Suicide reattempt in a population-wide brief contact intervention to prevent suicide attempts - the vigilans program, France

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SUICIDE REATTEMPT IN A POPULATION-WIDE BRIEF CONTACT INTERVENTION TO PREVENT SUICIDE ATTEMPTS - THE VIGILANS PROGRAM, FRANCE.

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Abstract

Objective: Among the postcrisis suicide prevention programmes, brief contact interventions (BCIs) have been proven to be efficient. VigilanS generalizes to a whole French region a BCI combining resource cards, telephone calls and sending postcards, according to a predefined algorithm. However, a major problem in suicide prevention is the suicide reattempt, which can lead to final suicide. Here, we analyse the suicide reattempt in VigilanS.

Methods: The study concerned patients included in VigilanS over the period from 1st January 2015 to 31 December 2018, with an end of follow-up on 1st July 2019. We performed a series of descriptive analyses, survival curves and regressions. The outcome was the suicide reattempt, and the predictive variables were the characteristics of the patient at entry and during follow-up in VigilanS. Age and sex were considered as adjustment variables.

Results: 11879 inclusions occurred during the study period, corresponding to 10666 different patients, among which 905 reattempted suicide. More than half were primary suicide attempters (53.4%). A significant relationship with suicide reattempt was identified for the following characteristics: being a non-primary suicide attempter, having attempted suicide by voluntary drug intoxication and phlebotomy, alcohol consumption among primary suicide attempters, and having no companion at the

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emergency room visit among non-primary suicide attempters. Hanging (as suicide method), having made no call to VigilanS were protective factors.

Conclusion: This study provides us with a valuable insight into the profiles of patients repeating a SA, which is important for suicide prevention in general.

Key words: Suicide reattempt, Suicide attempts, VigilanS, Prevention

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

INTRODUCTION

According to the WHO, around 800,000 people die by suicide each year worldwide [1]. Suicide and suicide attempts (SA) are major public health problems, representing an economic burden [2, 3] and a great emotional burden, impacting families and relatives. SA are nearly 20 times more common than suicide deaths [4], and history of SA is predictive of subsequent attempts and risk of death by suicide (which typically occurs after several repeated attempts) [4, 5]. The risk of complete suicide for people who have already had a previous history of SA is higher individuals with a single suicide attempt [6, 7] ; this risk increases with each SA and remains high for more than 30 years [8]. According to Aresman et al, nearly half of repeat events occur within the first three months after the initial attempt and nearly two-thirds (64%) within the first six months [9]. The risk of recurrence is highest immediately after discharge from hospital, with one in three patients repeating the attempt within 30 days [10].

It has been shown that the method used in the first SA is an important predictor of subsequent SA [11, 12]. A number of studies have found that recurrence rates are higher in people who presented with low lethal methods such as self-cutting , while those who used more lethal methods, such as hanging or drug over dose, had lower recurrence rates [13–15]. Conversely, other studies have found that subsequent suicide attempts were more likely to have occurred among people who use high-lethal methods in the index attempt (such as poisoning by domestically used gas, poisoning by other gases and vapors, hanging, drowning, firearms, air guns and explosives, jumping from high places, and other unspecified means) [16].

Given all of these characteristics, the implementation of recidivism prevention techniques is important. Among the many elements to be considered, the recommendations recommend monitoring programs such as maintaining contact at hospital discharge after a SA [17, 18]. These monitoring programs are commonly referred to as "Brief Contact Interventions " (BCIs) [19, 20]. These BCIs include: telephone recontact [21], issuing a “resource card” mentioning the call number of a professional crisis manager [22] ; sending letters written by a person who met the suicidal patient during a hospital stay [23] ; sending postcards [24]; and sending text messages to maintain contact [25]. Several studies have shown the effectiveness of BCIs in reducing SA [26–28]. Bertolote and al found the efficacy of phone calls on suicide mortality, but did not demonstrate this effect on SA, contrasting with Cebrià and al who found a decrease in the number of suicide reattempt related to phone calls, agree with those of a study on telephone follow-up as a protective factor against repeated suicide attempt [27, 28]. Fleischmann and al found a significant reduction in death by suicide among suicide attempters, based on continuous communication in combination with standard treatments [26].

In 2015, Milner et al and Inagaki et al published simultaneously two meta-analyses evaluating the effect of BCIs on people who have done SA. Their converging findings suggested that patients

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

benefited from recontact procedures, with significantly lower relapse and suicide rates compared to controls treated as usual [19, 20]. According to the results of Milner et al, BCIs were effective on the number of suicide reattempts per person (incidence rate ratio IRR = 0.66) [19]; according to the meta-analysis of Inagaki et al, BCIs were effective to prevent a repeat suicide attempt at 12 months (relative risk RR= 0.83) [20].

