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ORIGINAL PAPER

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The impact and patterns of hazardous drinking amongst male industrial workers in Goa, India

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Abstract *Aims* The aim of this study was to describe the impact and patterns of drinking in hazardous drinkers in a male industrial worker population in India. *Method* A case-control design was used, and 234 subjects (75 hazardous drinkers, 78 casual drinkers and 81 abstinent workers) were randomly selected from a population of male workers who had participated in a survey of drinking behaviour. The definition of these categories was based on the scores of subjects on the Alcohol Use Disorders Identification Test (AUDIT). Subjects were interviewed with a semi-structured social and health impact questionnaire, Revised Clinical Interview Schedule (CISR) and Brief Disability Questionnaire (BDQ). A total of 184 spouses of consenting workers were also interviewed with a semi-structured interview, the CISR, BDQ and AUDIT. A sub-group of 55 hazardous drinkers participated in a descriptive study of patterns of drinking, recording drinking behaviour using a daily drink diary over a 1-month period. *Findings* Hazardous drinkers have significantly poorer physical and mental health and show trends for adverse social outcomes such as violence. Casual drinkers, on the other hand, were no different from abstinent subjects on any of the key outcomes. As compared to casual drinkers, hazardous drinkers tend to drink alone, in bars, and prefer non-commercial alcoholic beverages which are cheaper and have high alcohol concentration. *Conclusions* Hazardous drinking has a significant adverse impact on drinkers and their families. Hazardous drinkers display unique drinking patterns suggesting the role of stigma and preference for higher alcohol-containing, but cheaper, drinks available in India.

Key words hazardous drinking – patterns of drinking – risk factors – alcohol – India

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Introduction

Hazardous drinking is a level of alcohol consumption which could prove harmful in the future (Edwards et al. 1981). This concept is important for public health because it describes a population with potentially early alcohol-related problems which may be a suitable target for delivering brief, preventive interventions (Moyer et al. 2002). Hazardous drinking becomes especially important in the workplace for a number of reasons. First, because the impact of the disability produced is likely to be greater given the occupational role of the subject. Secondly, because of the employment setting, interventions delivered through the workplace are a feasible preventive strategy. Thirdly, because there are studies documenting a high prevalence of drinking in this population.

Although there have been a number of surveys of hazardous drinking in working populations in developed nations (Davey et al. 2000; Hermansson et al. 2000), there have been very few studies in low- and middle-income countries. No studies from India were found during our literature search. The study described in this paper is part of a programme of research on hazardous drinking being conducted by Sangath, a mental health NGO in the state of Goa, India. These studies focused on male populations because of the consistent evidence that alcohol abuse is far more common amongst men in India (Saxena 1999) and because the vast majority of industrial workers are men. A cross-sectional survey of four industry worker populations found a prevalence of 21 % of hazardous drinking (Silva et al. 2003) based on the Alcohol Use Disorders Identification Test (AUDIT) scores (Babor et al. 1992).

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The present study aimed to examine the impact (social and health-related) on the drinker, his spouse, and the patterns of hazardous drinking. We hypothesized that hazardous drinkers would have higher levels of adverse social and health consequences as compared to abstinent men. We also hypothesized that casual drinkers were no more likely than abstinent men to have negative outcomes, which would validate the construct of hazardous drinkers in the Goan setting. Social consequences were related to problems at work, disability, absenteeism, sick leave, and violence at work and in the home. Health consequences were mental health of the subject and his spouse, disability, and injuries, accidents and hospitalization of the subject.

Subjects and methods

Setting

The study was set in Goa, a state on the west coast of India with a population of 1.35 million (Government of India 2001). Goa has one of the highest per capita incomes and literacy rates in India. Most of the population is Hindu (70 %), the rest being mostly Catholic (27 %). Alcoholic drinks are easily available through a wide network of bars and liquor shops, and are amongst the lowest taxed alcoholic drinks in India (Patel et al. 2001). The main industries in Goa are mining, shipbuilding, tourism, pharmaceuticals and agro-chemicals.

Study design

A case-control design to investigate the impact of drinking (the Impact Study) and a descriptive study of patterns of drinking in hazardous drinkers (the Patterns Study) were used.

Study population

This study was nested in a sample of 984 subjects who had participated in a survey of drinking behaviour in four industries in Goa, India, in 1999 (Silva et al. 2003). Subjects were recruited from two of these industrial settings (n = 594 and n = 146, respectively).

