

## Prevalence, Drinking Patterns and Self-reported Alcohol-Related Harms in a Semi-Urban Indian Community: A Cross-Sectional Survey

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### ABSTRACT:

**Background and Aims:** Alcohol use and its psycho-social and functional complications pose a major global public health challenge. This Public Health Initiative, sponsored by the Ministry of AYUSH, Government of India, surveyed the prevalence of alcohol use, drinking patterns, self-reported harms and indicators of problematic use in a semi-urban Indian community.

**Materials and Methods:** A community-based, cross-sectional, door-to-door survey was conducted among residents aged 10–90 years over 10 days. Of 32,568 eligible individuals, 20,000 were interviewed (response rate 61.4%) by 61 trained interviewers. Consecutive household enumeration was used, with no sampling frame, random starting point or probability-based selection. Of the 20,000 participants, 1,946 reported lifetime alcohol use. Data were collected using a custom composite questionnaire adapted from MAST and AUDIT together with study-specific questions. The instrument was reviewed by experts for clarity and content validity but was not formally validated, and standard scoring systems and cut-off values were not applied. Interviews were face-to-face in the local language. Missing data were handled by complete-case analysis, and prevalence is reported with 95% confidence intervals (CIs). **Results:** Of the 20,000 respondents, 1,946 (9.7%, 95% CI 9.3–10.2) reported lifetime alcohol use and 974 (4.9%, 95% CI 4.6–5.2) reported consumption in the last week. Among lifetime consumers, 36.3% (95% CI 34.2–38.5) drank regularly and 63.7% (95% CI 61.5–65.8) occasionally; binge drinking occurred in 13.0% (95% CI 11.6–14.6). Health issues, psychological guilt, financial distress and interpersonal violence were reported by 19.3% (95% CI 17.6–21.1), 18.6% (95% CI 16.9–20.4), 15.8% (95% CI 14.3–17.5) and 15.9% (95% CI 14.3–17.6), respectively. Self-reported dependence-like behavior was observed in 67.9% (95% CI 65.8–69.9), whereas only 15.7% (95% CI 14.2–17.4) had sought professional help to quit. **Conclusion:** These findings highlight the need for accessible, non-stigmatizing community-level screening and de-addiction services.

**KEYWORDS:** Alcohol use, Binge drinking, Community survey, Drinking habits, Holistic medicine, Prevention.

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## 1. INTRODUCTION

Globally, alcohol consumption has emerged as a critical concern, with the population of hazardous drinkers rising from 983 million in 1990 to 1.34 billion in 2020. [1] In India, per capita alcohol consumption nearly doubled from 2.3 liters in 2000 to 5.5 liters in 2018, with further increases projected by the World Health Organization. [2] The National Family Health Survey (NFHS-4) reported alcohol use among 29.0% of men and 1.0% of women aged 15–49 years nationally. [3] Furthermore, Karnataka's role as a significant contributor to national excise revenue underscores the profound intersection between high consumer demand and regional economic reliance on retail alcohol sales. [4]

National- and state-level surveys highlight the substantial burden of alcohol use and provide an important public health perspective. However, direct comparisons with the findings of the present study should be made with caution because of differences in the age groups included, survey methodologies, definitions of alcohol use and reference periods. The present study included participants aged 10–90 years and used different operational definitions for alcohol use. Therefore, these surveys are cited to provide background and context rather than to serve as direct benchmarks for the estimates reported in this study.

While state-level data provide broad estimates, they often mask localized community dynamics, the domestic and economic consequences of consumption, and specific barriers to recovery in semi-urban and rural areas. The present survey was conducted by an *Ayurveda* college and hospital in southern India under a Public Health Initiative sponsored by the Ministry of AYUSH, Government of India. The aim was an epidemiological survey to enumerate the local burden of alcohol use and the harms self-reported by those who consume alcohol, so that de-addiction services could subsequently be planned on the basis of local evidence.

**Objectives:** The primary objective of the study was to estimate the prevalence of lifetime and recent (past-week)

alcohol use in the target community. In addition to this primary objective, the secondary objectives were as follows:

1. To describe the drinking patterns of the study population.
2. To assess the probable physical, social, psychological and financial consequences associated with alcohol consumption.
3. To identify the alcohol-related harms dependence-like behavior and help-seeking behavior.

A hypothesis was not pre-specified, as the initiative was designed as a community-based public health program rather than a hypothesis-driven study.