The well documented effectiveness of BCI procedures, as well as their low cost and ease of deployment, are strong arguments in favor of their integration into a comprehensive multi-level prevention strategy [29]. Furthermore, by taking into consideration the strengths and limitations of each of these strategies (for example crisis card had a significant effect for first attempters than others) [21–24], a combination of BCIs has been proposed to allow for flexible and effective implementation [30, 31]. This is the case of the VigilanS program. [32–34].

Created in 2014 in collaboration with the hospitals of Nord-Pas de Calais, and operational since 2015, VigilanS allows to contact any suicidal person immediately after a SA, by a team of mental health professionals specially trained in suicide crises management. It is a regional BCI, combining several interventions: a resource card, telephone calls and sending postcards [32]. Unlike clinical trials, VigilanS is implemented in the entire population, under real conditions. Studies on BCIs are generally clinical trial studies, but the major disadvantage is the lack of generalization to the whole population, due to significant selection bias [35]. To our knowledge, there is a lack of literature on regionally implemented post-attempt BCIs. Previous studies have been done on VigilanS. These previous studies on VigilanS concerned the description of VigilanS in its functioning and implementation, and the relationship between the variation in suicide attempts and VigilanS penetration (proportion of people who had a suicide attempt and were included in VigilanS, relative to all people who had a suicide attempt regardless of their inclusion in VigilanS), in Nord Pas de Calais hospitals (NPC) [33, 34]. Nevertheless, the description of the profile of the patients followed by VigilanS as well as the analysis of suicide reattempt after inclusion in VigilanS are important analyses that have not yet been explored in these previous studies conducted on VigilanS. This is therefore the point of our article.

Objective:

The objective of this article was to study suicide reattempt in patients followed for at least 6 months in VigilanS. More specifically, the aim was to describe the characteristics of the patients, to estimate the mean time between suicidal iterations, and to identify the profiles of patients who had a suicide reattempt compared to other patients.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

METHODS

a- Description of the VigilanS system

VigilanS is a 6-month monitoring program, after a SA. As soon as the patient is discharged from the emergency room, he or she receives a resource card with the VigilanS number on it. From this point onwards, VigilanS takes charge of the intervention and patients follow-up, which complement the routine care provided by the participating centres, for a 6-month period.

- ***Telephone calls between the 10th and 21st day (D10-D21)***

Between 10th and the 21st day after discharge from hospital (D10-D21), all non-primary suicide attempters are recalled because they are at high risk of doing a new SA. During the D10- D21 call, decisions are made, depending on the case at hand as judged by the calling professional: an emergency or a regular appointment is planned; a new telephone call is scheduled; personalized postcards are sent; these actions can be combined; or no further action is planned.

- ***6-month calls***

At the 6th month, all patients (primary and non-primary suicide attempters) are called for an end of follow-up interview. A non-primary suicide attempter is a patient who have done at least one previous SA when included in VigilanS, and a primary suicide attempter is a patient who have done a first suicide attempt when included in VigilanS. Before each call, the patient is informed in advance of the call that will be made. If judged necessary by the calling clinician, the program can be extended for another 3 or 6 months. In case of a new SA during the follow-up period, the entire VigilanS program is reset for another 6 months. If a patient reiterates a SA after the follow-up period, (s)he re-enters VigilanS. There is no limit on the number of entries.

- ***Other telephone calls during follow-up***

In addition to these two systematic calls, intermediate calls are also made during the 6-month follow-up period. Intermediate calls are calls made at the initiative of VigilanS (outgoing calls) outside the 2 calls provided for by the program (at D10-D21 and at 6 months), or calls made by patients (incoming calls). A detailed description of the VigilanS intervention is published for more information

[32, 33].

b- Patient selection

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Our study was conducted on all the patients included in VigilanS over the period from January 1, 2015 to December 31, 2018 in the Nord-Pas-de-Calais region. July 1, 2019 marks the end of the follow-up of our study. Patients who died during the first stay follow-up (before the second inclusion in VigilanS) were excluded from the analysis.

c- Data processing

The same patient can be included several times in VigilanS in case of repeated SA. Therefore, the statistical units of analysis can be either the SA that triggered an inclusion in VigilanS, with possibly several records per patient, or the patients, with a single record consisting of all successive inclusions, if any. For our study, the statistical units were the patients; for those who had multiple inclusions in VigilanS, the first inclusion was selected.

d- Statistical analysis

The outcome was suicide reattempt, and the explanatory variables were the characteristics of the patient at entry and during follow-up in VigilanS, at the 1st inclusion in VigilanS if there were several. The recurrence was identified by a second entry in VigilanS. The list of variables and description can be found in the appendix (**Appendix number 1 and 2**).