Sample

For the Impact Study, the population of 740 workers was categorized into three groups based on their AUDIT scores (hazardous; casual; abstinent). We categorized subjects who scored 8 or more as hazardous drinkers, subjects with scores of 1–7 were categorized as casual drinkers, and those who scored 0 were abstinent. From the casual and abstinent groups, 100 subjects were randomly selected; from the hazardous group, all subjects were invited to participate (Fig. 1). Subjects were re-interviewed with the AUDIT to confirm whether their level of drinking was similar to that recorded in the survey (1999). In the event that the AUDIT category had changed, the subject was excluded. Hazardous drinkers were purposively sampled for the Patterns Study from the sample who participated in the Impact Study.

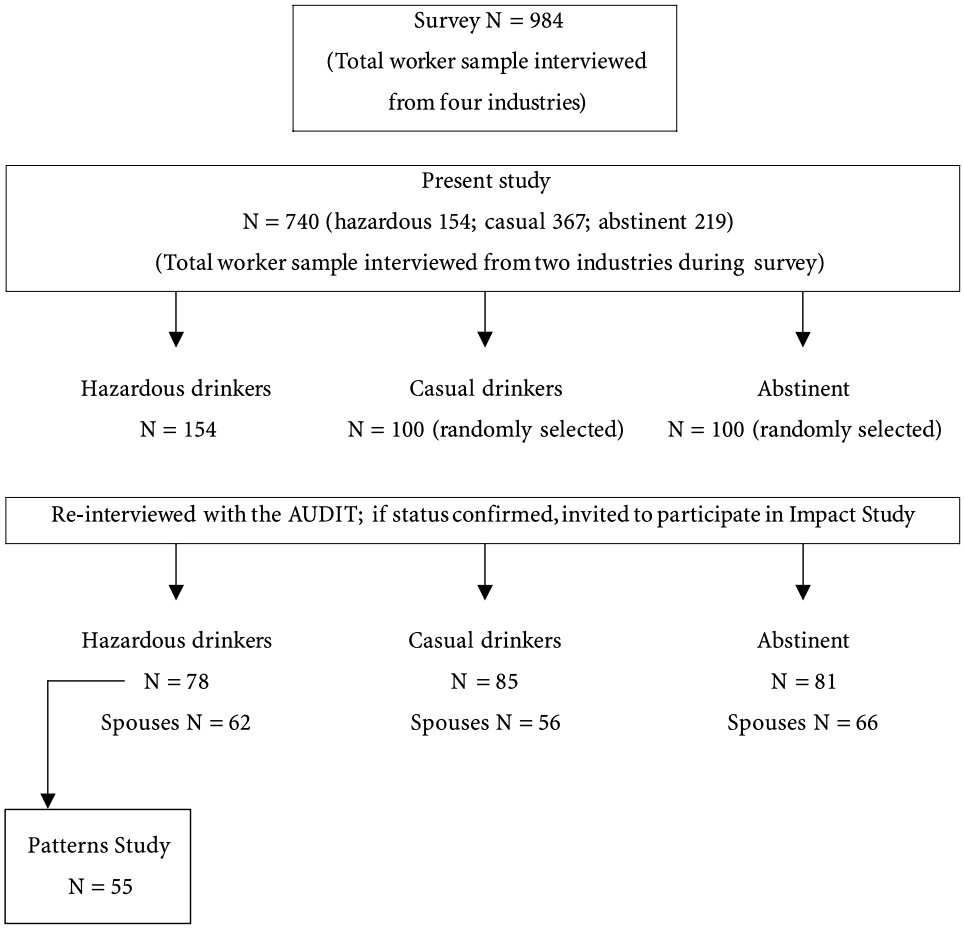

Fig. 1 Study flow chart

Data collection for the Impact Study

Data were collected from the worker and the spouse.

Interviews with the worker

A semi-structured interview was used to collect data on the social and health impact of drinking. This interview was derived from earlier studies on the impact of common mental disorders in Goa (Patel et al. 1998). Data included financial difficulties, sickness and health care use, absenteeism, violence at home and in the workplace, and drinking history. The Revised Clinical Interview Schedule (CISR) was used as the measure of mental health. The CISR is a structured interview for the measurement of common mental disorders (CMD) in community and primary care settings (Lewis et al. 1992). The Konkani (local Goan language) version of the CISR used in the present study was earlier field-tested for use in Goa (Patel et al. 1998). The Brief Disability Questionnaire (BDQ) elicits information on the impact of an illness on daily and occupational activities (Von Korff et al. 1996). The questionnaire generates a total score (range 0–22). The Konkani version of the questionnaire has been used in several studies in Goa (Patel et al. 1998, 2003).

