The near and dear ones. Around 70% of the deaths due to alcohol occur in developing countries. Poor regulatory policies on alcohol, widely prevalent multiple high risks of infectious and noncommunicable diseases, and public health in nascent stage makes people in developing countries vulnerable to alcohol-related diseases. In the year 2012, harmful use of alcohol contributed to 5.9% of the total deaths in the world. The fact of greater concern is that 25% of the deaths in the productive years (20–39 years) of life are attributable to harmful use of alcohol. The global burden of disease estimates shows that around 5.1% of total disability-adjusted life years is due to harmful use of alcohol. Harmful use of alcohol not only harms the self but also has ill effect on health of the near and dear ones. Around 70% of the deaths due to alcohol occur in developing countries. Poor regulatory policies on alcohol, widely prevalent multiple high risks of infectious and noncommunicable diseases, and public health in nascent stage makes people in developing countries vulnerable to alcohol-related diseases.
In India, over the years, alcohol production and consumption has shown an increasing trend.\[^{[2]}\] The National Family Health Survey (NFHS) of India showed that 32% of adult (15–54 years) men consume alcohol with 9.4% of them being alcohol dependent.\[^{[4]}\] Although there is high prevalence of alcohol use and detrimental pattern of alcohol consumption, there is a lack of public health policies against alcohol use. With 20% of total state revenues generated from alcohol, it turns the policy-makers intentionally blind toward this public health crisis.\[^{[3]}\] Hence, it makes mandatory to strengthen the secondary level of prevention to avert ill effects of alcohol on health of the individual. Early identification of individuals with harmful alcohol use and dependence treating efficiently can act as an interim solution for the larger issue.\[^{[6],[7]}\]

The WHO Alcohol Use Disorder Identification Test (AUDIT) questionnaire is a standardized screening tool recommended for identifying individuals with harmful use of alcohol at primary health-care centers.\[^{[8]}\] The tool can be used at community level by peripheral health workers to identify the alcohol users who require specialist psychiatric care. The Global Information System on Alcohol and Health recommends for reporting country-level prevalence on dependence using AUDIT tool.\[^{[9]}\] Community-based survey to find harmful use of alcohol and probable dependence may not be feasible as it requires a lot of resources (money and workforce) in settings with low prevalence of alcohol use. Hence, targeted screening among specific groups having high alcohol use is the preferred alternative.\[^{[10],[11]}\]

Fishermen are one of the occupation groups with high prevalence of alcohol use ranging from 63.4% to 88.3%.\[^{[12–14]}\] Among all the occupation groups, fishermen are ranked at top third position, with average stay in hospital of 2.1 days in a year due to alcohol-related illness.\[^{[15]}\] With the high burden of alcohol-related illness, it makes necessary to screen fishermen for harmful use of alcohol and treat efficiently.

Furthermore, during fishing activity in sea, there is a risk of crossing international borders, and dependence to alcohol may enhance this risk. Hence, this study was conducted among fishermen in a selected fishermen community in Puducherry, South India, to (a) assess the proportion of harmful alcohol use and probable dependence to alcohol among alcohol users and (b) find the associated sociodemographic factors with harmful alcohol use and probable dependence among alcohol users.

**MATERIALS AND METHODS**

**Study design and setting**

A community-based cross-sectional study was carried out among fishermen in a “fishermen colony” of a big coastal village of Puducherry, India. This is part of a larger study focusing on overall alcohol use, alcohol dependence, and attention deficit hyperactivity disorder among fishermen. In this article, we describe the harmful use of alcohol, probable dependence, and their associated factors. The village, Veerampattinam, is located about 7 km from main town Puducherry. Estimated population of the village is approximately 6000 with a literacy rate of 78.4%. Main occupation in the study setting is fishing and its allied activities. Mainly men are involved in deep sea fishing. There are three liquor shops within village and about 10–15 shops within a 10-km radius. The price of liquor is cheaper compared to the neighboring states as taxes on liquor are low in Puducherry.