We performed three types of analyses: descriptive analyses, bivariate analyses and multivariate analyses. A survival analysis was also done.

- **Descriptive analysis**

A general description was made on all the patients in order to give the size of each variable, as well as on the non-primary suicide attempters successfully contacted during the D10-D21 call.

- **Survival analysis of suicide reattempt**

As suicide reattempt is a time-dependent event, censored on the right, it was treated by survival analysis, performed by the Kaplan-Meyer method. This made it possible to estimate (1) the median time of suicide reattempt after inclusion in VigilanS; and (2) the rate of patients having reiterated at a given time.

The survival analysis of suicide reattempt included all patients selected in our study. The duration of follow-up depends on the last successful telephone call with the patient (difference between the SA date and the date of the last successful telephone). The last successful call can be either the last successful call made to the patient or received from the patient. For those with no successful telephone

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

calls, the duration of follow-up depends on the end date of our study (difference between the SA date and the end date of the study " 1st July 2019 "). The event analysed is the suicide reattempt, the time of occurrence of which is obtained by the difference between the date of the 1st SA and the date of the 1st suicide reattempt.

- **Bivariate and multivariate analysis**

The event to be studied being time-dependent, we performed Cox models. The duration of follow-up concerns the difference between date of SA and the end date of the study " 1st July 2019 ") for those who do not have the event; the difference between the date of the 1st SA and the date of the 1st suicidal reattempt for those who have the event.

Bivariate analysis was performed to study the relationship between two variables: dependent and independent. Variables whose p-value was less than 0.1 in bivariate analysis were selected for the multivariate analysis. For variables with multiple modalities, the global effect of the variable was also studied in order to include them in the multivariate analysis (global p-value less than 0.1). Analyses were adjusted for age and gender, which were considered as potentially confounding factors.

The multivariate analysis was performed using the multivariate Cox model. We used a step-by-step top-down selection. Before further interpreting the model and the significance of the effects, we tested the hypothesis of the model's validity by analysing residuals over time (time-dependent co-variables). According to this hypothesis of validity, a cox model is valid if the residuals are not time-depending.

A p-value less than 0.05 was considered statistically significant, as well as a Hazard Ratio (HR) that did not include the value 1 in its 95% confidence interval. The software used was R, version 4.0.5.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

RESULTS

From 1st January 2015 to 31 December 2018, we had 10 666 patients, of which 905 patients (7.6 %) had a suicide reattempt (**Fig 1**).

1. Patient description

The mean age of all patients was 40.6 ± 15 years. Most patients were women (58.7%) and from the North (54.5%). The most frequent length of hospitalization was one day (48%) and the majority of SA was by voluntary drug intoxication (VDI) (83.2%) (**Table 1)**.

Concerning primary and non-primary suicide attempters, there were some variations: there were more women among non-primary suicide attempters than among the primary suicide attempters (61.4% vs 56.3%), more alcoholics among non-primary suicide attempters than primary suicide attempters (54.6% vs 48.5%), but fewer patients with a companion in the emergency room among the non-primary suicide attempters as opposed to the primary suicide attempters (69.9% vs 79.0%). Calls made and received were higher among the non-primary suicide attempters than among the primary suicide attempters (**Table 1)**.

Among the non-primary suicide attempters interviewed on D10-D21 call (**Table 1**), more than ¾ of patients needed help (77.4%) and more than half of the patients had postcards sent following this interview (62.8 %). Apart from VigilanS, most patients were followed by a psychiatrist (65.8%).

2. Suicide reattempt survival curve

The rate of suicide reattempt in our study was 8%. The **Fig 2** shows the survival analysis of suicide reattempt in all suicide attempters as a function of their length of follow-up in months. We see that nearly 26 % of patients had a suicide reattempt during the first 6 months of follow-up, nearly 42 % within 12 months. The mean time of suicide reattempt was 18 months.

3. Bivariate analysis

After adjusting for age and sex (**Table 2**), there was a significant relationship between suicide reattempt and: being a non-primary suicide attempter; regular alcohol use; being unaccompanied

during the emergency room visit; no calls made to or received from the patient; no calls made to or receive from entourage; year of entry in VigilanS; means of suicide by VDI, hanging and phlebotomy.

The variables significantly associated with suicide reattempt in primary suicide attempters were alcohol users; length of hospitalization; no calls received from the patient; means of SA by hanging. (**Table 3**).