Interviews with spouse

Spouses who had lived with the subjects for the last 12 months qualified for recruitment in the study. Spouses were interviewed with the following measures: (i) a semi-structured questionnaire to assess demographic, family life, violence, economic, health and spouse drinking behaviour; (ii) CISR; and (iii) AUDIT to elicit data on spousal drinking patterns.

Data collection for the Patterns Study

Drink diaries were used to record the patterns of drinking for hazardous drinkers. Subjects were asked to keep a daily record of their drinking patterns over a consecutive 4-week to 1-month period. A research worker met with these subjects once a week to collect the drink diaries for the preceding week and to check for completeness of data. The daily record covered the following information: the amount and type of alcohol consumed; the time when the first drink was consumed; the location of drinking; and whom the subject drank with.

Ethical issues

Written informed consent was obtained from the subjects. Permission was obtained from the subject to conduct a home visit and interview his spouse. Interviews with spouses also required consent from the spouse. All information collected was confidential and no information was shared between the subject and his/her spouse or with the management. The ethical and scientific aspects of the research were approved by the Sangath Research Committee.

Interview procedure

Researchers were trained in administering the interview protocols and inter-rater reliability checks were completed. Study interviews were administered in a private setting at the workplace. The interview was conducted in English or Konkani as per the preference of the subject. An effort at maximizing reliability of collected information was made, by assuring subjects about the confidentiality of information volunteered, by enlisting the help of worker representatives to build worker confidence before the study began, and by providing free health advice and information regarding specialist care in the interview setting for those workers who had alcohol or mental health problems.

Analysis

Data collected for the Impact Study were analysed by comparing social and health-related variables for the hazardous drinkers and casual drinkers with abstinent men (with the exception of drinking history data which were compared between hazardous and casual drinkers). Patterns Study data were descriptive and were collected for the hazardous drinkers only.

Results

Socio-demographic characteristics

Detailed results are shown in Table 1. Subjects in the three groups were similar in terms of age (the average age was in the early 40s) and marital status (> 90 % were married and lived with their families). The average family size was four to five members in all the groups. As had been found in the earlier survey, there were more Christian subjects in the hazardous group. While the majority in all three groups had some degree of formal education, the casual and abstinent workers were more likely to have gone to college. All the subjects had been working in their present job for an average of 18 years or more. The hazardous drinkers earned less and their family income was lower than in the other two groups.

Patterns of drinking

Two levels of analyses of patterns of drinking were possible from this study. First, we were able to compare data for patterns of drinking of casual and hazardous drinkers at the initial interview of the Impact Study (Table 2). There did not appear to be an earlier age of onset of drinking behaviour in the hazardous group, with drinkers in both groups having their first drink in their early 20s. Peers or friends introduced most subjects to alcohol. A more regular pattern of drinking was usually established in the late 20s. Hazardous drinkers preferred drinks with higher concentration of alcohol per volume, such as bottled spirits and local beverages (mainly a local, distilled drink derived from the cashew fruit called *caju feni*) and drinking location was significantly more likely to be in bars. On the other hand, casual drinkers preferred beer and the drinking was done at home or at social gatherings. The most common time for starting drinking was 7.30 p.m. in the evening for both the groups. Indicators of problem drinking such as binge-drinking, early morning drinking, lesser number of days of abstinence in the previous year and fewer attempts to abstain from alcohol were significantly commoner in the hazardous drinkers group. Moreover, hazardous drinkers were also more likely to be aware they had a drinking problem as was evidenced in the high proportion who had attempted at any time in the past to cut down their consumption. However, only 6 % had sought help for their drinking, most often from friends/family

