor. Exclusion criteria include those aged under 18 or over 75, severe current illness or any considered by their doctors to be too ill to participate. The following data were collected:

- (i) Age, sex, place of birth, religion, educational level, annual family income, current housing and household composition, and financial status.

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- (ii) The AUDIT alcohol use disorder identification test that was developed by the World Health Organisation (Barbor *et al.*, 1989) and has been used in India (Silva *et al.*, 2003; Pal *et al.*, 2004). The AUDIT covers three domains on alcohol consumption. These are as follows: (i) hazardous use (i.e. frequency and quantity of intake); (ii) harmful use (i.e. guilt after drinking, blackouts, alcohol-related injuries, and others concerned about their drinking), and (iii) dependence (i.e. impaired control over drinking, increased salience, and morning drinking). The recommended threshold scores are  $\geq 8$  for a diagnosis of harmful drinking and  $\geq 20$  for a diagnosis of dependent drinking according to the 10th Edition of the International Classification of Diseases (WHO, 1992). This cut-off was based on data from several validation studies (Allen *et al.*, 1997; Cherpitel *et al.*, 1995; Conigrave *et al.*, 1995) include one done in India (Carey *et al.*, 2003). The AUDIT manual (Barbor *et al.*, 2001) also recommends that those scoring in the range of 8–15 require simple advice on alcohol consumption; 16–19 require simple advice plus brief counselling and continued monitoring and 20–40 need referral to specialists for diagnostic evaluation and treatment.
- (iii) Psychological status using the K10, a screening questionnaire for psychological morbidity (Kessler *et al.*, 2003) that is currently in use in the World Mental Health Surveys in 11 sites in India.
- (iv) Physical function using five questions from the Short Form 12, a quality of life scale (Jenkinson *et al.*, 1993).
- (v) Domestic or other violence experienced or perpetrated by men or women in the previous 12 months using a questionnaire applied in British general practice about experiencing violence (Mezey *et al.*, 1998). Questions concerned the nature of the violence and whether a weapon was used, injuries sustained, and reporting to doctors or others. Questions designed for the study were posed concerning perpetration of physical violence against others.
- (vi) Smoking and drinking habits using standardized instruments adapted from in the Health Survey for England (Department of Health, 2001) determined the weekly intake of tobacco and the total alcohol units consumed per week.
- (vii) Family history of alcoholism derived from a questionnaire used in the Health Survey for England (Qureshi *et al.*, 2005)
- (viii) The general practitioner completed a two-item questionnaire, after each consultation (without knowledge of the interview content). The questions included the following: In your opinion do you think that this person is a (i) problem drinker; (ii) and/or alcoholic. Data on total consultation rate and consultation rate for alcohol problems in the preceding 12 months were collected from practice records. Ethical approval was received from the Independent Ethics Committee, Mumbai, India.

#### Power and statistical analysis

We aimed to recruit sufficient attendees to achieve a precise estimate of the prevalence of harmful or dependent drinking. Given published estimates for Goa and other regions of India

of  $\sim 5\%$  of harmful alcohol use (i.e. scores  $\geq 8$ ) this entailed recruiting 1500 ( $\pm 1.1\%$  error margin) to 2000 attendees (1.0% error margin) at 95% power and an alpha of 0.05.

The survey commands in Stata version 9.0 were used throughout the analysis to examine the effect of clustering due to general practice. Where marked differences in conclusion between cluster and non-cluster analysis occurred, this was investigated. Where clustering was important, confidence intervals adjusted for this effect are reported. The data were first examined using descriptive statistics, dividing the population into non-drinkers, moderate or moderate drinkers, and harmful/dependent drinkers. We used the first two questions of AUDIT to assess weekly alcohol intake as total units consumed and compared this against the weekly intake reported on the drinking habits questionnaire. Using  $>14$  U as the cut-off in women and  $>21$  U in men (Royal College of Physicians, 1995), we assessed the agreement between the two questionnaires, using the kappa statistic. The recommended AUDIT thresholds for harmful and dependent drinking (Barbor *et al.*, 1989) were used, as well as higher thresholds as recommended in a recent Indian validation study of the instrument (Pal *et al.*, 2004). We generated univariable odds ratios (not shown) to examine associations with abstinence and moderate (AUDIT score 1–7) and harmful drinking (AUDIT score  $\geq 8$ ). Those variables most significantly related (at the 5% level of significance) were subsequently entered into a multivariable logistic regression to build a profile of harmful and dependent drinking. The survey command in Stata to account for clustering within practices, which means that not more than  $n-1$  coefficients (where  $n$  = number of practices) could be generated. The population attributable fraction for the role of alcohol in the perpetuation of physical violence was calculated; this indicates the proportion of violence that would be prevented if the risk factor (harmful alcohol use) were removed from the entire population. The sensitivity, specificity, and likelihood ratio of the doctors' detection of harmful and dependent drinking were calculated from their response to the two questions on whether the person had a drinking problem or/and was alcoholic against the gold standard cut-off  $\geq 8$  on AUDIT.