## 2. MATERIALS AND METHODS

**Study design and setting:** This community-based, cross-sectional, door-to-door survey was conducted in a semi-urban taluk headquarter of Karnataka, India, characterized by a diverse population with varied educational, religious and socio-economic backgrounds, over a period of 10 days between 24 November and 4 December 2021, excluding Sundays. The study area comprised 23 municipal wards. Although the survey was designed to include all wards, data collection was still in progress at the time of analysis. Consequently, the present article reports an interim analysis based on data collected from 15 wards in which the survey had been completed. Therefore, the findings presented in this article should be interpreted within the context of the wards included in the current analysis. Households were approached consecutively along defined routes within each ward. The survey was carried out by 61 interviewers who were exclusively trained for this project, with each interviewer interviewing 32–35 participants per day over these 10 days. The survey was designed and reported in strict accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies. [5]

All 61 interviewers received project-specific, three-hour hands-on training on the items, on communication about the survey and on administration of the tool by the specialists. However, formal inter-rater reliability was not

assessed. The survey was conducted under the supervision of experts and the project manager. A systematic check by the specialists, core committee members and the project manager was used as a field quality-control procedure to ensure accurate and complete data collection.

No re-interviews or back-checks were conducted on any subject. Interviews were conducted in the local language using standardized item wording, and respondents were assured of confidentiality. Data were entered through a Google Form and a hard copy simultaneously, to cross-check the completeness of the data entered. The manual data were entered by the data entry operator and the two files were reconciled, with discrepancies resolved against the source forms on a day-to-day basis.

**Ethical considerations and informed consent:** The study protocol was approved by the Institutional Ethics Committee (IEC) of the participating institution (Approval No. SDM/IEC/123/2020, dated 22/09/2020). Prior to the administration of any survey instrument, the trained interviewers conducted a formal consent process with all adult respondents and with the guardians of minor respondents.

For participants aged 10–17 years, informed written consent was obtained from a parent or legal guardian, and age-appropriate assent was obtained from the participant. Interviews with participants aged 10–17 years were conducted out of the hearing of other household members wherever the layout of the dwelling permitted and the alcohol-related items were administered only after the interviewer had established that the participant was willing to answer them. Where a parent or legal guardian chose to remain present, this was recorded.

The consent process was conducted in the local language and explicitly detailed the voluntary nature of participation, the right to withdraw at any stage without penalty, and the strict protocols implemented to ensure confidentiality of all personal, socio-demographic and behavioral data. All identifying geographical, institutional and project names were replaced with generic descriptors in the blinded file to

preserve the anonymity of the manuscript during peer review.

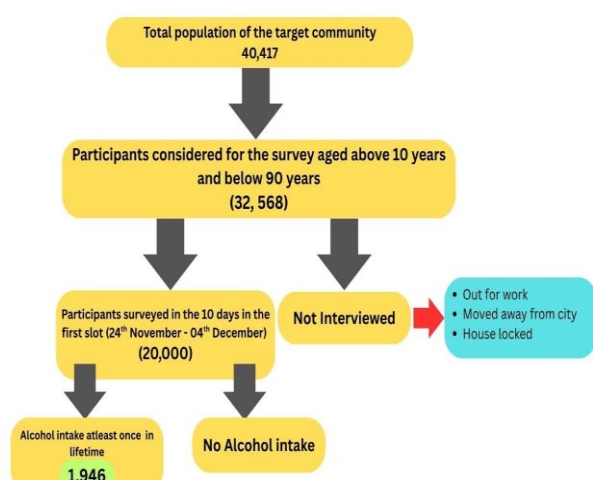
**Participant selection and sampling strategy:** A door-to-door convenience enumeration strategy was employed to recruit participants from the municipal wards of the said semi-urban taluk. Because this procedure did not involve a sampling frame or probability-based selection, the recruitment method is described here as consecutive door-to-door enumeration rather than systematic random sampling. The inclusion criteria required respondents to be aged between 10 and 90 years and residing in the selected household. Exclusion criteria applied to individuals who were physically or mentally unable to participate in a structured interview, including those with advanced dementia, severe acute psychiatric illness, or severe hearing and speech impairments.

Households were approached consecutively within each ward using a door-to-door enumeration strategy. No household sampling frame, random starting point or probability-based ward selection was used. Within each participating household, all eligible individuals who were present and provided consent were interviewed individually through face-to-face interviews in the local language, and information on alcohol use was obtained through self-report. Individuals who were unavailable at the time of the survey were neither interviewed nor included in the analytical sample of 20,000 respondents. Although information regarding alcohol use among some absent household members was occasionally provided by available family members, these data were not included in the study analyses.

The total population of 40,417 was narrowed to 32,568 by including only participants above 10 years of age. Of the 32,568 eligible individuals, 20,000 were interviewed, giving a response rate of 61.4%. During field data collection, the total number of eligible individuals and the number of completed interviews were documented. Given the large-scale, time-limited nature of the door-to-door survey, the reasons for non-participation, including refusal, household

unavailability and locked households, were not systematically recorded and could not be quantified separately. The participant flow is shown in [Figure 1](#).