Table 1 Socio-demographic characteristics of sample

Variable	Hazardous (N = 78)	Casual (N = 75)	Abstinent (N = 81)
Demographic			
Married	97.4% (76/78) $\chi^2 = 0.16$, df = 1, p = 1	90.7% (68/75) $\chi^2 = 2.05$, df = 1, p = 0.19	96.3% (78/81)
Nuclear family	80.8% (63/78) $\chi^2 = 3.43$, df = 1, p = 0.07	73.3% (55/75) $\chi^2 = 0.55$, df = 1, p = 0.48	67.9% (55/81)
Religion: Hindu (Non-Hindus – mainly Catholics)	**59% (46/78)** **$\chi^2 = 4.85$, df = 1, p = 0.02**	70.7% (53/75) $\chi^2 = 0.42$, df = 1, p = 0.51	75.3% (61/81)
Education: college education	**24% (19/78)** **$\chi^2 = 4.78$, df = 1, p = 0.02**	51% (38/75) $\chi^2 = 0.86$, df = 1, p = 0.35	42% (34/81)
Age (years)	44.8 (sd 6.6) t = 0.77, df = 157, p = 0.44	42.6 (sd 7.8) t = –0.9, df = 154, p = 0.32	43.9 (sd 8.0)
Household size	4.5 (sd 1.2) t = –0.07, df = 157, p = 0.94	4.8 (sd 1.3) t = 1.17, df = 154, p = 0.24	4.5 (sd 1.7)
Monthly income of subject (rupees)	**7633.3 (sd 2302.3)** **t = –2.4, df = 155, p = 0.01**	9424 (sd 3759.2) t = 0.9, df = 152, p = 0.34	8856.9 (sd 3724)
Total family monthly income (rupees)	**9297.4 (sd 8880)** **Z = –2.5, p = 0.01**	11536 (sd 5555.8) Z = –0.8, p = 0.38	10963.9 (sd 5823.8)
Number of months in the same job	247.5 (sd 83.1) t = 1.4, df = 157, p = 0.16	215.4 (sd 85.8) t = –0.88, df = 154, p = 0.37	228 (sd 92)

Note: comparative statistics compare hazardous drinkers and casual drinkers with non-drinkers unless otherwise specified; differences which are statistically significant at the $p \leq 0.05$ level are marked in bold

Table 2 Drinking patterns

	Hazardous (N = 78)	Casual (N = 75)	Comparative statistics
Age at first drink (years)	21.9 (sd 6.9)	22.8 (sd 6)	Ns
Age at regular drinking (years)	28.9 (sd 6.9)	27.6 (sd 6.6)	Ns
Introduced to drinking by peer/friends	81% (63/78)	75% (56/75)	Ns
Family member drinks (in comparison with abstinent)	33% (26/78)	37% (28/75)	Ns
Most common drink: beer	25% (19/78)	59% (44/75)	$\chi^2 = 15.7$, df = 1, p < 0.001
Most common drink: IMFL	48% (36/78)	35% (26/75)	Ns
Most common drink: local	27% (20/78)	7% (5/75)	$\chi^2 = 9.41$, df = 1, p = 0.002
Most common place for drinking: bar	69.3% (52/78)	25.4% (17/75)	$\chi^2 = 10.67$, df = 1, p = 0.001
Most common place for drinking: home	21% (21/78)	49.3% (33/75)	Ns
Binge-drinking (last one year)	13% (10/78)	0	Ns
Morning drinking (last one year)	6.4% (5/78)	0	Ns
Cut down (ever)	76% (59/78)	33% (25/75)	$\chi^2 = 27.6$, df = 1, p < 0.001
Seek professional help (ever)	6.4% (5/78)	0	Ns
Money spent on drinks per day (Rs.)	32.08 (sd 19.0)	24.3 (sd 31.0)	Z = –3.7, p < 0.001
Attempts made last year to stop alcohol	1.45 (sd 1.0)	2.42 (sd 2)	Z = –3.7, p < 0.001
Number of days abstained last year	59.4 (sd 69.5)	84.2 (sd 78.7)	Z = –3.92, p < 0.001

Note: comparative statistics compare hazardous drinkers and casual drinkers with non-drinkers. Ns means not statistically significant at p < 0.05 level; *IMFL* Indian Made Foreign Liquor

or from the company doctor. The amount of money spent on drinking per day was significantly higher in the hazardous group.

The subset of hazardous drinkers who kept drink diaries gave detailed information of the patterns with focus on choice of the alcoholic beverages. Drink diary data were obtained for a total of 1,307 days, of which 645 were drinking days, i. e. days on which alcohol was consumed (49.3%). The proportion of drinking days by day of the week showed a significant rise during the weekend; thus, drinking took place on approximately 40% of weekdays and 74% of weekend days (Saturdays and Sundays). The preferred location for drinking was a bar (59.3%), followed by home (37.3%). The subject drank alone on 81.5% of drinking days. Indian Made Foreign Liquor (IMFL) (includes whisky, gin, vodka, brandy and rum) was consumed on 53.3% of the drinking days, non-commercial alcohol was consumed on 34.7% of drinking days, while beer was consumed on 16.1% of drinking days. Thus, on 4% of days, more than one type

of drink was consumed. The average units of alcohol consumed differed according to the beverage and was highest for local alcohol and lowest for beer. The mean number of units of alcohol beverages consumed on any drinking day was 4.7. The average amount of money spent per day was about 27 rupees (≈0.6 US$) which represents just under 10 % of gross monthly household income.

