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This is a preliminary, unedited version of a manuscript that has been accepted for publication in the Brazilian Journal of Psychiatry. As a service to our readers, we are providing this early version of the manuscript. The manuscript will still undergo copyediting, typesetting, and review of the resulting proof before it is published in final form. The final version may present slight differences in relation to the present version.

# Alcohol use among first-time suicide attempters enrolled in a suicide prevention program: A Retrospective Cohort Study

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## ABSTRACT

**Objective:** VigilanS is a French national suicide prevention program. Individualized intervention needs comprehension of risk factors for suicide attempt in real-world conditions.Identifying factors associated with alcohol use during suicide attempts may help tailor preventive interventions

**Aim:** To investigate the clinical and socio-demographic factors associated with alcohol use during a first suicide attempt (SA).

**Method:** This retrospective study analyzed the medical, clinical and socio-demographic data from the VigilanS cohort. All prime suicide attempters between January 1, 2020 and December 31, 2022 were included. We compared patients with alcohol- associated SA (OH+) and patients with non-alcohol- associated SA (OH-). $\chi^2$ and Wilcoxon- Mann-Whitney test were used as well as multivariate regression.

**Results:** Among 4,300 SA, 2,170 met inclusion criteria. OH+ group comprised 685 patients, OH- group comprised 1,485 patients. OH+ SA were associated with Living

alone (p < .001); male gender (p < .001), profession type (p < .001), less psychiatric follow-up (p <0.005) and shorter hospital stays (p<0.001).
**Conclusions:** Alcohol related SA is associated with specific sociodemographic variables and reduced healthcare engagement. Alcohol can be both a marker of SA risk and a barrier to accessing care. Further work is needed to differentiate patterns of alcohol use in suicide attempter.
**Keywords:** Vigilans; Suicide prevention; alcohol use; risk factor

## Introduction

Suicide is among the leading causes of mortality, particularly in younger populations (1). In this context, the prevention of suicidal behavior constitutes a priority, requiring coordinated, multilevel strategies.

Brief contact intervention (BCI) is a pragmatic efficacious approach to reduce suicide reattempts. BCIs are low-intensity, structured follow-up strategies that maintain contact with patients after a suicide attempt without requiring sustained therapeutic engagement (2). These interventions typically consist of periodic follow-up contacts (e.g., telephone calls, postcards, or text messages). BCI are associated with a significant reduction in suicide reattempt rates, particularly when implemented systematically in high-risk populations such as individuals with a recent suicide attempt (SA) as it is the strongest predictor of subsequent suicide and suicide reattempt (3).

The French VigilanS program is one of the most ambitious real-world implementations of BCI. It combines scheduled follow-up calls after discharge and repeated contacts over several months, using phone call, text messages or postcards, allowing patient engagement and early detection of relapse risk. This longitudinal follow-up also permits improvements in continuity of care (4). Evaluations of the VigilanS program indicate a meaningful reduction in suicide reattempts at the population level of 3-5-fold (5,6).

However, this one-size-fits-all approach may not fully address individual heterogeneity in risk profiles. Risk stratification could enable a more personalized preventive strategy. Identifying risk factors associated with both the severity of the initial SA and the likelihood of recurrence is thus needed for personalization of care.

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Psychiatric disorders constitute the most robust and consistently reported determinants, particularly mood disorders, substance use disorders, and psychotic disorders (7,8).

Socio-demographic factors also significantly contribute, higher risks are observed among individuals: economic difficulty, unemployment experiencing and social isolation. Environmental and contextual variables, such as rural residence and limited access to mental health services, further exacerbate vulnerability (9).

A substantial body of literature demonstrates that both acute alcohol intoxication and chronic alcohol use disorders are strongly associated with increased suicidal behavior (10,11). Alcohol use is one of the few modifiable risk factors in the short term, making it a critical target for intervention.

Alcohol consumption can be addressed through brief interventions, motivational interviewing, and addiction care referral. If alcohol use is associated with repeated SA, integrating systematic screening and targeted management of alcohol use into suicide prevention programs such as VigilanS could therefore enhance their effectiveness.

Thus, the present study aim is to examine the impact of alcohol use on the clinical characteristics and outcomes of SA within a large-scale, real-world prevention program. By integrating clinical, socio-demographic, and environmental factors, this work contributes to the evolution from standardized to personalized suicide prevention strategies, and, optimize suicide prevention interventions such as VigilanS.