## RESULTS

#### Response rates

A total of 1634 people were approached of whom 1579 (97%) agreed to participate. However, 12 did not complete the AUDIT, leaving 1567 in the analysis. There were no significant differences in age, sex, or general practice between attendees refusing and agreeing to participate.

#### Alcohol consumption

There was good agreement between AUDIT and the drinking habits questionnaire. Based on the defined cut-off for weekly consumption of alcohol in men and women, we obtained kappa statistic of 0.71 in men and 0.91 in women.

937 (60%) [(338 M (41%), 597 F (81%))] of attendees reported that they never consumed alcohol. A total of 502 (32%) [365 M (44%), 137 W (19%)] were moderate drinkers using the standard threshold score for the AUDIT of  $\leq 8$ . A total of 128 people or 8.2% (95% confidence intervals,

accounting for practice clustering 2.8, 21.5%) or 123 (15%, CI 5.7, 33.7%) men and five (0.7%, CI 0.15, 2.9%) women scored above the AUDIT threshold  $\geq 8$  (Barbor *et al.*, 2001 Carey *et al.*, 2003) and were classified as harmful or dependent drinkers. The wide confidence intervals for men reflected considerable general practice variation in the prevalence of harmful drinking ranging from 0 to 39% for both sexes and 0 to 49.6% for men and 0–7.3% for women. The practice with the highest rates of people with harmful alcohol use was situated in a poorer area with a high prevalence of unskilled workers. Of the 123 men who scored  $\geq 8$  on the AUDIT, 66 (54%) scored in the range (8–15) requiring simple advice on alcohol consumption, 20 (16%) scored 16–19 requiring simple advise plus brief counselling and continued monitoring and 37 (30%) scored 20 or more indicating the need for referral to the specialist for diagnostic evaluation and treatment. Of the five women scoring  $\geq 8$  on the AUDIT,

two required simple advice on alcohol consumption and three referral for dependent drinking.

The drinking habits questionnaire independently assessed the weekly consumption of alcohol as total number of units consumed. A direct comparison between this questionnaire and total AUDIT scores was not possible as the latter considers a much broader assessment of alcohol use. However, direct comparison of the two only on the level of alcohol consumption suggested that the median number of units consumed per week by people with score  $\geq 8$  on AUDIT was 24.5 was above the recommended weekly intake.

#### *Associations with harmful and dependent drinking in men*

Men who consumed any alcohol were more likely than abstainers to be employed, Catholic and to own their own homes. Harmful and dependent drinkers were more likely