In contrast, among non-primary suicide attempters, the variables significantly associated with suicide reattempt were: no presence of a companion during the visit to the emergency room; no calls made to and received from the patient; year of entry in VigilanS; means of SA by VDI and hanging (**Table 3**). Variables concerning the call at D10-D21 were not significant.

4. Multivariate analysis

After analysing the validity of the model, the variable "years of entry into VigilanS" was not taken into account in the final model, because their residuals had a very strong relationship with time, making Cox's model less valid. According to the model validity assumption, the residuals should not be time dependent. The year effect increases linearly with time. The other effects appear to be fixed. (See document "**Appendices number 3 and 4"**).

In our multivariate analysis (**Table 4**), the patients at risk of suicide reattempt were non-primary suicide attempters (HR = 4.85); patients whose call was not made to their family and friends (HR = 1.23), and patients who attempted suicide by VDI (HR = 1.32) and phlebotomy (HR = 1.34). Alcohol consumption was identified as a risk factor for suicide reattempt in primary suicide attempters (HR = 1.26) and patients without a companion during the emergency room visit as a risk factor for suicide reattempt in non-primary suicide attempters (HR = 1.38).

However, the protective factors identified were hanging (HR = 0.49, p=0.008) and patients who did not make calls to VigilanS during follow-up (HR = 0.61, p<0.001).

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

DISCUSSION

Main findings and comparison with findings from other studies

Suicide reattempt is one of the important concerns in suicide prevention, as repetition can lead to final suicide. It is important to know which types of patients are at risk of suicide recurrence, especially when they have been followed by a post-attempted prevention program. In our study, the program is installed in hospitals in the Nord-Pas-De-Calais region. The interest and the originality of this study was to focus on a large population observed in real conditions.

The rate of suicide reattempt in our study was 8%, and the mean time of suicide reattempt according to our survival results was 18 months. This rate of suicide reattempt was lower to rates obtained in other studies. According to the study by Exbrayat et al also concerning an BCI, the rate of reattempt among study patients was 12.6% and 21.2% in the study by Carter et al [36, 37]. Lilley et al also found 17%, although survival analysis revealed a suicide reattempt rate of 33% of patients in the year following an episode [14], lower than our result, 42% in 1 year. In other studies, suicide reattempt occurred slightly earlier, within three to six months after SA [9, 38–40]. According to the study by Carter et al, more than half of the reattempt occur nearly 6 months after the intervention [37]. This thus suggests the effectiveness of VigilanS on suicide reattempt, from the first entry into VigilanS. Maintaining contact is of great importance for the patient's future.

Non-primary suicide attempters were 4 times more likely to repeat suicide than the primary suicide attempters. This result is similar to several studies, which have also shown that a history of SA is a risk factor for suicide reattempt [41–44]. In the study by Ribeiro et al, non-primary suicide attempters were 3.6 times more likely to repeat suicide [44], and the higher the number of previous SA, the higher the risk [43]. This risk of suicide reattempt identified in our study in non-primary suicide attempters supports the hypothesis that patients who have already made a failed SA have a high suicidal intention, and may have acquired the ability to engage in suicidal behavior with increased tolerance to physical pain and decreased fear of death, which may lead to a fatal suicide act [45, 46]. It is in this context that Vigilans has set up a specific telephone call to patient non-primary suicide attempters, between the 10th day and 21st day after their SA, because these patients are at high risk of suicide reattempt.

We found that the means used during SA were associated with suicide reattempt; patients who attempted suicide by VDI and Phlebotomy were more likely to have a suicide reattempt than those who used another method. However, those who attempted suicide by hanging, were less likely to have a suicide reattempt. This result is almost similar to that of Perry et al, who found that rates of recurrence were low in patients who used methods such as hanging, but also chemical poisoning, which is rather identified as a risk factor in our study [15]. According to Oflson et al, the risk of

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

suicide reattempt did not differ significantly between patients who initially used violent (firearm-related methods and "other violent" methods) and non-violent methods (poisoning or cutting) [47]. These differences can be explained by the fact that these studies were carried out on a national level, unlike our study which was carried out on a regional level and the methods of attempted suicides may differ from one region to another.

Patients who had not made calls to VigilanS were identified as being at lower risk of suicide reattempt. Incoming intermediate calls (calls made outside D10-D21 call and 6-month call) are usually long calls from patients in need of help and/or listening, and outgoing intermediaries' calls are often intended for patients at high risk of suicide, or for patients who have could not be reached in previous telephone calls. Regardless of the type of incoming or outgoing call, there is a risk of repeat suicide attempt in these patients, which necessitates the importance of paying special attention to these patients through telephone follow-ups. However, it was found that no call to the relatives was a risk factor for a new suicide attempt. This result shows the importance of family and friends in supporting suicidal patients, helping the patient to avoid making a new suicide attempt.