## Methods

To conduct this retrospective cohort study, we used the database of the VigilanS-PDL program, which operates with the Sys.Vision software. This database collects medical and socio-economic data on patients included in the VigilanS program in “Pays de la Loire” (PDL) region. The PDL region is situated in western France  with a population of 3 965 226 citizens (12).

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*Data collection in the Vigilans PDL Program*

The VigilanS Pays de la Loire (PDL) program coordinates suicide reattempt prevention efforts across all 35 psychiatric wards and emergency departments with psychiatric care of the region. It includes patients who have undergone a medical assessment by a psychiatrist following a suicide attempt during the preceding 3 months. Assessment and inclusion may take place either in a psychiatric inpatient unit or in an emergency department.

At inclusion, the referring psychiatrist completes a standardized form documenting the patient's sociodemographic and clinical characteristics. These include gender, address, living alone, phone number, and profession, as well as information regarding the suicide attempt: whether it was the patient's first attempt, the method and location of the attempt, the patient's reported reasons for the attempt, and whether alcohol consumption was involved. The form also records personal and family histories of suicidal behavior, whether hospitalization was indicated and, when applicable, its duration. Finally, information is collected on the referring physician and psychiatrist, any medical consultations during the preceding three months, and any suicide prevention strategies already implemented.

Following inclusion, patients are contacted by phone at three and six months. An additional early telephone call, scheduled 10–20 days after inclusion, is arranged for patients meeting specific criteria, including a severe suicide attempt, age-related criteria (under 21 or over 65 years), or a history of previous suicide attempts. If patients cannot be reached by telephone, postcards are sent monthly. In addition, patients have access to a dedicated telephone line staffed by a mental health professional for support in situations of psychological distress.

Data collected by the VigilanS PDL program are extracted from the inclusion form and updated at each subsequent patient contact Throughout follow-up. If a new suicide attempt occurs during follow-up and is medically assessed, a new VigilanS inclusion form is completed. This enables the program to document recurrent suicide attempts and extend follow-up as appropriate.

We extracted data for first-time suicide attempters, specifically those who made their SA between January 1, 2020, and December 31, 2022. Both adult and minor patients were included.

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Once extracted, the data were divided into two groups: the OH + group comprised all suicide attempter with a recent alcohol use, the OH – group comprised all suicide attempter without a recent alcohol use.

*Database Processing*

Alcool presence was evaluated by the addressing psychiatrist and was considered positive when patient presented with either reported recent alcohol use at the time of the suicide attempt (approximately in the 3 preceding hours) or presence of alcohol confirmed by a positive blood alcohol concentration and/or a positive breath alcohol test.

Raters were not blinded to alcohol presence to assess other clinical variables.

We grouped nominal variables into categories. For professions, we classified them into several categories based on the nomenclature of professions and socio-professional categories from the French National Institute of Statistics and Economic Studies (INSEE) (13). It consists in six main categories: (1) farmers, (2) craft workers /trades workers / business owners, (3) executives and intellectual professions, (4) intermediate professions, (5) employees, and (6) manual workers. We added three extra categories: (7) students, (8) non-active (individuals who are unemployed or on sick leave), and (9) retirees.

For place of residence type, we categorized municipalities as either rural or urban. To classify them, we used the INSEE's 2022 four-level density grid, which groups municipalities into four categories according to population density (14). INSEE considers the two highest-density categories as urban areas and the two lowest-density categories as rural areas.

For information regarding severity, the classification of SA as severe or non-severe was established by the addressing psychiatrist when including the patient in Vigilans PDL based on the recorded data and the individual clinical assessment of every SA. SA was categorized in eight main classes as follows: medication overdose, phlebotomy, hanging/strangulation, road traffic incidents, jumping from height, drowning, defenestration, and another category for cases that do not fit into the previous classifications.

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SA recurrence was coded according to any new suicide attempt both reported directly during VigilanS intervention or by any psychiatric or emergency department service of the PDL Region

*Statistical Analysis*

The extracted data were analyzed using the R Software (version 4.5.2) and the JASP software (15–20).

All analysis were two-tailed. p-values < 0.05 were considered statistically significative. Descriptive statistics included percentages for nominal variables and means and standard deviations for continuous variables.

For univariate analysis, we used $\chi^2$ test for nominal variable, we expressed effect size as φ when appropriate, and else Cramer's V. For continuous variable, we used non-parametric Wilcoxon- Mann-Whitney test as it did not satisfy the homoscedasticity hypothesis with a significant Levene test. We expressed effect size as rank – biserial correlation.