Table 1. Characteristics of men based on drinking categories

|                                 | AUDIT defined harmful drinking |             |                     | SVY <i>F</i> -test | <i>P</i> -value |
|---------------------------------|--------------------------------|-------------|---------------------|--------------------|-----------------|
|                                 | Teetotaller (%)                | Drinker (%) | Harmful drinker (%) |                    |                 |
| Total                           | 338 (41)                       | 365 (44)    | 123 (15)            |                    |                 |
| Age                             |                                |             |                     |                    |                 |
| Mean, SD                        | 48.2, 16.0                     | 47.2, 14.5  | 49.2, 12.8          |                    |                 |
| <i>N</i> (%)                    |                                |             |                     |                    |                 |
| Marital status                  |                                |             |                     |                    |                 |
| Married                         | 261 (77)                       | 288 (79)    | 105 (85)            |                    |                 |
| Single, never married           | 65 (19)                        | 68 (19)     | 15 (12)             |                    |                 |
| Separated, widowed or divorced  | 12 (4)                         | 9 (2.5)     | 3 (2)               | 1.03               | 0.394           |
| Occupation*                     |                                |             |                     |                    |                 |
| Employed and F/T education      | 224 (66)                       | 268 (73)    | 87 (71)             |                    |                 |
| Unemployed                      | 27 (8)                         | 20 (5.5)    | 17 (14)             |                    |                 |
| Retired or looking after family | 87 (26)                        | 77 (21)     | 19 (15.5)           | 9.96               | 0.007           |
| Accommodation                   |                                |             |                     |                    |                 |
| Owns home                       | 231 (79)                       | 287 (86.5)  | 110 (89)            |                    |                 |
| Other                           | 62 (21)                        | 45 (14)     | 13 (11)             | 10.67              | 0.004           |
| Living alone                    |                                |             |                     |                    |                 |
| Yes                             | 10 (3)                         | 16 (4)      | 5 (4)               |                    |                 |
| No                              | 328 (97)                       | 349 (96)    | 118 (96)            | 0.71               | 0.502           |
| Satisfaction with accommodation |                                |             |                     |                    |                 |
| Satisfied                       | 284 (84)                       | 323 (88.5)  | 93 (76)             |                    |                 |
| Neutral                         | 38 (11)                        | 31 (8.5)    | 25 (20)             |                    |                 |
| Dissatisfied                    | 15 (4.5)                       | 11 (3)      | 5 (4)               | 4.34               | 0.024           |
| Ethnicity                       |                                |             |                     |                    |                 |
| Goan                            | 268 (79)                       | 310 (85)    | 107 (87)            |                    |                 |
| Other                           | 70 (21)                        | 55 (15)     | 16 (13)             | 2.61               | 0.124           |
| Religion                        |                                |             |                     |                    |                 |
| Hindu                           | 189 (56)                       | 145 (40)    | 40 (32.5)           |                    |                 |
| Roman catholic                  | 116 (34)                       | 206 (56)    | 81 (66)             |                    |                 |
| Other                           | 33 (10)                        | 14 (4)      | 2 (2)               | 13.05              | <0.001          |
| Literacy                        |                                |             |                     |                    |                 |
| Literate                        | 229 (88.5)                     | 327 (90)    | 82 (67)             |                    |                 |
| Non-literate                    | 39 (11.5)                      | 38 (10)     | 41 (33)             | 11.43              | 0.003           |
| Highest qualification           |                                |             |                     |                    |                 |
| None                            | 34 (10)                        | 34 (9)      | 35 (28.5)           |                    |                 |
| Up to standard 4                | 82 (24)                        | 48 (13)     | 21 (17)             |                    |                 |
| Up to standard 10               | 121 (36)                       | 125 (34)    | 47 (38)             |                    |                 |
| Up to standard 12               | 24 (7)                         | 27 (7)      | 4 (3)               |                    |                 |
| Professional qualification      | 77 (23)                        | 131 (36)    | 16 (13)             | 6.26               | <0.001          |
| Annual family income            |                                |             |                     |                    |                 |
| <Rs 10 000                      | 46 (16)                        | 27 (8)      | 34 (31)             |                    |                 |
| Rs 10 000–50 000                | 108 (37)                       | 98(30.5)    | 37 (34)             |                    |                 |
| Rs 50 000–100 000               | 80 (27)                        | 91 (28)     | 23 (21)             |                    |                 |
| Rs 100 000–500 000              | 52 (18)                        | 93 (29)     | 15 (14)             |                    |                 |
| >Rs 500 000                     | 6 (2)                          | 12 (4)      | 0 (0)               | 2.88               | 0.080           |

Rs: Indian Rupees.

Table 2. Associations with drinking patterns in men

|  | Teetotaller (%) | Drinks alcohol (%) | Harmful drinker (%) | SVY <i>F</i> -test | <i>P</i> -value |
|--|-----------------|--------------------|---------------------|--------------------|-----------------|
| Total  | 338 (41)        | 365 (44)           | 123 (15)            |                    |                 |
| Patient's view of their health               |                 |                    |                     |                    |                 |
| Good   | 172 (51) (77)   | 197 (54) (79)      | 73 (59) (89)        | 2.81               | 0.103           |
| Fair or poor                                 | 51 (15) (23)    | 51 (14) (21)       | 9 (7) (11)          |                    |                 |
| Missing                                      | 115 (34)        | 117 (32)           | 41 (33)             |                    |                 |
| Long-standing illness                        |                 |                    |                     |                    |                 |
| Yes  | 171 (51)        | 159 (44)           | 62 (50)             | 1.57               | 0.239           |
| No   | 167 (49)        | 206 (56)           | 61 (50)             |                    |                 |
| K10 risk of mental illness                   |                 |                    |                     |                    |                 |
| Low or no                                    | 248 (73)        | 282 (77)           | 59 (48)             | 8.07               | <0.001          |
| Medium                                       | 77 (23)         | 77 (21)            | 60 (49)             |                    |                 |
| High   | 13 (4)          | 6 (2)              | 4 (3)               |                    |                 |
| Use tobacco now                              |                 |                    |                     |                    |                 |
| Yes  | 51 (15)         | 78 (21)            | 60 (49)             | 27.66              | <0.001          |
| No   | 287 (85)        | 286 (79)           | 62 (51)             |                    |                 |
| Parent or sibling has drinking problem       |                 |                    |                     |                    |                 |
| Yes  | 70 (21)         | 78 (21)            | 52 (42)             | 9.73               | 0.003           |
| No/don't know                                | 268 (79)        | 287 (79)           | 71 (58)             |                    |                 |
| Victim of any crime                          |                 |                    |                     |                    |                 |
| Yes  | 52 (15.38)      | 71 (19.5)          | 46 (37.4)           | 7.94               | 0.004           |
| No   | 286 (84.62)     | 294 (80.6)         | 77 (62.6)           |                    |                 |
| Patient committed verbal or physical assault |                 |                    |                     |                    |                 |
| Yes  | 97 (29)         | 122 (33)           | 58 (47)             | 5.29               | 0.024           |
| No   | 241 (71)        | 243 (67)           | 65 (53)             |                    |                 |