Impact of drinking on the worker

Compared to abstinent subjects, hazardous drinkers were significantly more likely to have taken a greater number of days of sick leave, to be smoking cigarettes, to have higher disability scores and poorer mental health scores (Table 3). Hazardous drinkers were spending more money on health care. There were more reports of injury in the form of fractures in the hazardous group. For many other variables, trends were noted which showed impairment of function in hazardous drinkers, though these findings did not reach statistical significance. At work, there was a higher prevalence of verbal arguments and physical fights, although only one subject attributed this to his drinking behaviour. Loss of pay due to absenteeism was reported more often amongst hazardous drinkers. Overall, the majority of men in all three groups reported enjoying a satisfactory relationship with their spouses. Though there were more reports of extramarital sexual relationship in hazardous drinkers, no significant differences were seen in the sexual behaviour of the three groups. Verbal, physical or sexual violence against the spouse, violence against other family members and being charged by the police for criminal offences were commoner in the hazardous drinkers group. As was mentioned earlier, the hazardous group earned less than the other two groups. Contrary to our expectations, however, there was no evidence of greater economic impact in the hazardous drinkers group (however, this contrasted with the reports by their spouses described below). Moreover, rates of being in debt were similar in all groups and exceeded 80 % of all subjects. Difficulties in buying items of necessity were experienced by all workers. There were no significant differences between casual drinkers and abstinent subjects on any of the measures of impact of drinking.

Impact of drinking on the family

The average age of spouses was in the late 30s. Spouses of casual and abstinent subjects were more likely to be employed outside the home, mostly on a daily wage basis. In all, 13 % of spouses of hazardous drinkers and 23 % of spouses of casual drinkers were not aware that their husbands drank alcohol (Table 4). A third of spouses of hazardous drinkers felt that their husbands had a drinking problem as compared to none in the casual group. A third of the spouses of hazardous drinkers reported difficulties in buying items of necessity and the majority attributed this difficulty to their husbands' drinking behaviour. Physical, verbal and sexual violence was commoner amongst spouses of hazardous drinkers and more than a third attributed this to drinking behaviour. There were more mental health symptoms reported in the spouses of hazardous and casual drinkers, but this was not statistically significant. Only six spouses, four married to hazardous drinkers and two to casual drinkers, had used alcohol in the previous year; none scored in the hazardous range of the AUDIT.

Discussion

To the best of our knowledge, this is the first study of the impact and patterns of hazardous drinking in a non-clinical population in India. The strengths of the study, in particular the use of two study designs, allowed the patterns and impact of hazardous drinking to be investigated in the same study sample. The Impact Study facilitated the investigation of the differences between the casual and hazardous drinkers and abstinent subjects with respect to various social, economic and health factors. The Patterns Study described the patterns of drinking among the hazardous drinkers, mainly focusing on the type of alcohol consumed. The sample for the Impact Study was drawn from an earlier survey of drinking behaviour in four industries in Goa. Differences in the sample characteristics of hazardous drinkers in the current study, as compared to the original survey, were noted; these are due to the fact that only those subjects who continued to fulfil the AUDIT criteria for hazardous drinking were included in the case-control study. The case-control study was conducted about a year after the survey and a proportion of men had changed their drinking patterns during that period.

The key findings of this study are that hazardous drinkers exhibit a number of dangerous drinking behaviours, tend to drink cheaper high-alcohol concentration spirits, experience a range of adverse health and social outcomes, but rarely seek help for their drinking problem. The three groups were similar on most socio-demographic characteristics, with the exception of lesser education and lower income levels (both personal and family) among the hazardous drinkers. The finding that debts were common in all three study groups was the result of the study being conducted in an industrial setting where obtaining a loan was a universal phenomenon due to availability of soft loans from company credit societies. The uniform distribution of potential confounding variables facilitated independent investigation of the impact of drinking levels. One significant difference was the greater proportion of Christians among hazardous drinkers, a finding that has been duplicated from the original survey. This probably points at the influence religion and culture have on drinking patterns. Furthermore, this finding also dispels the com-