Stepwise Multivariate logistic regression was used with a threshold for factors with $p< 0.2$, we expressed association strength with adjusted Odds Ratio (aOR) with 95 % confidence interval (IC).

A sensitivity analysis was performed using multiple imputation by chained equations (MICE). Twenty imputed datasets were generated using logistic regression for binary variables and multinomial logistic regression categorical variable. The same multivariable logistic regression model was fitted to each imputed dataset, and estimates were pooled using Rubin's rules.

*Ethical Considerations*

This study has been approved by the institutional review board of the Angers University Hospital (authorization #2023-102). All procedures were performed in accordance with the ethical standards of the national and institutional research committee as well as with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. All collected data were in line with the French recommendation regarding use of personal data, with the approval of the French CNIL (Commission Nationale de l'Informatique et des Libertés).

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## Results

*Flow Chart*

The VigilanS-PDL cohort included 4300 subjects between January 1, 2020, and December 31, 2022. Among them, 2,285 subjects were first-time suicide attempters. Among first-time attempters, 117 patients were excluded due to missing information regarding alcohol consumption at the time of the SA, 2170 subjects were included in the study and divided in 2 groups according to their alcohol consumption status: 685 (31.6%) subjects in the “Patient with alcohol associated SA” group (OH+) and 1,485 in the “Patient with a non-alcohol associated SA” (OH-) The complete flowchart is available in Figure 1.

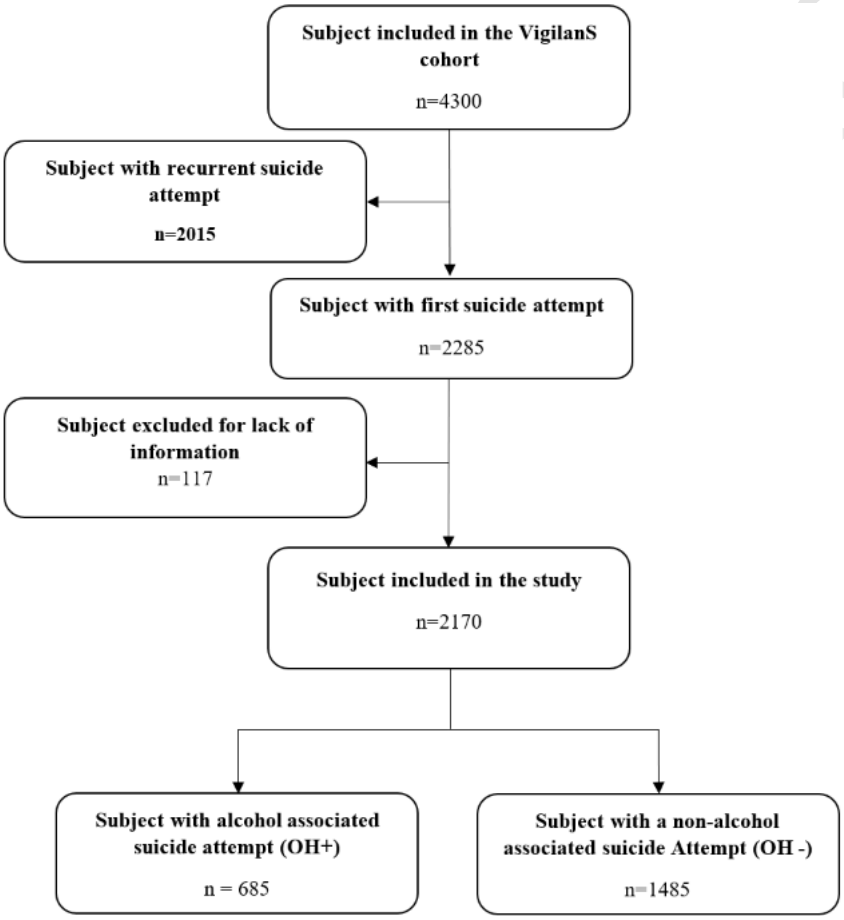



**Figure 1** Flowchart of subjects’ selection

*Descriptive Results*

The mean age of participants was 35.9 years, and 59.4% were female. Students accounted for 24.1% of the sample, 51.4% of participants resided in urban areas, and 26.9% lived alone. A family history of suicide and suicide attempts was reported by 14.1% and 25.3% of participants, respectively. Overall, 26.8% had a referring psychiatrist, whom 76.9% had consulted within the preceding three months.