Among the 20,000 respondents, 10,250 were males and 9,750 were females. The final sample of eligible respondents provided consent and completed the initial screening within the given timeframe of 10 days. From this large community sample, the 1,946 participants who reported consuming alcohol at least once in their lifetime were included in the detailed analysis of drinking behaviors, screening responses and associated harms.



**Figure 1: Participant flow for the survey.**

[Figure 1](#) depicts the progression from the total community population (40,417) to the age-eligible population (32,568), the interviewed sample (20,000) and the 1,946 respondents reporting lifetime alcohol use, together with the stated reasons for non-participation.

**Sample size:** No formal sample size calculation was performed. The target of 20,000 participants was based on the logistical feasibility within the field period, while providing a high degree of statistical precision.

**Variables and operational definitions:** The questionnaire addressed four main domains, constructed to align with both modern public health metrics and holistic health concepts. The self-reported responses of the participants were considered.

**Socio-demographic characteristics:** Given the large scale of the survey and the diversity of the study population, basic socio-demographic variables, including age, sex and

religious affiliation, were collected to characterize the participants.

**Self-reported alcohol consumption patterns:** An operational threshold was set for each drinking pattern assessed: lifetime exposure; regularity of use, with regular consumption defined as more than 4–5 days a week and occasional consumption as up to 1–3 days a week; and recent intake, understood as consumption in the last week. No standard-drink definition, gram-of-ethanol equivalent, beverage-volume aid or validated criterion for binge drinking was provided to respondents, as the standards for alcohol consumption varied in the local setting. Hence, the binge-drinking estimate reported here is a subjective self-designation and is not comparable with threshold-based definitions used in national or international surveys.

**Self-reported alcohol-related harms:** Adverse physical or mental health outcomes, financial distress (defined as increased cost of living, debt, or inability to meet basic household expenses due to alcohol purchasing), and interpersonal conflict or violence (including marital discord, physical or verbal fights within the family, or external conflicts).

**Self-reported abstinence and help-seeking behavior:** Self-perceived ability to cease drinking independently, previous voluntary abstinence attempts, frequency of successful abstinence, history of reducing or cutting off intake, and professional help-seeking behavior.

**Survey instrument development and validation:** The structured survey instrument was developed by a multidisciplinary panel comprising public health epidemiologists, psychiatrists and senior Ayurvedic physicians. Data regarding alcohol use and related behaviors were collected using a custom composite questionnaire adapted from the Michigan Alcoholism Screening Test (MAST) and the Alcohol Use Disorders Identification Test (AUDIT), covering socio-demographics, drinking behaviors, alcohol-related harms and help-seeking efforts. [6, 7] While both source instruments are independently validated, this specific hybrid configuration

has not undergone formal psychometric validation. To ensure clarity and face validity, the combined tool was reviewed by two addiction specialists prior to deployment. The questionnaire was translated from English into the local language to ensure semantic equivalence and cultural appropriateness. No pilot testing was performed, internal

consistency was not assessed, and a formal Content Validity Index was not calculated. A total of 61 trained healthcare providers administered the questionnaire through face-to-face household interviews over a ten-day period. The correspondence between the study questions and the source MAST and AUDIT items is presented in [Table 1](#).