Figures in italics correspond to percentages when missing data are ignored.

than moderate drinkers to be illiterate, have no education, and receive low pay than moderate drinkers (Table 1). In addition, harmful or dependent drinkers were more likely than the remainder to be at medium risk of psychological disorder, use tobacco, report a first degree relative with alcohol problems, and report having been the victim of crime or perpetrated interpersonal violence in the past 12 months (Table 2). Five per cent of abstainers (17/338) and 5% of moderate drinkers (18/365) had committed interpersonal violence in the preceding 12 months compared to 21.5% (14/65) of drinkers with an AUDIT score 8–15, 20% (4/20) of those with a score of 16–19 and 30% (11/37) of dependent drinkers (AUDIT score  $\geq 20$ ) ( $\chi^2 = 53.5$ ,  $df = 3$ ,  $P = 0.0000$ , 4 missing). Of the 29 harmful drinkers (AUDIT score  $\geq 8$ ) who admitted perpetrating interpersonal violence, 21 (72%) said they were drinking alcohol at the time. The relative risk ratio for perpetrating violence amongst harmful drinkers compared to non-drinkers or moderate drinkers was 4.73 (95% CI 3.01, 7.45). The population attributable fraction of harmful drinking in the perpetration of any physical violence over the preceding 12 months was 0.36. This means that 36% of violence perpetrated by men in this population over the preceding 12 months involved harmful drinkers.

#### Associations with moderate drinking in women

Women who consumed any alcohol were more likely than abstainers to own their own homes, be Goan, Catholic and literate, and have higher education and higher incomes (Table 3). They were also more likely to report a long standing physical illness and to have perpetrated a physical or verbal assault in the preceding year. A total of 7.7% of alcohol consumers (11/142) reported perpetrating physical violence compared to 2.7% of abstainers (16/599) ( $\chi^2 = 8.5$ ,  $df = 1$ ,  $P = 0.004$ ). The relative risk ratio for perpetrating physical violence among moderate drinkers compared to abstainers

was 2.90 (95% CI 1.38, 6.11). The population attributable fraction of moderate drinking in the perpetration of any physical violence over the preceding 12 months was 0.27. This means that 27% of the violence in women involved moderate drinkers (as compared to abstainers) (Table 4).

#### Attendance at the general practice

Mean consultation rate at the general practice over the preceding year for harmful drinkers (4.0, SD 4.5) was not significantly different to that for moderate drinkers (4.6, SD 5.6) and abstainers (4.8, SD 6.1).

#### Independent associations with harmful drinking in men

A multivariate analysis of independent associations with harmful or dependent drinking showed that men drinking at these levels were more likely to be Catholic, middle-aged, users of tobacco, and illiterate. They were also more likely to report psychological symptoms and a history of alcohol problems and/or treatment for same (Table 5).

#### Doctors' detection of harmful and dependent drinking in men

The doctors were able to identify correctly (sensitivity) almost 60% of problem drinkers, but also misdiagnosed ~5% of moderate drinkers as problem drinkers (specificity) (Table 6). The likelihood ratio of a positive diagnosis by the doctor was just over 12 for harmful and dependent drinking, meaning that the doctor's diagnosis raised the odds of a patient being a harmful/dependent drinker by a factor of 12. The likelihood ratio is a useful measure of the utility of a test or doctor's opinion. The overall prevalence of the disorder in question (in this case 8.2%) is converted into odds and multiplied by the likelihood ratio to obtain the post-test odds which is then converted and expressed as a post-test prevalence. Given that the prevalence of harmful drinking in the study population was 8.2%, this means that the post-test prevalence