Severe suicide attempts accounted for 8.7% of all attempts. The most common method was drug intoxication (72.8%), followed by hanging (6.8%), phlebotomy (4.9%), and other methods (10.1%).

Hospitalization was required for 82.3% of participants, with a mean length of stay of 6.2 days. During follow-up, 6.1% of participants experienced a recurrent suicide attempt.

*Analytic results*

Analytic results are presented in tables 1, 2 and 3. For clarity purpose we separated pre-morbid factors including Socio-demographic and medical characteristics as well as previous healthcare follow up (table 1); SA aspects (table 2) and post attempt follow-up (table 3).

*Pre-morbid factors*

In Univariate analysis, the OH+ group included a significantly higher proportion of adults ($p < .001$; $\varphi=0.2$). Consistently, the mean age was significantly higher in the OH+ group (40.2 years vs 33.9 years; $p < .001$; RBC = 0.3), The OH+ group comprised a lower proportion of female patients (43.8% vs. 66.6%; $p < .001$; $\varphi = 0.2$). Patients in the OH+ group were less likely to come from urban areas ($p <0.05$; $\varphi = 0.045$). Individuals in the OH+ group were more likely to live alone than those in the OH− group ($p < .001$; $\varphi = 0.1$).

Occupational status varied significantly between the two groups ($p < .001$; $\varphi = 0.30$). Workers proportion was higher in the OH+ group (21.6% vs. 12.1%). Students were underrepresented in the OH+ group (9.0% vs. 31.5%).

No significant differences were identified between the two groups in terms of familial vulnerability to suicidal behavior. Specifically, the prevalence of a family

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history of suicide attempts did not differ significantly, nor did the prevalence of family history of death by suicide.

No significant differences were observed between the OH+ and OH− groups concerning primary care involvement. The proportion of patients having a general practitioner did not differ significantly between groups. Similarly, there was no significant difference in the proportion of participant with recent referring physician consultation.

In contrast, differences emerged in relation to psychiatric care. Patients in the OH+ group were significantly less likely to have an identified referring psychiatrist compared to those in the OH− group ($p < 0.001$; $\varphi = 0.07$). However, no significant difference was found between the two groups regarding recent referring psychiatrist consultation.

The association between OH exposition and psychiatric recourse remained significant in multivariate analysis (aOR=0.7; p= 0.027) and remained consistent in sensitivity analysis

In multivariate analysis, Sexe (aOR = 1.7; p<0.001) age (aOR= 1,02; p <0.001), living alone (aOR=1.4; p= 0.006) and profession type remained significantly associated with OH presence. Compared with farmers, students (aOR = 0.2; p < .001) and retirees (aOR = 0.1; p < .001) had lower odds of belonging to the OH+ group. The sensitivity analysis using multiple imputation yielded estimates consistent with the complete-case analysis.

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**Table 1** Descriptive and analytic results of sociodemographic characteristics