Other risk factors such as alcohol consumption and absence of a companion during his or her visit in the emergency room were specifically identified in primary suicide attempters and non-primary suicide attempters. Alcohol consumption is an important profile of SA. Nearly a quarter of suicide deaths are directly attributable to alcohol [48], which is often used in SA (both non-lethal and lethal) [49–51]. Regarding the absence of a companion during his or her visit in the emergency room. The presence of a person around the patient, especially one with whom the patient shares many affinities, leads to less loneliness. Liu et al also emphasize the importance of a relative. According to them, hopelessness and social support emerged as significant predictors of suicide reattempt [52]. By Holma et al, a presence of partner is an important factor in protecting patients against from SA, in support [53].

Strengths and weaknesses

However, our study had some limitations. It was based only on a limited number of patients, due to a large number of patients lost to follow-up in VigilanS. More than half of the patients were lost to follow-up (no news from them during the program after several contact attempts). In addition, patients who died during the first follow-up were excluded from our study, which may have been due to a new suicide attempt or illness or other reason (95 patients). This may modify our estimate of the suicide reattempt rate. However, if there is a recurrence, then the patient re-enters VigilanS (unless the patient dies, is not hospitalized, or does his SA outside the NPC region, which is a minority). The recurrence is therefore correctly identified for a majority of patients.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

For the survival analysis, the last successful telephone call was considered as the end date of the follow-up, and the end date of the study for those with no successful telephone calls. This variation of the date of the follow-up could influence the estimate of the mean duration of suicide reattempt.

Another limitation is that our population was based only on the hospital environment, and some of the SA in the population do not lead to hospitalization. In France, however, the proportion of non-hospitalized SA is small, around 8% [54], but this can still pose a difficulty in generalizing our results to the entire population.

In addition, not all patients admitted to the emergency department during our study period were fully analysed. Not all patients admitted to the Emergency Department included in VigilanS, and some patients who were not in the study may have different suicidal behaviours from those included in the study. This non-exhaustive inclusion may therefore influence our analyses, mainly the rate of suicide reattempt.

Analysis on the patient's psychiatric profile would have been desirable but could not be carried out, as attempts to establish this profile proved too cumbersome in the context of a large-scale implanted program and were abandoned. It is still important to pay attention to other factors.

On the other hand, a strength of this study is the almost exhaustive collection over 4 years of data on patients passing through the care system following a SA, over an entire region. This study provides a baseline that can help in the design of suicide prevention interventions because, to our knowledge, no previous data on suicide reattempt among patients followed by a post-attempt system in France is available to allow comparisons. Our results provide knowledge on suicide reattempt, identify people at risk of suicide reattempt and allow for better post-suicide follow-up. In addition, the study evaluates the effectiveness VigilanS, which is based on a simple methodology that could easily be applied in other countries.

To conclude, after a SA, the risk suicide reattempt is present in some patients, especially non-primary suicide attempters with a very high risk of suicide reattempt. However, VigilanS plays an important role in post-attempt follow-up, with a low rate of suicide reattempt compared to the literature. VigilanS suggests the possibility of better identification of patients likely to repeat, and to strengthen prevention efforts in these populations.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Abbreviations:

BCI: Brief Contact Interventions

CI : Confidence Interval

D10-D21: Call between the 10th and 21st days after SA

LFU: lost to follow-up

HR: Hazard Ratio

P : P-value

SA : Suicide Attempt

SD: Standard Deviation

SUA: statistical units of analysis

VDI: Voluntary Drug Intoxication

WHO: World Health Organization

DECLARATIONS SECTION

Ethics approval and consent to participate

The VigilanS study was authorized by the French Ministry of Health and approved by the Comité de Protection des Personnes of Nord-Pas-de-Calais region (Ethics Committee). It was registered with ClinicalTrials.gov (NCT03134885).

Consent for publication

Not applicable

Availability of data and materials

All relevant data are within the paper and its supplementary information file (**Additional file 1)**.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Competing interests

The authors declare that they have no competing interests.

Funding

LDF* was supported by a fellowship from the Faculty of Medicine of Paris-Sud University.

Author's contributions

All authors made significant contributions to this study. AM and GV contributed to the conception, analysis, and critical revisions. LDF* contributed to the analysis, drafting of the manuscript, interpretation, and critical revisions. CD and A-LD contributed to the interpretation and critical revisions. All authors read and approved the final manuscript.