**Table 1: MAST and AUDIT items used for the corresponding questions in the prepared questionnaire**

| Question number | Question in the form                                                   | Corresponding MAST/AUDIT item                                                           | Source             | Recall Period | Response        |
|-----------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------|---------------|-----------------|
| <b>Q8</b>       | Have you ever consumed alcohol?                                        | AUDIT Q1 asks frequency of alcohol consumption                                          | AUDIT              | Lifetime      | Yes = 1; No = 0 |
| <b>Q9</b>       | Do you consume alcohol regularly?                                      | AUDIT Q1 – frequency of drinking                                                        | AUDIT              | Lifetime      | Yes = 1; No = 0 |
| <b>Q10</b>      | In the last week have you had alcohol?                                 | No direct equivalent                                                                    | —                  | Past week     | Yes = 1; No = 0 |
| <b>Q11</b>      | Are you an occasional drinker?                                         | AUDIT Q1 – frequency of drinking                                                        | AUDIT              | Lifetime      | Yes = 1; No = 0 |
| <b>Q12</b>      | Has alcohol troubled your health (physical/mental) anytime?            | AUDIT Q9 – alcohol-related injury; MAST Q17 – liver trouble                             | Both               | Lifetime      | Yes = 1; No = 0 |
| <b>Q13</b>      | Do you ever feel guilty about consuming alcohol?                       | MAST Q5; AUDIT Q7                                                                       | Both               | Lifetime      | Yes = 1; No = 0 |
| <b>Q14</b>      | Financial problems due to alcohol consumption                          | No exact standard item; related to alcohol-related consequences                         | MAST/AUDIT domains | Lifetime      | Yes = 1; No = 0 |
| <b>Q15</b>      | Has alcohol consumption induced fights/violence within family/outside? | MAST Q9 – physical fights when drinking; MAST Q10 – family problems                     | MAST               | Lifetime      | Yes = 1; No = 0 |
| <b>Q16</b>      | Are you able to stop drinking on your own?                             | MAST Q7 – ability to stop drinking; AUDIT Q4 – inability to stop once started           | Both               | Lifetime      | Yes = 1; No = 0 |
| <b>Q17</b>      | Have you abstained alcohol?                                            | No exact equivalent                                                                     | —                  | Lifetime      | Yes = 1; No = 0 |
| <b>Q18</b>      | Have you ever considered help to quit alcohol?                         | MAST Q19 – gone to anyone for help about drinking; MAST Q11 – family member sought help | MAST               | Lifetime      | Yes = 1; No = 0 |
| <b>Q19</b>      | Have you ever cut off your alcohol intake?                             | AUDIT Q10 asks whether someone suggested cutting down; MAST Q7 concerns stopping        | Both               | Lifetime      | Yes = 1; No = 0 |
| <b>Q20</b>      | Felt annoyed when someone criticizes your alcohol habit?               | AUDIT Q10 – relative/friend concerned or suggested cutting down                         | AUDIT              | Lifetime      | Yes = 1; No = 0 |
| <b>Q21</b>      | Are you a binge drinker?                                               | AUDIT Q3 – six or more drinks on one occasion                                           | AUDIT              | Lifetime      | Yes = 1; No = 0 |
| <b>Q22</b>      | Do you need alcohol first thing in the morning?                        | MAST Q16 – drink before noon; AUDIT Q6 – first drink in morning                         | Both               | Lifetime      | Yes = 1; No = 0 |

Several steps were taken to minimize potential sources of bias. Interviewers were trained to adopt a non-judgmental approach and participants were assured that their responses would remain confidential, in order to reduce social desirability bias and the under-reporting of alcohol use. However, some under-reporting, particularly among women and younger participants, cannot be ruled out. Recall bias was addressed by using clearly defined questions and reference periods. To reduce interviewer-related bias, all interviewers underwent uniform training, and data collection was carried out using a common questionnaire under the supervision of the study team. Although every effort was made to maintain privacy during household interviews, complete privacy could not always be ensured, which may have influenced participants' responses. Consecutive door-to-door enumeration was used to reduce household selection bias. However, locked or unoccupied households could not be included. Non-participation was documented during field visits to assess the potential impact of non-response. In addition, the use of a composite questionnaire that had not undergone formal validation may have introduced some degree of misclassification. Finally, because participants were recruited from multiple households and wards, the possible influence of clustering was considered during the interpretation of the results.

**Statistical methods:** Statistical analysis was conducted using IBM SPSS Statistics for Windows, Version 26.0. Descriptive statistics, including frequencies and percentages along with 95% confidence intervals, were calculated to summarize socio-demographic features and behavioral patterns. Complete-case analysis was used to handle missing data. Sex-specific prevalence were calculated using the number of male or female alcohol users with the total number of male or female respondents as the denominator. No multivariable modeling, sensitivity analyses, subgroup analyses or interaction analyses were conducted, and no

adjustments were made for multiple comparisons. The primary objective of the study was descriptive, namely to estimate the prevalence and characterize the patterns of alcohol consumption in the study population. Therefore, the analysis was primarily descriptive and was not designed to assess independent predictors or causal associations. Accordingly, no statement of comparative or differential risk between drinking groups is made anywhere in this report, and every association referred to in the Discussion is exploratory. Estimates are unweight and standard errors were not adjusted for clustering within households or wards, so the confidence intervals presented are likely to be narrower than the true uncertainty.

3. RESULTS

**Socio-demographic characteristics of the participant respondents:** Among the 20,000 community members screened, 1,946 reported lifetime exposure to alcohol, representing a community-wide lifetime prevalence of 9.7%. These 1,946 alcohol users were analyzed in detail. The age- and sex-specific prevalence of alcohol use is presented in [Table 2](#), and the socio-demographic profile of the alcohol-using respondents is presented in [Table 3](#).

The age distribution shows that the largest segment of the consuming population is concentrated within the active, economically productive middle-adulthood brackets, with 15.6% aged 46–50 years and 15.2% aged 36–40 years. This describes the age composition of alcohol consumers rather than the prevalence of alcohol use within those age bands. Collectively, individuals aged 31–50 years represent the majority of the alcohol-consuming respondents (56.9%). The sample was predominantly male (97.0%) and overwhelmingly identified as Hindu (97.9%). Among the screened respondents, the prevalence of alcohol use was 18.41% (95% CI 17.67–19.17) among males (n = 10,250) and 0.61% (95% CI 0.47–0.78) among females (n = 9,750).