| Variable | Complete Sample (n=2170) Mean (SD) or % (n) | OH + group (N= 685) Mean (SD) or % (n) | OH - group (N= 1485) Mean (SD) or % (n) | Unilateral analysis | p (Effect Size) | Multivariate analysis (Complete cases) N = 1 541 aOR | p | Multivariate analysis imputed cases aOR | p |
|---|---|---|---|---|---|---|---|---|---|
| **Age (Year) (n=2170)** | 35.9 (18.3) | 40.2(14.5) | 33.9(19.5) | 652947.5† | < .001*** (0.3†) | 1,02 [1,01–1,03] | <0.001*** | 1,02 [1,01–1,03] | <0.001*** |
| **Gender (Female) (n=2170)** | 59.4 (1289) | 43.8 (300) | 66.6 (989) | 101.1 | < .001*** (0.2) | 1.7 [1.4–2.2] | <0.001*** | 1.9 [1.5–2.3] | <0.001*** |
| **Professions (n=1721)** | | | | 151.5 | < .001*** (0.3¤) | | | | |
| **1) Farmer** | 2.0(34) | 3.0(17) | 1.5(17) | | | Reference variable | | | |
| **2) Craft workers / Sales Workers /Business owner** | 6.5(112) | 11.0(62) | 4.3(50) | | | 1.1 [0.5–2.5] | 0.84 | 1.3 [0.6–2.8] | 0.528 |
| **3) Executive and higher intellectual profession** | 4.6(80) | 5.8(33) | 4.1(47) | | | 0.7 [0.3–1.7] | 0.44 | 0.7 [0.3–1.7] | 0.468 |
| **4) Intermediate profession** | 7.3(126) | 9.7(55) | 6.1(71) | | | 0.6 [0.3–1.5] | 0.30 | 0.8 [0.4–1.8] | 0.618 |
| **5) Employee** | 17.5(302) | 18.7(106) | 17.0(196) | | | 0.6 [0.3–1.2] | 0.15 | 0.7 [0.3–1.5] | 0.353 |
| **6) Workman** | 15.2(262) | 21.6(122) | 12.1(140) | | | 0.7 [0.3–1.6] | 0.41 | 0.8 [0.4–1.7] | 0.642 |
| **7) Student** | 24.1(415) | 9.0(51) | 31.5(364) | | | 0.2 [0.1–0.5] | <0.001*** | 0.3 [0.1–0.6] | 0.001** |
| **8) Non active** | 11.6(199) | 13.3(75) | 10.7(124) | | | 0.6 [0.3–1.3] | 0.18 | 0.7 [0.3–1.5] | 0.376 |
| **9) Retiree** | 11.1(191) | 8.0(45) | 12.6(146) | | | 0.1 [0.1–0.3] | <0.001*** | 0.2 [0.1–0.4] | <0.001*** |
| **Live alone(n=1922)** | 26.9% (517) | 35.5 (215) | 22.9(302) | 33.1 | < .001*** (0.1) | 1.4 [1.1–1.8] | 0.006* | 1.5 [1.2–1.9] | <0.001*** |
| **Residence type (Urban) (n=2161)** | 51.6 % (1116) | 48.3 %(328) | 53.2 % (788) | 4.4 | 0.04* (0.045) | 1.0 [0.8–1.2] | 0.76 | 1.0 [0.8–1.2] | 0.817 |
| **Family history of SA (presence)** | 25.3% (443) | 24.6% (135) | 25.6% (308) | 0.2 | 0.7 (0.01) | | | | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **(n = 1752)** | | | | | | | | | |
| **Family history of suicide (presence) (n = 1879)** | 14.1% (265) | 15.3% (91) | 13.6% (174) | 0.2 | 0.7 (0.01) | | | | |
| **General practitioner (Yes) (n=2170)** | 87.6% (1900) | 86.1% (590) | 88.2% (1310) | 1.9 | 0.2 (0.029) | | | | |
| **Recent General practitioner consultation (Yes) n =1461** | 72.8% (1063) | 71.1% (323) | 73.5% (740) | 0.9 | 0.4 (0.024) | | | | |
| **Referring psychiatrist (Yes) (n=2170)** | 26.8% (581) | 22.2% (152) | 28.9% (429) | 10.7 | 0.001** (0.07) | 0.7 [0.6–1.0] | 0.027 | 0.8 [0.6–1.0] | 0.021* |
| **Recent Referring psychiatrist consultation (Yes) n = 372** | 76.9% (286) | 73.9% (68) | 77.9% (218) | 0.6 | 0.4 (0.04) | | | | |

Statistical Test results were expressed as $\chi^2$ for nominal variable and U (indicated with †) for continuous variable; Effect size were expressed as φ or Cramer's V for continuous variable; ¤ indicate the use of Cramer's; † indicate the use of rank – biserial correlation for continuous variable; * indicate p value < 0.05; ** indicate p value < 0.001; *** indicate p-value < 0.005

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*Suicide attempt aspects*

The mean of SA did not differ significantly between groups. Suicide attempts in the OH+ group were more frequently severe ($p < 0.05$; $\varphi = 0.047$), however this association did not remain significant in multivariate analysis (aOR= 1.0; p= 0.859) which were consistent in sensitivity analysis.