**Study population and study period**

The study population was fishermen residing in the village of Veerampattinam. The study was conducted during the month of February 2015.

**Inclusion and exclusion criteria**

All fishermen above 18 years of age who went out to sea for catching fish at least once in the past 3 months and reported alcohol consumption in the past 1 year were included in the study.

**Study procedure**

A house-to-house survey was conducted in the entire village to identify eligible fishermen, and written informed consent was obtained after explaining the study procedure to the participants. The participants were interviewed by the investigator using a structured interview schedule as mentioned in the study tools. Adequate privacy was ensured before the conduct of interview.

**Data variables and data tools**

Data variables included were age, marital status, education, monthly income, duration in fishing occupation, owning a boat or wager, frequency of fishing per month/week, and number of hours spent in sea. We used a semi-structured interview schedule to collect the above information form participants. We used the WHO AUDIT tool to screen for harmful use of alcohol and probable dependence.

**The WHO Alcohol Use Disorder Identification Test tool**

The tool has in total ten questions, under three domains, namely hazardous alcohol use, dependence symptoms, and harmful use of alcohol. All these questions have four-point Likert scale answers with scoring of 0–4. Of the total score 40, a score of 8 or above indicates harmful or hazardous drinking, score of 16 or above denotes that the individual has severe alcohol-related problem and demands counseling and monitoring, and 20 or above score indicates probable alcohol dependence in the individual and requires...
specialist referral. The WHO recommends the use of these categories for reporting alcohol use in primary care settings, and several studies have used these categories in reporting their findings.\(^8\)

**Operational definitions**
- Harmful use of alcohol: AUDIT score cutoff of \(\geq 8\) was considered as harmful use of alcohol
- Probable dependence: Cutoff of \(\geq 20\) on applying AUDIT questionnaire was considered as probable dependence on alcohol.

**Data entry and analysis**
Data were single entered and analyzed using EpiData software (version 3.1 for data entry and version 2.2.2.182 for analysis, EpiData Association, Odense, Denmark). Harmful use of alcohol and probable dependence were expressed as proportions with 95% confidence intervals (CIs). Possible association of sociodemographic and occupational characteristics with harmful use of alcohol and probable dependence was assessed using Chi-square test. \(P < 0.05\) was considered as statistically significant.

**Ethics**
The study protocol was approved by the Human Institute Ethics Committee, and written consent was obtained from the participants.

**RESULTS**

Of 304 fishermen in the study setting, 241 fishermen (79%) reported alcohol use in the past 1 year. Of the 241 alcohol users, the mean age (standard deviation) of the participants was 41 (11) years. Sociodemographic and occupational characteristics are described in Table 1. Above four-fifths (82%) of the alcohol users had some formal education and two-thirds (67%) had monthly income \(< 3000\) INR. Of total, 189 (78%) participants reported going to sea for fishing daily. Majority (82%) did not own fishing boats and were daily wagers. The predominant type of alcohol consumed by the participants was brandy (74.3%), followed by beer (16.2%) and toddy (6.6%). Almost 98% (\(n = 237\)) of alcohol users reported one or more alcohol users in the family.

“Harmful use” of alcohol was noted in 185 fishermen (76.8%, 95% CI: 71.1%–81.8%). Association of sociodemographic and occupational characteristics with “harmful use” of alcohol revealed that none of the factors were significant. The prevalence of harmful use was low among elderly (\(\geq 60\) years of age) and higher among illiterates, though these were not statistically significant.