Table 3. Characteristics of women based on drinking categories\*

|                                 |                 |              | SVY    |         |
|---------------------------------|-----------------|--------------|--------|---------|
|                                 | Teetotaller (%) | Drinker (%)  | F-test | P-value |
| Total                           | 599 (81)        | 137 (19)     |        |         |
| Age                             |                 |              |        |         |
| Mean, SD                        | 49.48 (14.4)    | 50.55 (14.4) |        |         |
| <i>N</i> (%)                    | <i>N</i> (%)    | <i>N</i> (%) |        |         |
| Marital status                  |                 |              |        |         |
| Married                         | 367 (61)        | 91 (66)      |        |         |
| Single, never married           | 52 (9)          | 14 (10)      |        |         |
| Separated, widowed, or divorced | 180 (30)        | 32 (23)      | 1.26   | 0.305   |
| Occupation*                     |                 |              |        |         |
| Employed and F/T education      | 120 (20)        | 32 (23)      |        |         |
| Unemployed                      | 23 (4)          | 7 (5)        |        |         |
| Retired or looking after family | 456 (76)        | 98 (72)      | 0.70   | 0.481   |
| Accommodation                   |                 |              |        |         |
| Owns home                       | 448 (84)        | 115 (97)     |        |         |
| Other                           | 83 (16)         | 4 (3)        | 11.11  | 0.010   |
| Living alone                    |                 |              |        |         |
| Yes                             | 27 (4.5)        | 4 (3)        |        |         |
| No                              | 572 (95.5)      | 133 (97)     | 0.70   | 0.425   |
| Satisfaction with accommodation |                 |              |        |         |
| Satisfied                       | 456 (76)        | 108 (79)     |        |         |
| Neutral                         | 107 (18)        | 14 (10)      |        |         |
| Dissatisfied                    | 36 (6)          | 15 (11)      | 3.61   | 0.079   |
| Ethnicity                       |                 |              |        |         |
| Goan                            | 520 (87)        | 136 (99)     |        |         |
| Other                           | 79 (13)         | 1 (1)        | 22.09  | 0.001   |
| Religion                        |                 |              |        |         |
| Hindu                           | 233 (39)        | 6 (4)        |        |         |
| Roman catholic                  | 340 (57)        | 127 (93)     |        |         |
| Other                           | 26 (4)          | 4 (3)        | 0.56   | <0.001  |
| Literacy                        |                 |              |        |         |
| Literate                        | 431 (72)        | 119 (87)     |        |         |
| Non-literate                    | 168 (28)        | 18 (13)      | 7.74   | 0.021   |
| Highest qualification           |                 |              |        |         |
| None                            | 162 (27)        | 20 (15)      |        |         |
| Up to standard 4                | 132 (22)        | 16 (12)      |        |         |
| Up to standard 10               | 179 (30)        | 50 (36.5)    |        |         |
| Up to standard 12               | 42 (7)          | 14 (10)      |        |         |
| Professional qualification      | 83 (14)         | 37 (27)      | 5.08   | 0.006   |
| Annual family income            |                 |              |        |         |
| < Rs 10 000                     | 93 (18)         | 13 (11)      |        |         |
| Rs 10 000–50 000                | 193 (37)        | 33 (27)      |        |         |
| Rs 50 000–100 000               | 155 (30)        | 49 (40)      |        |         |
| Rs 100 000–500 000              | 79 (15)         | 25 (20)      |        |         |
| > Rs 500 000                    | 3 (1)           | 3 (2)        | 6.23   | 0.004   |

Rs: Indian Rupees.

\*The 5 harmful drinkers are not included here.

(or prevalence in the group GPs considered were problem drinkers) was 52%, an impressive increase. However, this accuracy was partly explained by their tendency to regard women (correctly) as not being problem drinkers. When we calculated their accuracy in men alone (likelihood ratio 6.65) the pre-test prevalence of 15% rose to a post-test prevalence (prevalence in the group GPs considered at risk) of 54%, a less impressive rise.

## DISCUSSION

### Main findings

Harmful drinking was found exclusively in men in this population. The male pattern of drinking alcohol in Goa is