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**Table 2** Descriptive and analytic results of suicidal behavior aspects

| Variable | Complete Sample n=2170 | OH + group N= 685 (%) Mean (SD) or % (n) | OH - group N= 1485 (%) Mean (SD) or % (n) | Statistical Test results ($\chi^2$, U) | p (Effect Size) | Multivariate analysis Complete cases aOR | p | Multivariate analysis imputed cases aOR | p | Multivaral analysis Complete cases OR |
|---|---|---|---|---|---|---|---|---|---|---|
| **SA Severity (Severe)** | 8.7% (189) | 10.7% (73) | 7.8% (116) | 4.8 | 0.029* | 1.0 [0.7–1.4] | 0.859 | 0.9 [0.7–1.3] | 0.707 | 1.0 [0.7–1.4] |
| **(n=2170)** | | | | | (0.047) | | | | | |
| **Method of SA** | | | | 10.7 | 0.2 (0.07[¤]) | | | | | |
| **(n=2170)** | | | | | | | | | | |
| **1) Drug intoxication:** | 72.8% (1579) | 70.4% (482) | 73.9% (1097) | | | | | | | |
| **2) Hanging:** | 6.8% (147) | 8.2% (56) | 6.1% (91) | | | | | | | |
| **3) Phlebotomy:** | 4.9% (107) | 5.5% (38) | 4.6% (69) | | | | | | | |
| **4) Jumping:** | 2.1% (46) | 2.9% (20) | 1.8% (26) | | | | | | | |
| **5) Car crash:** | 1.3% (29) | 1.3% (9) | 1.3% (20) | | | | | | | |
| **6) Defenestration:** | 1.1% (23) | 0.6% (4) | 1.3% (19) | | | | | | | |
| **7) Drowning:** | 0.9% (19) | 0.6% (4) | 1.0% (15) | | | | | | | |
| **8) Other:** | 10.1% (220) | 10.5% (72) | 10.0% (148) | | | | | | | |

Statistical Test results were expressed as $\chi^2$ for nominal variable and U (indicated with †) for continuous variable; Effect size were expressed as φ or Cramer's V for continuous variable; ¤ indicate the use of Cramer's; † indicate the use of rank – biserial correlation for continuous variable; * indicate p value < 0.05; ** indicate p value < 0.001; *** indicate p-value < 0.005

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*Post attempt follow-up*

Hospitalization rate did not differ significantly between groups. Hospital length was significantly shorter in the OH + group (p<0.001; RBC =0.19).
No significant difference was observed between the groups in terms of recurrence of suicide attempts.

**Table 3** Descriptive and Analytic results of healthcare utilization

| Variable | Complete Sample n=2170 Mean (SD) or % (n) | OH + group (N= 685) Mean (SD) or % (n) | OH – group (N= 1485) Mean (SD) or % (n) | Statistical Test results ($\chi^2$, U) | P (Effect Size) |
|---|---|---|---|---|---|
| **Hospitalization rate (n=1959)** | 82.3 (1615) | 82.5 (515) | 82.3 (1099) | 0.001 | **1(0)** |
| **Mean length of hospitalization (in days) (n=1615)** | 6.2 (11.8) | 4.8 (11.2) | 6.8 (12.0) | 345597 † | **<0.001***(0.19)** |
| **SA recurrence (Yes) (n=2170)** | 6.1% (132) | 5.3%(36) | 6.5%(96) | 1.2 | **0.3 (0.024)** |

Statistical Test results were expressed as $\chi^2$ for nominal variable and U (indicated with †) for continuous variable; Effect size were expressed as φ or Cramer's V for continuous variable; ¤ indicate the use of Cramer's; † indicate the use of rank – biserial correlation for continuous variable; * indicate p value < 0.05; ** indicate p value < 0.001; *** indicate p-value < 0.005.

## Discussion

The present study shows that a third of suicide attempts involve alcohol use (OH+), moreover, it highlights a significant association between OH+ SA and a distinct sociodemographic profile characterized predominantly by adult, single males. No significant independent association was identified between alcohol involvement and suicide attempt severity or subsequent suicide attempts. In addition, patients in the OH+ group appeared to have less engagement with psychiatric care, as reflected by less frequent psychiatric consultations before the suicide attempt and shorter hospital stays when admitted. These findings both confirm and extend existing knowledge regarding the complex relationship between alcohol use, suicidal behavior and care efficiency.

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The association between alcohol use and increased suicide risk is well established in the literature. Both in acute or chronic use, alcohol consumption significantly elevates the likelihood of suicidal ideation, attempts, and completed suicide (21–23).

Our study contributes novel evidence by underlining that suicide attempts involving alcohol are particularly associated with a known subtype of suicide attempters whose characteristics are associated with specific vulnerabilities and barriers to mental healthcare.