Table 3 Impact of drinking on subject

Variable	Hazardous (N = 78)	Casual (N = 75)	Abstinent (N = 81)
Occupational			
Verbal arguments at work in the last year	17% (13/78) $\chi^2 = 2.3$, df = 1, p = 0.15	9.3% (7/75) $\chi^2 = 0.02$, df = 1, p = 1	8.6% (7/81)
Physical fights at work in the last year	4% (3/78) $\chi^2 = 1.1$, df = 1, p = 0.36	0	1.2% (1/81)
Pay lost in the last year (number of sub.)	5% (4/78) $\chi^2 = 1.9$, df = 1, p = 0.2	1.3%(1/75) $\chi^2 = 0.003$, df = 1, p = 1	1.2% (1/81)
Sick leave in past year (number of days)	**2.7 (sd 2.5)** **Z = −1.9, p = 0.05**	2.5 (sd 2.6) Z = −1.3, p = 0.31	2.2 (sd 2.9)
Casual leave in past year (number of days)	3.6 (sd 3.0) Z = −1.1, p = 0.26	3.4 (sd 2.4) Z = −1.3, p = 0.16	2.9 (sd 2.5)
Economic			
In debt	85% (66/78) $\chi^2 = 0.27$, df = 1, p = 0.67	89% (67/75) $\chi^2 = 1.9$, df = 1, p = 0.18	82% (66/81)
Facing difficulty in buying food	10.3% (8/78) $\chi^2 = 0.006$, df = 1, p = 1	13% (10/75) $\chi^2 = 0.45$, df = 1, p = 0.61	10% (8/81)
Gone hungry in the last month	3% (2/78) $\chi^2 = 0.37$, df = 1, p = 0.61	1.3% (1/75) $\chi^2 = 0.003$, df = 1, p = 1	1.2% (1/81)
Spouse/social			
Satisfactory relationship with spouse	98.6% (75/76) $\chi^2 = 0.001$, df = 1, p = 0.95	100% (68/68) $\chi^2 = 0.01$, df = 1, p = 0.90	100% (78/78)
Verbally hurt spouse in past year	21.6% (16/74) $\chi^2 = 1.3$, df = 1, p = 0.25	8.8% (6/68) $\chi^2 = 0.07$, df = 1, p = 0.79	11.8% (9/76)
Physically hurt spouse in past year	6.75% (5/74) $\chi^2 = 0.57$, df = 1, p = 0.44	0	2.63% (2/76)
Sexually hurt spouse in past year	2.7% (2/74) $\chi^2 = 0.51$, df = 1, p = 0.49	0	0
Hit family members (other than spouse)	4% (3/78) $\chi^2 = 3.1$, df = 1, p = 0.11	0	0
Charged by police in the past year	5% (4/78) $\chi^2 = 1.97$, df = 1, p = 0.2	0	1.2% (1/81)
Health			
Smoking tobacco	**27% (21/78)** **$\chi^2 = 7.7$, df = 1, p = 0.007**	13% (10/75) $\chi^2 = 0.45$, df = 1, p = 0.61	10% (8/81)
Chewing tobacco	4% (3/78) $\chi^2 = 0.2$, df = 1, p = 0.67	1.3% (1/75) $\chi^2 = 0.2$, df = 1, p = 1	2.5% (2/81)
Fracture in the last 3 years	12% (9/78) $\chi^2 = 2.3$, df = 1, p = 0.15	9% (7/75) $\chi^2 = 1.1$, df = 1, p = 0.35	5% (4/81)
Extramarital relationships	4% (3/78) $\chi^2 = 1.1$, df = 1, p = 0.36	0	1.2% (1/81)
Visited CSW in the last 1 year	1.3% (1/78) $\chi^2 = 0.001$, df = 1, p = 1	0	1.2% (1/81)
Difficulty in sex in the last year	3% (2/78) $\chi^2 = 0.37$, df = 1, p = 0.61	1.3% (1/75) $\chi^2 = 0.003$, df = 1, p = 1	1.2% (1/81)
BDQ score	**Mean = 2.2 (sd 5.7)** **Z = −2.1, p = 0.03**	Mean = 1.1 (sd 2.6) Z = −1.0, p = 0.31	Mean = 1.7 (sd 4.8)
CISR score	**2.9 (sd 5.1)** **Z = −2.5, p = 0.01**	Mean = 1.4 (sd 3.5) Z = −1.5, p = 0.13	Mean = 1.7 (sd 4.9)
Health expenditure in the last year (Rs)	Mean = 691.7 (sd 3904.5) Z = −0.6, p = 0.49	Mean = 186.1 (sd 644.7) Z = −0.4, p = 0.67	Mean = 487 (sd 2722.8)

Note: comparative statistics compare hazardous drinkers and casual drinkers with non-drinkers unless otherwise specified; differences which are statistically significant at the $p \leq 0.05$ level are marked in bold; *CSW* commercial sex worker

mon belief in Goa that Christians are more likely to drink non-hazardously because of the cultural sanction towards alcohol consumption.