Table 4. Associations with drinking patterns in women

|  |               |                | SVY    |         |
|--|---------------|----------------|--------|---------|
|  | Teetotaller   | Drinks alcohol | F-test | P-value |
| Total  | 599 (81)      | 137 (19)       |        |         |
| Patient's view of their health               |               |                |        |         |
| Good   | 295 (49) (92) | 63 (46) (91)   |        |         |
| Fair or poor                                 | 27 (4.5) (8)  | 6 (4) (9)      | 0.01   | 0.924   |
| Missing                                      | 277 (46)      | 68 (50)        |        |         |
| Long-standing illness                        |               |                |        |         |
| Yes  | 289 (48)      | 75 (55)        |        |         |
| No   | 310 (52)      | 62 (45)        | 6.72   | 0.029   |
| K10 risk of mental illness                   |               |                |        |         |
| Low or no                                    | 371 (62)      | 71 (52)        |        |         |
| Medium                                       | 201 (34)      | 53 (39)        |        |         |
| High   | 27 (4.5)      | 13 (10)        | 2.98   | 0.085   |
| Use tobacco now                              |               |                |        |         |
| Yes  | 13 (2)        | 5 (4)          |        |         |
| No   | 586 (98)      | 132 (96)       | 1.69   | 0.226   |
| Mother or father with drinking problem       |               |                |        |         |
| Yes  | 21 (3.5)      | 7 (5)          |        |         |
| No/don't know                                | 578 (96.5)    | 130 (95)       | 0.39   | 0.549   |
| Parent or sibling has drinking problem       |               |                |        |         |
| Yes  | 113 (19)      | 30 (22)        |        |         |
| No/don't know                                | 486 (81)      | 107 (78)       | 0.61   | 0.456   |
| Victim of any crime                          |               |                |        |         |
| Yes  | 95 (16)       | 30 (22)        |        |         |
| No   | 504 (84)      | 107 (78)       | 2.71   | 0.134   |
| Patient committed verbal or physical assault |               |                |        |         |
| Yes  | 178 (30)      | 59 (43)        |        |         |
| No   | 421 (70)      | 78 (57)        | 11.11  | 0.009   |

Figures in italics correspond to percentages when missing data are ignored.

Table 5. Independent associations with harmful drinking in men (AUDIT ≥8)

|   | Odds ratio | 95% Confidence intervals |       | P-value |
|---|------------|--------------------------|-------|---------|
| Religion                                |            |                          |       |         |
| Hindu                                   | 1.00       |                          |       |         |
| Roman catholic                          | 1.91       | 1.33                     | 2.73  | 0.005   |
| Other                                   | 0.20       | 0.06                     | 0.76  | 0.023   |
| Tobacco use                             |            |                          |       |         |
| No                                      | 1.00       |                          |       |         |
| Yes                                     | 4.50       | 2.15                     | 9.40  | 0.001   |
| History of alcohol problem or treatment |            |                          |       |         |
| No                                      | 1.00       |                          |       |         |
| Yes                                     | 3.87       | 1.33                     | 11.21 | 0.018   |
| Kessler psychological distress          |            |                          |       |         |
| Low or no risk                          | 1.00       |                          |       |         |
| Medium or high risk                     | 2.59       | 1.40                     | 4.79  | 0.007   |
| Literacy                                |            |                          |       |         |
| Yes                                     | 1.00       |                          |       |         |
| No                                      | 2.59       | 1.21                     | 5.53  | 0.019   |
| Age band                                |            |                          |       |         |
| 18–30                                   | 1.00       |                          |       |         |
| 30–60                                   | 2.18       | 1.08                     | 4.42  | 0.034   |
| 60–75                                   | 1.50       | 0.48                     | 4.5   | 0.44    |

one of the high rates of abstinence coupled with relatively high rates of harmful and dependent drinking in those who consume alcohol. Harmful use was associated with psychological problems and the use of tobacco. There were clear links with violence in men who drink at harmful levels, compared to moderate drinkers or abstainers and in women who drink any alcohol compared to abstainers. GPs were

Table 6. Ability of doctors to detect harmful and dependent drinking

|  | Sensitivity | Specificity | Positive predictive value | Negative predictive value | Misclassified | LR of +ve diagnosis | LR of -ve diagnosis |
|--|-------------|-------------|---------------------------|---------------------------|---------------|---------------------|---------------------|
| GP's opinion                                 | (%)         | (%)         | (%)                       | (%)                       | (%)           |                     |                     |
| Likely to be a problem drinker—men and women | 59.06       | 95.19       | 52.08                     | 96.33                     | 7.75          | 12.28               | 0.43                |
| Likely to be a problem drinker—men           | 59.02       | 91.13       | 53.73                     | 92.721                    | 13.64         | 6.65                | 0.45                |

LR: Likelihood ratio of a positive or negative diagnosis.

able to detect ~60% of harmful drinkers. However, there was considerable variation in the prevalence of harmful drinkers between practices that in part reflected the socio-economic profile of the practice areas. It may also be that some doctors are perceived as more open to dealing with the problems arising from misuse of alcohol.