Our findings reveal that individuals in the OH+ group differ markedly from the typical demographic profile of suicide attempters, as the highest rates of suicide attempts are which is generally observed among adolescent females (25). In our study the OH + group consisted predominantly of adult males living alone which is close to the known typical demographic profile of individuals who die by suicide (24).

Several factors may contribute to the increased vulnerability observed in this subgroup, including social isolation economic hardship, reduced access to healthcare services, and cultural norms surrounding masculinity and help-seeking behavior (26,27). It has been shown that isolation is the main risk factor for suicide in similar populations (28). As alcohol use is associated with isolation, economic hardship and reduced access to healthcare service (29–32), all of these aspects seem to act in a synergistic manner in this particular high-risk subgroup. Interestingly, in our study, although rural residence was more frequent in the OH+ group in univariate analysis, this association did not remain statistically significant after adjustment. This suggests that the observed difference may be partly accounted for by other sociodemographic or clinical characteristics included in the model. Rural residence may nevertheless be relevant to healthcare access, particularly in settings characterized by geographical isolation or limited availability of mental health professionals. Alcohol-related problems may coexist with or exacerbate these difficulties, potentially creating a combination of vulnerabilities that complicates access to appropriate care

Our study found no significant difference between the OH+ and OH− groups in terms of family history of suicide or suicide attempts. This finding is consistent with prior research suggesting that, while family history is a strong risk factor for suicidal behavior in general, it does not appear to be specifically associated with alcohol-

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related suicide attempts (36). This supports the interpretation that alcohol acts as an acute proximal risk factor rather than a marker of inherited vulnerability and as such its use needs to be addressed in high-suicide risk population.

Our study found no significant correlation between alcohol use and SA aspects such as SA mean or suicide severity. More precisely, for SA severity, while the odds of a Severe SA were significantly greater in OH associated SA in univariate analysis which did not confirm in multivariate analyse, as univariate analysis's effect size was small and the loss of power in multivariate analysis and some aspect of collinearity with some demographic's variable known to be associated with more severe SA such as genre would both explain these findings (37). These findings suggest that the association may not be independent of other patient characteristics. The attenuation of the association may reflect confounding by sociodemographic or clinical characteristics, reduced precision in the adjusted model, or a combination of these factors

One of the most clinically relevant findings of our study concerns the lower engagement with psychiatric care observed in the OH+ group. These patients were less likely to have had a psychiatric consultation before the index suicide attempt and had shorter hospital stays when hospitalization occurred. Together, these findings raise concerns about potential gaps in the identification and management of psychiatric needs among patients whose suicidal behavior involves alcohol. Although these observations do not establish that the care received was inadequate, they raise questions about the identification of psychiatric needs and the continuity of care among patients whose suicidal behavior involves alcohol.

Concerning outpatient care, individual with alcohol use or abuse frequently benefit from a general practitioner follow up but almost half patient who need it are not addressed to a psychiatric follow-up (38). This inequity is also observed for inpatient care with a mean shorter length of psychiatric hospitalization for patient with alcohol misuse (39) and more discharge against medical advice (40). Several explanations may account for this disparity.

First, alcohol use may act as a barrier to accessing specialized psychiatric care either due to stigma of alcohol use, lack of insight concerning psychiatric health, or prioritization of substance use over mental health care (41,42). Second, the

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predominance of rural residence in the OH+ group may reflect structural barriers in France to access psychiatric care, including shortages of mental health professionals and geographic isolation (43).Third, healthcare professionals may hold negative attitudes toward patients with alcohol abuse or dependence, potentially reducing their engagement in follow-up care or leading to the trivialization of SA. (44,45).

Another possible explanation concerns the relationship between acute alcohol intoxication and suicidal ideation, it is possible that some individuals in the OH+ group experience suicidal ideation primarily during episodes of acute intoxication, without an underlying chronic psychiatric disorder. In such cases, suicidal thoughts may resolve upon sobriety, reducing the perceived need for ongoing psychiatric care. This highlights the importance of distinguishing between state or trait-dependent suicidal risk, particularly in individuals with alcohol use disorders.

This issue is particularly relevant to suicide prevention programs, as sustained engagement with follow-up care difficulty (46,47). The systematic assessment of alcohol consumption, alongside psychiatric symptoms and psychosocial circumstances, may help identify needs that would otherwise remain unaddressed. Integrating alcohol screening, brief intervention, and specific referral pathways to addiction services into post-attempt care could complement existing suicide prevention strategies, including brief contact interventions and may help reduce discontinuity between the initial assessment and subsequent treatment.(2,48).