Table 2: Age- and sex-specific prevalence of alcohol use

| Age group | Alcohol users (n = 1,946) | Total surveyed (n = 20,000) | Age-specific prevalence (%) | 95% CI (%) |
|-----------|---------------------------|-----------------------------|-----------------------------|------------|
|-----------|---------------------------|-----------------------------|-----------------------------|------------|

|               |      |       |       |             |
|---------------|------|-------|-------|-------------|
| 10–15 years   | 4    | 2,135 | 0.19  | 0.00–0.37   |
| 16–20 years   | 20   | 3,105 | 0.64  | 0.36–0.92   |
| 21–25 years   | 80   | 1,790 | 4.47  | 3.51–5.43   |
| 26–30 years   | 143  | 2,065 | 6.92  | 5.83–8.01   |
| 31–35 years   | 242  | 1,853 | 13.05 | 11.51–14.59 |
| 36–40 years   | 295  | 1,983 | 14.87 | 13.31–16.44 |
| 41–45 years   | 267  | 1,601 | 16.68 | 14.85–18.50 |
| 46–50 years   | 304  | 1,614 | 18.84 | 16.93–20.76 |
| 51–55 years   | 172  | 1,026 | 16.76 | 14.48–19.04 |
| 56–60 years   | 147  | 1,053 | 13.96 | 11.87–16.05 |
| 61–65 years   | 123  | 740   | 16.62 | 13.94–19.31 |
| 66–70 years   | 88   | 500   | 17.60 | 14.26–20.94 |
| 71–75 years   | 36   | 244   | 14.75 | 10.31–19.20 |
| 76–80 years   | 17   | 162   | 10.49 | 5.79–15.19  |
| 81–85 years   | 6    | 90    | 6.67  | 1.50–11.83  |
| 86–90 years*  | 2    | 39    | 5.13  | 0.00–12.12  |
| <b>Gender</b> |      |       |       |             |
| Male          | 1887 | 10250 | 18.41 | 17.67–19.17 |
| female        | 59   | 9750  | 0.605 | 0.47–0.78   |

**Table 3: Socio-demographic profile of the alcohol-consuming respondents (n = 1,946)**

| Demographic Variable | Category    | Frequency (n) | Percentage (%) | 95% CI (%)  |
|----------------------|-------------|---------------|----------------|-------------|
| <b>Age Group</b>     | 10–15 years | 4             | 0.2            | 0.00–0.41   |
|                      | 16–20 years | 20            | 1.0            | 0.58–1.48   |
|                      | 21–25 years | 80            | 4.1            | 3.23–4.99   |
|                      | 26–30 years | 143           | 7.3            | 6.19–8.51   |
|                      | 31–35 years | 242           | 12.4           | 10.97–13.90 |
|                      | 36–40 years | 295           | 15.2           | 13.57–16.75 |
|                      | 41–45 years | 267           | 13.7           | 12.19–15.25 |
|                      | 46–50 years | 304           | 15.6           | 14.01–17.23 |
|                      | 51–55 years | 172           | 8.8            | 7.58–10.10  |
|                      | 56–60 years | 147           | 7.6            | 6.38–8.73   |
|                      | 61–65 years | 123           | 6.3            | 5.24–7.40   |
|                      | 66–70 years | 88            | 4.5            | 3.60–5.45   |
|                      | 71–75 years | 36            | 1.8            | 1.25–2.45   |
|                      | 76–80 years | 17            | 0.9            | 0.46–1.29   |
|                      | 81–85 years | 6             | 0.3            | 0.06–0.55   |
|                      | 86–90 years | 2             | 0.2            | 0.00–0.25   |
| <b>Sex</b>           | Male        | 1,887         | 97.0           | 96.21–97.73 |
|                      | Female      | 59            | 3.0            | 2.27–3.79   |
| <b>Religion</b>      | Hindu       | 1,906         | 97.9           | 97.31–98.57 |
|                      | Muslim      | 36            | 1.8            | 1.25–2.45   |
|                      | Christian   | 4             | 0.2            | 0.00–0.41   |

**Alcohol consumption patterns and frequency:** The consumption patterns and drinking frequencies within the respondents are presented in [Table 4](#). While 100.0% of the respondents reported lifetime alcohol exposure, 36.3% consumed alcohol regularly on a daily or near-daily basis, while 63.7% were classified as non-regular or occasional consumers. When participants were asked a subjective,