#### *Strengths and limitations*

Despite our high participation rates, these findings apply only to people attending GPs in private practice and thus our prevalence rates are likely to be higher than in the general population. However, we emphasize that 80% of people in Goa consult GPs in private practice (Bhat, 1993; Brugha and Zwi, 1998) and basing our study in primary care enabled us to examine doctors' ability to detect harmful use. Our findings are based on self report and this may have led to cultural anomalies. For example, the finding that Catholic men were more likely to report harmful or dependent drinking did not accord with the GPs' clinical experience and may simply reflect greater readiness to be open about such issues. Lastly, some of the questionnaires used on the study were adapted from those developed in Western countries and although most have been applied to ethnic minorities living in the UK (including South Asians) they were not tested on Goan populations on account of the limited resources available to conduct this study.

#### *Harmful alcohol use in India*

It is difficult to generalize about alcohol consumption and harmful use across India given varied methodological approaches to research and diverse cultural practices and legal histories (Isaac, 1998). The most consistent finding of all studies is that men are the main consumers of alcohol (Bennett *et al.*, 1998). In a series of studies of a probabilistic sample of 3600 households in Delhi Mohan *et al.* (2002a,b) reported a prevalence of 7.0% and an incidence rate of 1.7% per annum of dependent drinking in men. No women were found to be in these categories. Similar findings in other states indicate that women are usually abstinent and that high percentages of men are also abstainers (Dorchner, 1983). One exception to this trend, however, comes from Rajasthan, where 25% of people aged 15 and over (36.1% men and 13.4% women) drank alcohol, while 3% (5.6% men and 0.5% women) were found to be alcohol dependent (Sundaram *et al.*, 1984). A more recent survey conducted across India (including Goa) reported that 18.3% of men between the ages 12 and 60 consumed alcohol (Srivastava *et al.*, 2003). As we reported, alcohol consumption is strongly

associated with other substance use such as tobacco and it also known that smokers in India are much more likely to start alcohol consumption over follow-up periods of 1 year (Mohan *et al.*, 2002a). Goa is a state of India that has developed rapidly and has been most influenced by European culture. It is likely that the pattern of harmful drinking and associated problems occurring here will occur across other states in India in due course.

#### *Other problems*

Alcohol misuse is linked to a range of problems, including cardiovascular and hepatic disease and malnutrition. Our study and others highlight the associated psychological problems such as anxiety disorders and depression. Our findings on violence fit with other findings in Goa on links between alcohol misuse in industrial workers and social problems such as family neglect, poverty, and domestic violence (Gaunekar *et al.*, 2005) and other research from India that has shown similar patterns of behaviour (Ravishankar *et al.*, 1999; Khosla *et al.*, 2005; WHO, 2004). Harmful drinking was more common in poorer and poorly educated men. It also suggests that reduction of harmful and dependent drinking in men could have an impact on reducing interpersonal violence.

#### *Managing harmful drinking in general practice*

Alcohol plays a role in various clinical presentations to health care workers, who do not always recognize its significance in the aetiology of the presenting conditions. Evidence has accumulated in high income countries on the effectiveness of primary care interventions for harmful alcohol consumption. The evidence suggests that brief advice and education by general practitioners leads to reductions of alcohol consumption after 6 and 12 months in both men and women (Bertholet *et al.*, 2005). Thus, primary care may also a useful setting in low income countries in which to recognize and manage the majority of alcohol problems.

#### *Conclusions*

Our results show that the prevalence of harmful alcohol drinking in men attending private primary care clinics is high and that these men are more likely to be perpetrators of violence. Primary care doctors were often aware of the problem and are well placed to offer simple therapeutic interventions for people consuming harmful levels of alcohol.