Acknowledgements

The authors gratefully acknowledge the contribution of all investigators who contributed to our study.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

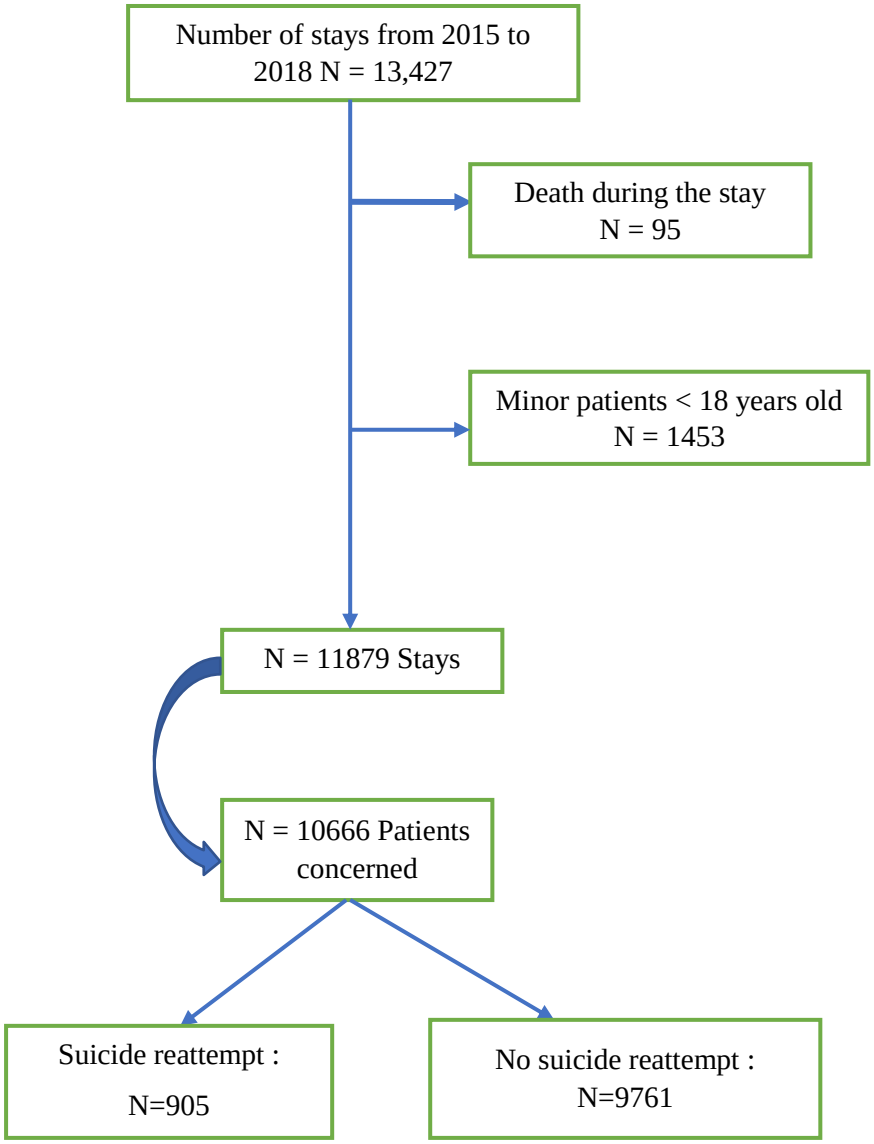

Fig 1: Flow chart for patient selection in the analysis

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

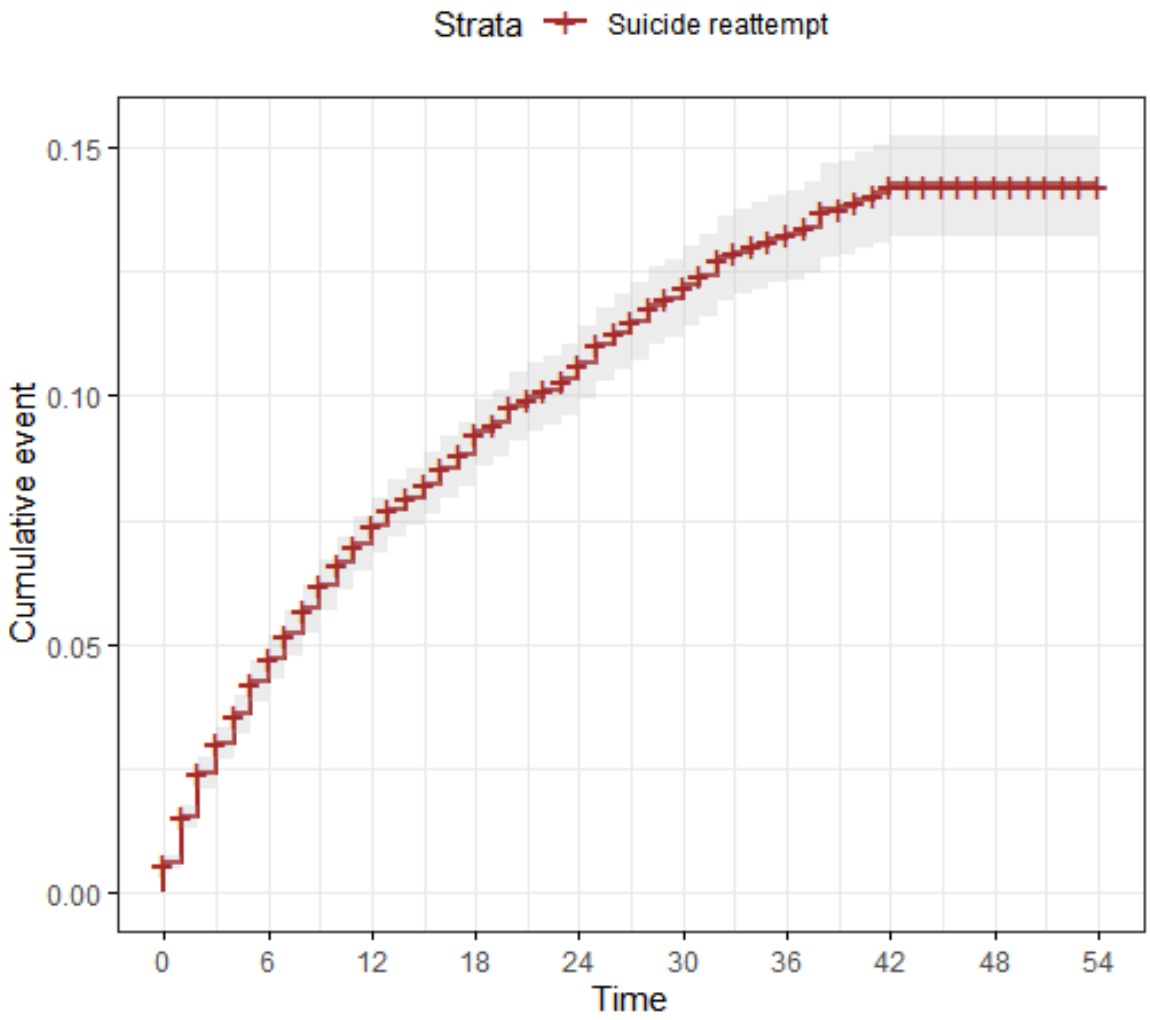

Fig 2: Suicide reattempt survival analysis as a function of follow-up time in months (N=10666).

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Table 1: Description of patients at first entry into VigilanS

Variables	All patients (N = 10666)	Primary suicide attempters (N=5700)	Non-Primary suicide attempters (N=4966)
Age (mean)	40.6±14.7 [a]	39.2±15.1 [a]	42.2±14.0 [a]
Sex			
Male	4404 (41.3%)	2489 (43.7%)	1915 (38.6%)
Female	6262 (58.7%)	3211 (56.3%)	3051 (61.4%)