Within the VigilanS program, alcohol involvement could be considered a potential marker for assessing follow-up needs. In particular, patients who have limited prior engagement with psychiatric services may benefit from particularly active contact and assistance accessing appropriate care. Telephone-based interventions and teleconsultations may also help address practical and geographical barriers.

The findings of this study have several important clinical implications. First, our findings reinforce the need for specific care targeting high-risk subgroup—namely, adult, single males living in rural areas with alcohol use. These may include community-based interventions, specific information on alcohol use consequences on mental health, improved access to addiction and mental health services eventually using technological means such as teleconsultation or phone-based suicide prevention intervention such as VigilanS. Furthermore, public health campaigns

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aimed at reducing stigma and promoting help-seeking behavior encompassing both alcohol use and mental health could facilitate the recourse to mental health services.

Second, the reduced engagement with psychiatric care observed in the OH+ group underscores the need for integrated care models that address both substance use and mental health. Emergency departments represent a critical point of contact for individuals following a suicide attempt. Systematic referral pathways to addiction services and psychiatric follow-up are needed to ensure continuity of care.

Finally, the potential for transient, alcohol-induced suicidal ideation highlights the need for timely intervention. Even in the absence of chronic psychiatric disorder, individuals presenting with alcohol-related suicidal behavior should receive appropriate evaluation and follow-up, as the risk of recurrence remains significant.

Our study provides valuable insights and possesses some strength. The main strength of this study is its large sample size and its ecological aspects. Patients come from various hospitals in both rural and urban areas, including university and non-university medical centers, making this a representative sample of first-time suicide attempters in the region. These results must be considered whilst taking account of some limitations.

First, the main one is a classification bias due to potential data errors in inclusion. Variables such as occupation, alcohol involvement, suicide attempt method, and severity may have been assessed differently across clinicians, potentially reducing measurement consistency.

Second, another major limitation is that the database does not differentiate between chronic and acute alcohol consumption or alcohol use disorder which limits the interpretation of our data and preclude us from conclusion on pattern of alcohol use such as alcohol use disorder. Dedicated prospective methodology with more specific evaluation of alcohol use pattern are needed for this aspect.

Third, as subsequent SA were identified through documented medical contact, SA that did not result in an emergency department visit or hospitalization may have been missed. If the probability of seeking medical attention after a recurrent attempt differed between the OH+ and OH- groups, the observed association may also have been affected. Prospective studies using more systematic follow-up would help clarify the relationship between alcohol involvement and suicidal recurrence.

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Fourth, information on potentially important confounders, including psychiatric comorbidities, may have been unavailable or insufficiently detailed. Residual confounding therefore remains possible Finally, the study was conducted in a single French region, and its findings may not be directly generalizable to healthcare systems with different organizational structures, referral pathways, and access to psychiatric services.

In conclusion, in this regional multicenter study, alcohol involvement was reported in approximately one-third of suicide attempts and was associated with a distinct sociodemographic profile and lower engagement with psychiatric care. These findings reinforce the critical role of alcohol as both a distal and proximal risk factor for severe suicidal behavior

this study demonstrates that alcohol use in suicide attempts is implicated in the known suicidal high-risk sociodemographic profile. These findings reinforce the critical role of alcohol as both a distal and proximal risk factor for severe suicidal behavior. Systematic assessment of alcohol use, improved access to integrated care, and targeted active post-attempt follow-up are prospectives strategies to enhance suicide prevention.

Moreover, for the VigilanS program, alcohol use could be integrated in the evaluation determining the proximity of the phone call to maximize adherence This addition could be a first step to the uniformization of collected data and contact protocols in the VigilanS program and to further research work on BCI targeted strategies.

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We the authors declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us. We understand that the Corresponding Author is the sole contact for the Editorial process.
He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

**Declaration of interests**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Data availability**

The data that support the findings of this study are available from the corresponding author, LM, upon reasonable request.

**Author contribution**

LM: Data curation; Formal analysis; Methodology; Investigation; Visualization; Writing – original draft
DL: Conceptualization; Data curation; Resources; Project administration; Writing – review & editing
JBT: Conceptualization; Data curation; Investigation; Writing – review & editing
DD**:** Writing – review & editing
EG: Writing – review & editing
BG: Validation; Supervision; Writing – review & editing
FK: Validation; Supervision; Writing – review & editing

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