## REFERENCES

- Allen J. Litten R., Fertig J. and Barbor T. (1997) A review of research on the Alcohol Use Disorders Identification Test (AUDIT). *Alcoholism: Clinical and Experimental Research* **21**, 613–619.
- Barbor, T. F., de la Fuente, J. R., Saunders, J. et al. (1989) *The Alcohol Use Disorders Identification Test: Guidelines for the Use in Primary Health Care*. World Health Organisation, Geneva.
- Barbor T. F., Higgins-Biddle J. C., Saunders J. B., Montero M. G. (2001) *AUDIT-the alcohol use disorders identification test. Guidelines for use in Primary Care*. WHO, Department of Mental Health Sciences and Substance Dependence (Second Edition).
- Benegal V. India: alcohol and public health. (2005) *Addiction* **100**, 1051–1056.
- Bennett, L. A., Campillo, C., Chandrashekar, C. R. et al. (1998) Alcoholic beverage consumption in India, Mexico, and Nigeria: a cross-cultural comparison. *Alcohol Health and Research World* **22**, 243–252.
- Bertholet, N., Daepfen, J. B., Wietlisbach, V. et al. (2005) Reduction of alcohol consumption by brief alcohol intervention in primary care: systematic review and meta-analysis. *Archives of Internal Medicine* **165**, 986–995.
- Bhat, R. (1993) The public/private mix of health care in India. *Health Policy and Planning* **8**, 43–56.
- Brugha, R. and Zwi, A. (1998) Improving the quality of private sector delivery of public health services: challenges and strategies. *Health Policy and Planning* **13**, 107–120.
- Carey, K. B., Carey, M. B. and Chandra, P. S. (2003) Psychometric evaluation of the alcohol use disorders identification test and short drug abuse screening test with psychiatric patients in India. *Journal of Clinical Psychiatry*: **64**, 767–774.
- Cherpitel C. (1995) Analysis of cut points or screening instruments for alcohol problems in the emergency room. *Journal of Studies on Alcohol* **56**, 695–700.
- Conigrave, K., Hall, W. and Saunders, J. (1995) The AUDIT questionnaire: choosing a cut-off score. *Addiction* **90**, 1349–1356.
- Department of Health. (2001) *Health Survey for England: 2000*. The Stationery Office, London.
- Dorschner, J. (1983) Rajput alcohol use in India. *Journal of Studies on Alcohol* **44**, 538–544.
- Gaunekar, G., Patel, V. and Rane, A. (2005) The impact and patterns of hazardous drinking amongst male industrial workers in Goa, India. *Social Psychiatry and Psychiatric Epidemiology* **40**, 267–275.
- Isaac, M. (1998) India. In *Alcohol and Emerging Markets: Patterns, Problems and Responses*, Grant, M. ed., pp. 145–175. Brunner/Mazel, Philadelphia.
- Jenkinson, C., Coulter, A. and Wright, L. (1993) Short form 36 (SF36) health survey questionnaire: normative data for adults of working age. *British Medical Journal* **306**, 1437–1440.
- Kessler, R. C., Barker, P. R., Colpe, L. J. et al. (2003) Screening for serious mental illness in the general population. *Archives of General Psychiatry* **60**, 184–189.
- Khosla, A. H., Dua, D., Devi, L. et al. (2005) Domestic violence in pregnancy in North Indian women. *Indian Journal of Medical Sciences* **59**, 195–199.
- Mezey, G., King, M. and MacClintock, T. (1998) Victims of violence and the general practitioner. *British Journal of General Practice* **48**, 906–908.
- Mohan, D., Chopra, A. and Sethi, H. (2002a) The co-occurrence of tobacco and alcohol in general population of metropolis Delhi. *Indian Journal of Medical Research* **116**, 150–154.
- Mohan, D., Chopra, A. and Sethi, H. (2002b) Incidence estimates of substance use disorders in a cohort from Delhi, India. *Indian Journal of Medical Research* **115**, 128–135.
- Pal, H. R., Jena, R. and Yadav, D. (2004) Validation of the Alcohol Use Disorders Identification Test (AUDIT) in urban community outreach and de-addiction center samples in north India. *Journal of Studies on Alcohol* **65**, 794–800.
- Patel, V. V. (1998) The politics of alcoholism in India. *British Medical Journal* **316**, 1394.
- Qureshi, N., Bethea, J., Modell, B. et al. (2005) Collecting genetic information in primary care: evaluating a new family history tool. *Family Practice* **22**, 663–669.
- Ravishankar, A., Subbiah, A. and Ramachandran, S. Couples Life Style and Domestic Violence In India: A Micro Level Investigation From National Family Health Survey II—1999.
- Royal College of Physicians. (1995) Alcohol and the heart in perspective: sensible limits reaffirmed. Summary of the report of a working group of the Royal Colleges of Physicians, Psychiatrists and General Practitioners. *Journal of the Royal College Physicians of London* **29**, 266–271.
- Silva, M.C., Gaunekar, G., Patel, V., Kukalekar, D.S. and Fernandes, J. (2003) The prevalence and correlates of hazardous drinking in industrial workers: A study from Goa, India. *Alcohol and Alcoholism* **38**, 79–83.
- Srivastava, A., Pal, H. R. Dwivedi, S. N. et al. (2003) National household survey of drug abuse in India. *Report submitted to Indian Ministry of Social Justice and Empowerment and the United Nations Office for Drugs and Crime*.
- Sundaram, K. R., Mohan, D., Advani, G. B. et al. (1984) Alcohol abuse in a rural community in India. Part I: epidemiological study. *Drug and Alcohol Dependence* **14**, 27–36.
- World Health Organization (Division of Mental Health). (1992) *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines : International Statistical Classification of Diseases and Related Health Problems : ICD-10*.
- World Health Organization. (2004) *World Health Organization global status report on alcohol*. Department of Mental Health and Substance Abuse, Geneva.