Geographic sub region (French "Departement")			
North	5809 (54.5%)	3028 (53.1%)	2781 (56.0%)
Pas de Calais	4114 (38.6%)	2265 (39.7%)	1849 (37.2%)
Other	707 (6.6%)	391 (6.9%)	316 (6.4%)
Missing Values	36 (0.3%)	16 (0.3%)	20 (0.4%)
Alcohol consumption			
No	5177 (48.5%)	2938 (51.5%)	2239 (45.1%)
Yes	5473 (51.3%)	2762 (48.5%)	2711 (54.6%)
Missing Values	16 (0.2%)	0 (0.0%)	16 (0.3%)
Accompanying person			
No	2688 (25.2%)	1195 (21.0%)	1493 (30.1%)
Yes	7978 (74.8%)	4505 (79.0%)	3473 (69.9%)
Hospitalization stay (days)			
0	1522 (14.3%)	842 (14.8%)	680 (13.7%)
1	5120 (48.0%)	2801 (49.1%)	2319 (46.7%)
2+	4024 (37.7%)	2057 (36.1%)	1967 (39.6%)
Outgoing D10-D21 call issued successfully?			
No	-	Not concerned	2343 (47.2%)
Yes	-	Not concerned	2623 (52.8%)
Number of intermediate outgoing calls issued successfully			