The ages at first drink and at which regular drinking began were the early 20s and late 20s, respectively, and did not differ significantly among the casual and hazardous drinkers. This is contrary to the pattern seen in western countries where serious drinking usually begins in the late teens. This finding suggests that the window of opportunity for preventive interventions is greater in the Indian setting. Higher concentration of alcohol in the beverages drunk, binge-drinking, early morning drinking, fewer attempts at abstaining and periods of abstinence, and drinking alone characterized

Table 4 Impact of drinking: data from spouse interviews

Variable	Hazardous (N = 62)	Casual (N = 56)	Abstinent (N = 66)
Demographic			
Employed	**6.5% (4/62)** χ^2 **= 7.3, df = 1, p = 0.006**	16.1% (9/56) $\chi^2 = 1.1$, df = 1, p = 0.28	25.7% (17/66)
Age (years)	37.3 (sd 7.5) t = 0.4, df = 126, p = 0.67	36.7 (sd 7.1) t = 0.03, df = 120, p = 0.97	36.7 (sd 7.8)
Spouse drinking behaviour			
Believes husband drinks alcohol	**85.5% (53/62)** χ^2 **= 85.3, df = 1, p < 0.001**	**73.2% (41/56)** χ^2 **= 62.3, df = 1, p < 0.001**	3% (2/66)
Husband has drinking problem	32.3% (20/62)	0	0
Very worried about husband's drinking	18.9% (10/62) χ^2 **= 6.4, df = 1, p < 0.01**	2.6% (1/56) $\chi^2 = 0.1$, df = 1, p = 0.6	3% (2/66)
Relationship with spouse			
Verbal violence in past year	14.5% (9/62) $\chi^2 = 2.5$, df = 1, p = 0.14	7.1% (4/56) $\chi^2 = 0.05$, df = 1, p = 1	6.1% (4/66)
Physical violence in past year	8.1% (5/62) $\chi^2 = 3.06$, df = 1, p = 0.1	1.8% (1/56) $\chi^2 = 0.01$, df = 1, p = 1	1.5% (1/66)
Sexual violence in past year	3.2% (2/62) $\chi^2 = 0.4$, df = 1, p = 0.61	0	0
Proportion attributing violence to drinking	66.7% (6/9)	0	0
Economic			
Difficulty buying food	32.3% (20/62) $\chi^2 = 2.0$, df = 1, p = 0.16	21.4% (12/56) $\chi^2 = 0.001$, df = 1, p = 1	21.2% (14/66)
Proportion attributing this to drinking	**40% (8/20)** χ^2 **= 3.26, df = 1, p = 0.036**	8.3% (1/12) $\chi^2 = 0.0001$, df = 1, p = 0.481	–
Food expenditure per month (rupees)	3114.7 (sd 972) t = –0.6, df = 122, p = 0.49	3472.2 (sd 1038) t = 1.27, df = 115, p = 0.2	3234.4 (sd 971.8)
Health			
CISR score	3.2 (4.9) Z = –1.31, p = 0.18	3.8 (6.0) Z = –1.0, p = 0.29	2.7 (5.1)
Health expenses in the last year	1119.4 (2704.9) Z = –0.55, p = 0.57	926.8 (2701.2) Z = –0.39, p = 0.69	485.7 (1085.9)
Consumed alcohol in the last year	6.5% (4/62)	3.6% (2/56)	0

Note: comparative statistics compare spouses of hazardous drinkers and spouses of casual drinkers with spouses of non-drinkers; differences which are statistically significant at the $p \leq 0.05$ level are marked in bold

the hazardous drinkers, which confirms the hazardous nature of drinking prevalent in this group. Drinking on social occasions or at home was the typical drinking pattern amongst the casual drinkers. This suggests that when the drinking behaviour becomes hazardous, it loses its social context or the pattern of consumption of low concentration alcohols. Even though the workplace settings provide health care, less than one in ten hazardous drinkers have ever sought any professional help for their drinking problem.