**Table 4: Alcohol consumption and drinking patterns (n = 1,946)**

| Consumption Parameter      | Response | Frequency (n) | Percentage (%) | 95% CI      |
|----------------------------|----------|---------------|----------------|-------------|
| Lifetime Consumption       | Yes      | 1,946         | 100.0          |             |
| Regular Consumption        | Yes      | 707           | 36.3           | 34.2 – 38.5 |
|                            | No       | 1,239         | 63.7           | 61.5 – 65.8 |
| Recent Intake (Last Week)  | Yes      | 974           | 50.1           | 47.8 – 52.3 |
|                            | No       | 972           | 49.9           | 47.7 – 52.2 |
| Self-Identified Occasional | Yes      | 1,119         | 57.5           | 55.3 – 59.7 |
|                            | No       | 827           | 42.5           | 40.3 – 44.7 |
| Binge Drinking Pattern     | Yes      | 253           | 13.0           | 11.6 – 14.6 |
|                            | No       | 1,693         | 87.0           | 85.4 – 88.4 |

self-identifying question (“Are you an occasional drinker?”), only 57.5% identified as occasional, while 42.5% did not. Current (last-week) alcohol consumption was reported by 50.1% of the respondents, equating to a community-wide current prevalence of 4.9% of the 20,000 surveyed. Binge drinking was identified in 13.0% of the respondents.

**Self-reported alcohol-related harms:** The physical, psychological and socio-economic problems reported by participants as being associated with their alcohol use, rather than clinically confirmed outcomes, are presented in [Table 5](#). Physical or mental health issues attributed to alcohol consumption were reported by 19.3% of the

**Table 5: Self-reported alcohol-related harms (n = 1,946)**

| Harm Category                    | Response | Frequency (n) | Percentage (%) | 95% CI      |
|----------------------------------|----------|---------------|----------------|-------------|
| Health Trouble (Physical/Mental) | Yes      | 376           | 19.3           | 17.6 – 21.1 |
|                                  | No       | 1,570         | 80.7           |             |
| Psychological Guilt              | Yes      | 362           | 18.6           | 16.9 – 20.4 |
|                                  | No       | 1,584         | 81.4           |             |
| Financial Distress/Problems      | Yes      | 308           | 15.8           | 14.3 – 17.5 |
|                                  | No       | 1,638         | 84.2           |             |
| Interpersonal Violence/Conflicts | Yes      | 309           | 15.9           | 14.3 – 17.6 |
|                                  | No       | 1,637         | 84.1           |             |

**Self-reported inability to stop, dependence-like behavior and help-seeking patterns**

The parameters reflecting behavioral dependence and attempts to modify drinking behavior are presented in [Table 6](#). According to ICD-11, alcohol dependence is a disorder of

respondents. Socio-emotional and economic harms were also highly prevalent, with 18.6% expressing psychological guilt regarding their habits, 15.8% reporting financial instability, and 15.9% reporting that their consumption induced violence or fights within or outside the family.

regulation of alcohol use arising from repeated or continuous use of alcohol. [8] A significant majority of the respondents (67.9%) reported an inability to cease consumption independently, indicating a self-reported inability to stop and dependence-like behavior. While 28.4%

had attempted voluntary abstinence in the past, only 15.7% had ever sought professional help to quit. Successful voluntary reduction or cutting off of alcohol intake was achieved by 23.1% of the respondents. Among those who

attempted abstinence, the majority (19.9% of the total respondents) had done so only once, while 1.0% had attempted it twice and 0.1% reported 11 attempts.

**Table 6: Behavioral dependence, abstinence history and help-seeking patterns (n = 1,946)**

| Behavioral Parameter                    | Response     | Frequency (n) | Percentage (%) | 95% CI      |
|-----------------------------------------|--------------|---------------|----------------|-------------|
| <b>Inability to Stop Independently</b>  | Yes (Unable) | 1,321         | 67.9           | 65.8 – 69.9 |
|                                         | No (Able)    | 625           | 32.1           |             |
| <b>History of Voluntary Abstinence</b>  | Yes          | 553           | 28.4           | 26.5 – 30.5 |
|                                         | No           | 1,393         | 71.6           |             |
| <b>Number of Abstinence Attempts</b>    | 0 times      | 1,538         | 79.0           |             |
|                                         | 1 time       | 387           | 19.9           |             |
|                                         | 2 times      | 20            | 1.0            |             |
|                                         | 11 times     | 1             | 0.1            |             |
| <b>Sought Professional Help to Quit</b> | Yes          | 306           | 15.7           | 14.2 – 17.4 |
|                                         | No           | 1,640         | 84.3           |             |
| <b>Voluntary Intake Reduction</b>       | Yes          | 450           | 23.1           | 21.3 – 25.1 |
|                                         | No           | 1,496         | 76.9           |             |