| Characteristics | Frequency (%) |
|-----------------|---------------|
| Age (years)     |               |
| 19-39           | 108 (44.8)    |
| 40-59           | 118 (49.0)    |
| \(\geq 60\)     | 15 (6.2)      |
| Educational status* |       |
| Illiterate      | 43 (17.8)     |
| Primary and middle school | 111 (46.1) |
| High school and above | 87 (36.1) |
| Marital status  |               |
| Married         | 235 (97.5)    |
| Unmarried       | 6 (2.5)       |
| Monthly income (rupees) |   |
| \(< 1999\)      | 63 (26.1)     |
| 2000-2999       | 98 (40.7)     |
| \(\geq 3000\)   | 80 (33.2)     |
| Duration of occupation (years) |   |
| 0-10            | 36 (14.9)     |
| 11-20           | 100 (41.5)    |
| 21 and above    | 105 (43.6)    |
| Time spent in sea (h) |     |
| 0-5             | 49 (20.3)     |
| 6-24            | 151 (62.7)    |
| 25 and above    | 41 (17.0)     |
| Frequency of going to sea |   |
| Daily           | 189 (78.4)    |
| Occasionally    | 52 (21.6)     |
| Type of launch  |               |
| Big             | 49 (20.3)     |
| Small           | 192 (79.7)    |
| Boat ownership  |               |
| Own             | 43 (17.8)     |
| Wage            | 198 (82.2)    |

**Table 1: Sociodemographic and occupational characteristics of fishermen who reported consumption of alcohol in the past 1 year, Puducherry, South India, 2015 (\(n=241\))**

**Table 2: Proportion of dependence and harmful use of alcohol among fishermen who reported consumption of alcohol in the past 1 year during study period (\(n=241\))**

| AUDIT classification for alcohol use | Proportions (95% CI) |
|-------------------------------------|----------------------|
| Less risk                           | 10.8 (7.5-15.3)      |
| Harmful use                          | 76.8 (71.1-81.8)     |
| Probable dependence                 | 12.4 (8.9-17.2)      |

CI - Confidence interval; AUDIT - Alcohol Use Disorder Identification Test

Among alcohol users, the proportion of probable alcohol dependence was 12.4% (95% CI: 8.9%–17.2%) as shown in Table 2. Dependence was high among illiterate fishermen and those who were spending >24 h in sea for fishing. However, none of the sociodemographic and occupational characteristics were associated with dependence.
Of total, more than half of participants (54%) reported intake of alcohol in morning. Regarding work absenteeism due to alcohol use, 137 (57%) participants reported failing to go for fishing at least once in a month. Of total, 146 (61%) participants reported some injury ever before because of alcohol drinking.

**DISCUSSION**

This study from a coastal region of South India has shown a high level of “harmful alcohol use” among fishermen, and one in ten had probable dependence on alcohol. None of the individual characteristics of alcohol users were associated with either harmful use of alcohol or probable dependence. More than half of participants had reported failing to go to work and above three-fifths had injuries due to alcohol use.

The NFHS survey among general population had reported around 9.4% of adult (15–54 years) alcohol users to be consuming alcohol almost every day.[4] The consumption of alcohol everyday was considered as the proxy measure of alcohol dependence. There are no country-level data on harmful use or alcohol dependence among alcohol users. Very few studies have used comprehensive screening tools such as AUDIT or CAGE ((Cut Down, Annoyed, Guilty and Eye Opener) Questionnaire) to detect harmful use and alcohol dependence among alcohol users. The study done in urban slum of Kolkata among adult men alcohol users using AUDIT tool reported 8% to have harmful alcohol consumption and 14% to have alcohol dependence.[10] The alcohol dependence is higher than the current study, and this may be due to the difference in study population, living environment, type of occupation, income, and social-cultural factors. Moreover, widespread availability of alcohol, lower taxes on alcohol, and permissive attitudes toward alcohol in Puducherry may have contributed to the higher prevalence of use.

Studies from India and other South Asian countries among general population have reported “harmful use” of alcohol varying from 15.6% to 34.8%.[17–20] In the current study, harmful use of alcohol was seen among 77% of the alcohol users. The similar high prevalence (69.8%) of harmful use of alcohol among fishermen was reported from Uganda.[12] There was relatively high proportion of harmful use of alcohol among alcohol users in the current study compared to previous published studies in general population and also among fishermen. Possible reasons for this high prevalence may be easy access to liquor in the village, unregulated sale and low cost of liquor, relatively high prevalence of alcohol use in the community, economic liquidity as most of the study participants were daily wagers, and no regulations on alcohol use during fishing activities. There is a need for qualitative studies in this special group to explore the real reasons for high proportion of harmful alcohol use.