The drink diary data showed that hazardous drinkers did not drink on half the days; instead, drinking tended to occur most commonly during the weekends, suggesting a pattern of binge-drinking. IMFL and locally brewed beverages, both of which are high concentration alcohol beverages, were consumed on the majority of the drinking days. Beer was consumed on less than a fifth of the drinking days and, thus, does not seem to be the beverage of choice in the hazardous group. The use of higher alcohol strength local beverages may be attributed to the lower cost of these beverages in India because they are often taxed much less, and drinking in bars or alone may be attributed to the stigma of hazardous drinking in the home.

There were trends showing an adverse impact on social and health measures in the hazardous drinkers; for six variables, these differences reached statistical significance. The hazardous group had a higher number of days of sick leave, higher rates of tobacco use, injury in the form of fractures, disability scores, money spent on health and poorer mental health. Non-significant trends were observed for violence at workplace and home. Significant expenditure on buying alcohol seen in the hazardous drinkers may have led to compromised spending on other necessities. Perhaps unsurprisingly, whereas hazardous drinkers did not report any financial difficulties, their spouses were more likely to attribute financial difficulties to their husbands' drinking. The lack of financial difficulty may be because of the relatively easy access to loans in this population; we did not have data on the amount of loans or the reasons for the loans and are, thus, unable to test the possibility that loans for hazardous drinkers were related to meeting basic necessities (as opposed to acquisition of new assets for other

subjects). The main limitation of the study can be found in the small samples for the Impact Study which may have led to a Type II error for some of the comparisons between groups; however, there were statistically significant differences reported for some indicators, and the absence of significant differences for other indicators could also be interpreted in the light of the construct of hazardous drinking, i. e. a state where adverse outcomes are likely to occur (rather than are already occurring).

Recognizing one's husband's drinking as a problem was more often seen among the spouses of hazardous drinkers. Our data showed trends towards higher levels of family violence in the hazardous group. None of the spouses were drinking at hazardous levels, which is in line with studies in India which show very low levels of drinking amongst women. There are several Indian studies which have shown higher levels of family dysfunction and frequent violence including wife-beating amongst alcohol dependents and alcohol abusers (Parvathi 1989; Varalakshmi 1988; Ganihar et al. 1983). Wives of alcoholics are reported to suffer from significantly higher stress levels and various physical and mental health problems (Rajendra and Cherian 1992). Some other studies have reported more depressive symptoms in wives of alcohol abusers (Devar et al. 1983). However, all these studies were conducted with samples of subjects with harmful levels of alcohol consumption such as alcohol dependence or in clinical populations. On the other hand, hazardous drinking is detected at a much earlier stage in drinking history and, therefore, the comparatively lower level of spouse distress and family dysfunction may be interpreted in this light.

The concept of hazardous drinking is central to the model for prevention of alcohol abuse, for it signifies a level of drinking which is likely to lead to harm unless action is taken to reduce the dangerous drinking levels and/or patterns. Hazardous drinkers in this study would also include subjects drinking at levels which would have been considered harmful or dependent. Thus, the study has reported a number of significant adverse outcomes already evident in the hazardous drinking group. The key implication of these findings is that men who are drinking at a level identified using a simple screening scale (the AUDIT) do constitute a qualitatively distinct group of drinkers; men who drink below this level are not different from abstinent men on any of the measures. Further, the proportion of hazardous drinkers in the population sampled is high; amongst men who drink, nearly half are drinking at a hazardous level. Hazardous drinkers not only drink more alcohol, but also consume this in dangerous patterns such as drinking alone and bingeing.

The study findings lend support to three key initiatives needed to reduce the burden of hazardous drinking. First, taxation must be based on alcohol content so that low-alcohol beverages are relatively cheaper than high-alcohol beverages, thus making stronger drinks less affordable and accessible. There needs to be stricter enforcement of licensing for the sale of stronger alcoholic beverages. Secondly, the fact that such a low number of hazardous drinkers seek help may be due to a number of reasons including stigma, lack of services and lack of awareness. A concerted campaign is needed to educate the community about the health dimensions of hazardous drinking, combined with provision of community-based intervention programmes. There is a strong record of NGO commitment to substance-abuse prevention and treatment programmes in India (Patel and Thara 2003), which may be relevant in a low-resource setting. Thirdly, there is a need for greater awareness regarding the different patterns of drinking so that the distinction between casual (or sensible) drinking and hazardous or dangerous drinking is appreciated by the larger community. This strategy provides the potential for primary prevention.

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