Four items in the composite questionnaire are conceptually related to the domains covered by the CAGE instrument. The responses to these four items are presented individually in [Table 7](#) as self-reported indicators only, and must not be interpreted as a CAGE screening result. [9]

**Table 7: Self-reported responses to the four individual items conceptually related to the CAGE domains (n = 1,946)**

| CAGE related items                    | Frequency | Percentage |
|---------------------------------------|-----------|------------|
| Felt the need to cut down             | 450       | 23.1%      |
| Felt annoyed by criticism of drinking | 286       | 14.7%      |
| Felt guilty about drinking            | 362       | 18.6%      |
| Drank first thing in the morning      | 170       | 8.7%       |

#### 4. DISCUSSION

The epidemiological findings of this door-to-door survey provide a detailed picture of alcohol consumption and its associated consequences in semi-urban India. The correspondence between the study questions and the source MAST and AUDIT items is set out in [Table 1](#), and the participant flow is depicted in [Figure 1](#). The age- and sex-specific prevalence estimates are given in [Table 2](#) and the socio-demographic profile of alcohol users in [Table 3](#).

Drinking patterns are summarized in [Table 4](#), self-reported harms in [Table 5](#), and dependence-like behavior, abstinence history and help-seeking in [Table 6](#). The four individual items conceptually related to the CAGE domains are reported in [Table 7](#).

Individuals aged 31–50 years constituted the largest proportion of identified alcohol users in the study population ([Table 3](#)). This period of middle adulthood is characterized by heightened occupational, familial and financial responsibilities, which may act as stressors that drive self-medication and alcohol reliance. [10] This may be considered a plausible and untested explanation. When alcohol consumption is used as a coping mechanism for these stressors, it may worsen financial strain, and financial strain may in turn increase drinking. The two are likely to be mutually reinforcing.

The stark sex imbalance in these respondents (97.0% male versus 3.0% female, [Table 3](#)) mirrors national epidemiological data, which report male-to-female alcohol use ratios ranging from 7:1 to 10:1. [3] However, the very low number of female alcohol users identified in this door-

to-door survey may partly reflect social desirability and reporting bias among women, and may partly reflect genuinely lower consumption in this setting. These two explanations cannot be distinguished from the present data. In rural and semi-urban Indian societies, female substance use is associated with cultural stigma and social condemnation, and women may therefore under-report or deny alcohol consumption during face-to-face household interviews. It has been suggested in the wider literature that conventional survey methods may not fully capture alcohol use. This is offered as context from that literature and not as a finding of the present survey. [11]

The self-reported severity of alcohol use in this setting is highlighted by behavioral dependence, with 67.9% of respondents reporting an inability to cease consumption independently ([Table 6](#)). [12] Though this resembles dependence-like behavior, it does not establish alcohol dependence syndrome or alcohol use disorder, which requires structured diagnostic assessment against ICD-11 or DSM-5 criteria. [8] Although the validated CAGE questionnaire, which screens for potential alcohol use disorders and dependence in adults, was not used for evaluation, the individual items relating to a felt need to cut down (23.1%), annoyance at criticism (14.7%), guilt about drinking (18.6%) and morning drinking (8.7%) indicated potentially problematic drinking behaviors ([Table 7](#)). [9] Against this background, the contrast with help-seeking is striking: while 67.9% reported an inability to stop unaided, only 15.7% had ever sought professional help, an absolute difference of 52.2 percentage points. Plausible contributors include limited community awareness, poor accessibility of de-addiction services and stigma associated with seeking treatment for substance use.

These findings are consistent with previous research in the Indian context, which identifies alcohol misuse in association with household economic distress and domestic or interpersonal violence. The high rate of alcohol-induced violence (15.9%) and financial instability (15.8%) shown in [Table 5](#) indicates that the harms reported by respondents

extend beyond physical health. Wider social and economic consequences of alcohol misuse have been described in the Indian literature; those reports are cited here as external context and were not measured in the present survey. [13, 14, 15] Because both exposure and outcome were measured at the same point in time and by self-report, these findings describe association rather than causation.

Overall, this self-reported survey observed a substantial burden of alcohol use and alcohol-related behaviors among the survey population, which included dependence-like behavior. These findings provide important descriptive evidence on patterns of alcohol use and associated psychosocial and behavioral characteristics in the study population. The observed associations may indicate potential relationships between alcohol use and the factors examined. However, it should be interpreted cautiously that a cross-sectional design does not permit causal inference. Discussion of these associations remains exploratory and should be considered in the context of the existing literature rather than as causal conclusions drawn from the present study.