About 12.4% of the fishermen who use alcohol had probable dependence to alcohol. In the previous studies with use of AUDIT tool, proportion of probable alcohol dependence among alcohol users in general population ranges from as low as 4.5% to as high as 14.7%.[17–20] Although the prevalence of alcohol consumption and hazardous drinking is comparatively high in this study, the level of dependence is almost similar to previous studies.

The findings of high frequency of alcohol use and harmful use of alcohol among the fishermen could be a reflection of the highly stressful nature of their occupation and also permissive attitudes toward alcohol in the region. However, the proportion of fishermen with dependence is similar to other studies done in populations of mixed occupations, indicating that fishing as an occupation may not confer additional risk to the development of alcohol dependence. Development of dependence may be determined by biological factors such as a family history of alcohol dependence, in addition to social and environmental factors.

The previous studies had reported that individuals who initiate alcohol before 21 years of life, with low level of education or illiteracy, having the habit of smoking, spending >100 INR per day on alcohol, and having a family member consuming alcohol, have increased risk of harmful alcohol intake.[18] A study conducted in the rural areas of South India reported that the risk of harmful intake of alcohol is high in those villages were the illicit alcohol is made locally.[21] Similarly, in our study, the easy availability of alcohol may be the reason for high level of harmful drinking among the fishermen.

There are few strengths in the current study. First, to our knowledge, this is the first study to report harmful use of alcohol and probable dependence to alcohol among fisherman in India. Second, we used the widely accepted AUDIT tool and recommended cutoff to ascertain harmful alcohol use and dependence which makes the study results comparable across the world. Third, single interviewer conducted all the interviews and hence very less information bias. Fourth, it was a community-based house-to-house survey, and all the eligible individuals were interviewed, hence minimizing the selection bias.

There are few limitation. First, the study was conducted in a selected fisherman colony and the results cannot be generalized to wider fisherman community. Second, the sample size (number of alcohol users) was not adequate to find the associated sociodemographic factors with harmful alcohol use and probable alcohol dependence. Third, the study did not explore the reasons for high proportion of harmful alcohol use among the fisherman who use alcohol. Fourth, the other high-risk conditions such as
other substance abuse and comorbid psychiatric conditions which may have influence on the alcohol consumption of the fishermen were not captured in the study.

With very high proportion of harmful use of alcohol among fisherman, there is a need for regular community-level screening by peripheral health workers using standard tools to detect probable dependence. Furthermore, there is a need for comprehensive health checkup with more emphasis on alcohol-related disorders affecting hepatobiliary system. There is a need to set up a referral system to manage those fishermen who are screened with probable alcohol dependence. Alcohol cessation clinics can be planned in the primary health centers catering to the fisherman community. Workplace regulations against alcohol use need to be developed; fisherman and fishing boats before getting into sea must be monitored police guards to ensure alcohol-free workplace. Community-level awareness campaigns regarding ill effects of alcohol need to be conducted.

**CONCLUSION**

Among fishermen who use alcohol, eight out of ten have harmful use of alcohol and one out of ten has probable alcohol dependence. The harmful use alcohol is relatively higher than general population and other occupational groups. There is a need to screen for alcohol-related disorders among fisherman and also to adopt Brief intervention strategy to counter high proportion of harmful use of alcohol. Health promotion activities such as community awareness programs explaining ill effects of alcohol, policing against alcohol use during fishing, legal limits for alcohol intake, and increasing taxes need to be considered.

**Acknowledgment and Author contribution**

We thank the fishermen community at Veerampattinam, for their support throughout the study. BB, PC, and GR conceived and designed the study. MKA and GR designed the data extraction sheet and collected and entered data. MGM and GR analyzed the data. MKA and BB prepared the manuscript. MKA, MGM, PC, and GR critically reviewed the manuscript. All authors approved the final version.

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**Conflicts of interest**

There are no conflicts of interest.

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