The material presented below is intended to provide programme context and to suggest possible directions for future work. No therapeutic intervention was provided or evaluated as part of the present survey. Since the initiative was conducted through an Ayurvedic hospital, the findings provide an opportunity to explore structured Ayurvedic de-addiction approaches in future phases of the Public Health Initiative. In *Ayurveda*, health is viewed not simply as the absence of disease, but as a state of balance and harmony between the body, senses, mind and soul. [16] Within this framework, alcohol misuse is understood through the concept of *Madatyaya* (alcohol intoxication), which is described in relation to disturbances of the *Tridosha* (the three functional bio-entities, namely *Vata*, *Pitta* and *Kapha*) and depletion of *Ojas* (the vital essence of life and immunity), with possible effects on physical, cognitive and emotional well-being. [17]

The findings of the present survey may help create greater awareness of alcohol-related problems and encourage individuals to seek appropriate support. Building on this, structured Ayurvedic de-addiction protocols could be explored as a potential component of future phases of the initiative. Their acceptability, feasibility and effectiveness in supporting recovery, reducing stigma and promoting healthier drinking behaviors can be evaluated through well-designed controlled studies in the future.

**Generalizability:** While the prevalence estimates in this study are specific to the surveyed population, the observed patterns of alcohol use and help-seeking behavior may provide useful insights for the development of community-based screening and public health interventions in similar settings. However, the applicability of these findings to other populations should be interpreted with caution and requires confirmation through further studies using more rigorous sampling methods and standardized assessment tools.

### Recommendations

Future studies should:

1. Report age- and sex-standardized estimates using NFHS-compatible definitions, so that local figures can be benchmarked.
2. Investigate cultural and economic determinants of alcohol use across different Indian states.
3. Evaluate Ayurvedic interventions such as *Sattvavajaya Chikitsa* (psychotherapy), *Shodhana* (bio-purificatory therapy) and *Rasayana* (rejuvenation therapy) in appropriately controlled clinical studies.
4. Assess the long-term effectiveness of community-based interventions and policy-level actions.
5. Use probability sampling and validated instruments in future surveys.
6. Include qualitative methods to explore individual motivations behind alcohol use and quitting.

Greater investment in mental health infrastructure and community sensitization programmes is essential to reduce the burden of alcohol-related harm.

**Limitations:** Several limitations should be considered when interpreting these findings. First, the cross-sectional design precludes any inference regarding causality. Second, the absence of a formal sample-size calculation, the lack of weighting and the unaccounted clustering within households and wards may have affected the representativeness and precision of the estimates. In addition, individuals who were unavailable during household visits, particularly working adults, were not included in the survey, which may have resulted in an underestimation of alcohol use. Potential under-reporting, especially among women and minors, may also have influenced the observed prevalence and sex distribution. Finally, the use of a non-validated composite questionnaire and reliance on self-reported data may have introduced misclassification and reporting bias. Data were collected on age, sex and religion only; the gap in data collection regarding education, occupation and income could not be addressed retrospectively.

### 5. CONCLUSION

In this semi-urban Karnataka community, 9.7% of the 20,000 residents surveyed reported lifetime alcohol use and 4.9% reported drinking in the preceding week. Among lifetime users, occasional drinking was the predominant pattern, roughly one in six to one in five reported alcohol-attributed health, psychological, financial or interpersonal harm, and 67.9% reported being unable to stop drinking without help.

Only 15.7% of users had ever sought professional help, despite 67.9% reporting that they could not stop unaided. This gap indicates a substantial unmet need for accessible, non-stigmatizing screening and de-addiction services at community level. Whether integrating culturally familiar approaches, including Ayurvedic interventions, into primary care would narrow that gap was not examined here and remains to be established by prospective evaluation.

### Abbreviations:

AUD: Alcohol Use Disorder

AUDIT: Alcohol Use Disorders Identification Test

AYUSH: Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy

CAGE: Cut-down, Annoyed, Guilty, Eye-opener

CI: Confidence Interval

DSM-5: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition

ICD-11: International Classification of Diseases, 11th Revision

IEC: Institutional Ethics Committee

MAST: Michigan Alcoholism Screening Test

NFHS: National Family Health Survey

SPSS: Statistical Package for the Social Sciences

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

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**Data availability:** Data availability is restricted, as this is an ongoing project. The de-identified dataset may be made available on reasonable request following completion of the project.

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**Reporting guideline and registration:** This observational cross-sectional survey is reported in accordance with the [STROBE statement](#); a completed STROBE checklist with page and line numbers accompanies this submission as a separate file. The CONSORT checklist is not applicable, as the study was not a randomized controlled trial. Author contributions using the CRediT taxonomy are provided in the separate author details file. The study protocol and statistical analysis plan were not prospectively registered, as the survey was conducted as part of a community-based Public Health Initiative rather than a registered clinical study.

#### Declaration of Generative AI

The authors declare this manuscript was written without the use of generative artificial intelligence tools. All the content, including text generation, data analysis and references was developed and reviewed by the author without assistance from AI technologies.

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