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

0	9797 (91.9%)	5534 (97.1%)	4263 (85.8%)
1+	869 (8.1%)	166 (2.9%)	703 (14.2%)
Number of incoming calls from the patient			
0	9134 (85.6%)	5346 (93.8%)	3788 (76.3%)
1+	1532 (14.4%)	354 (6.2%)	1178 (23.7%)
Outgoing 6M call issued successfully?			
No	8699 (81.6%)	4680 (82.1%)	4019 (80.9%)
Yes	1967 (18.4%)	1020 (17.9%)	947 (19.1%)
Number of outgoing call to the patient's family and friends			
0	9437 (88.5%)	5386 (94.5%)	4051 (81.6%)
1+	1229 (11.5%)	314 (5.5%)	915 (18.4%)
Number of incoming call from the patient's family and friends			
0	10290 (96.5%)	5593 (98.1%)	4697 (94.6%)
1+	376 (3.5%)	107 (1.9%)	269 (5.4%)
Year VigilanS'Entry			
2015	1807 (16.9%)	909 (15.9%)	898 (18.1%)
2016	2699 (25.3%)	1438 (25.2%)	1261 (25.4%)
2017	3043 (28.5%)	1655 (29.0%)	1388 (28.0%)
2018	3117 (29.2%)	1698 (29.8%)	1419 (28.6%)
MEANS OF SA			
VDI			
No	1791 (16.8%)	970 (17.0%)	821 (16.5%)
Yes	8875 (83.2%)	4730 (83.0%)	4145 (83.5%)
Hanging			
No	10122 (94.9%)	5349 (93.8%)	4773 (96.1%)
Yes	544 (5.1%)	351 (6.2%)	193 (3.9%)
Phlebotomy			
No	9877 (92.6%)	5313 (93.2%)	4564 (91.9%)

ETHICS APPROVAL AND CONSENT TO PARTICIPATE			
Yes	789 (7.4%)	387 (6.8%)	402 (8.1%)
Others (Firearms, Lesions, Drowning, Jump)			
No	10327 (96.8%)	5515 (96.8%)	4812 (96.9%)
Yes	339 (3.2%)	185 (3.2%)	154 (3.1%)
VARIABLES OF D10-D21 CALLS ISSUES SUCCESSFULLY			***(N=2623)***
Evolution of discomfort since SA			
Stationary	-	-	805 (30.7%)
Favorable	-	-	1720 (65.6%)
Unfavorable	-	-	98 (3.7%)
Need help			
No	-	-	594 (22.6%)
Yes	-	-	2029 (77.4%)
Followed by a Psychiatrist outside VigilanS			
No	-	-	896 (34.2%)
Yes	-	-	1728 (65.8%)
Patient's state at the end of the interview			
Good	-	-	1039 (39.6%)
Poor, not in crisis	-	-	1488 (56.7%)
In crisis	-	-	96 (3.7%)

[a] Means ± Standard deviation

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Table 2: Comparison of general characteristics of Suicide reattempt and No Suicide reattempt patients and simple age and sex-adjusted logistic regression

Variables	All patients				
	Suicide reattempt (N=905)	**No Suicide reattempt (N=9761)**	**HR**	**95% Confidence Interval (CI)**	**P**
AGE (mean)	41.0±13.1 [a]	40.5±14.8 [a]			
SEX					
Male	342 (37.8%)	4062 (41.6%)			
Female	563 (62.2%)	5699 (58.4%)			
Geographic sub region (French "Departement")					
NORTH	508 (56.1%)	5301 (54.3%)	1.10	0.840 - 1.453	0.475
PAS DE CALAIS	337 (37.2%)	3777 (38.7%)	1.04	0.788 - 1.381	0.768
OTHERS *	57 (6.3%)	650 (6.7%)			
Suicide attempters					
Non- Primary suicide attempters	634 (70.1%)	4332 (44.4%)	**5.36**	**4.640 - 6.196**	**<0.001**
Primary suicide attempters *	271 (29.9%)	5429 (55.6%)			
Alcohol consumption					
No *	400 (44.2%)	4777 (48.9%)			
Yes	500 (54.2%)	4973 (51.0%)	**1.24**	**1.083 - 1.414**	**0.002**
Accompanying person					
No	290 (32.0%)	2398 (24.6%)	**1.45**	**1.262 - 1.671**	**<0.001**
Yes *	615 (68.0%)	7363 (75.4%)			
Hospitalization stay (days)					
0 *	123 (13.6%)	1399 (14.3%)			
1	413 (45.6%)	4707 (48.2%)	0.96	0.787 - 1.178	0.713
2+	369 (40.8%)	3655 (37.5%)	1.17	0.957 - 1.443	0.124
Number of outgoing call issued succesfully					**0.02[b]**
0	733 (81.0%)	8601 (88.1%)	**0.41**	**0.332 - 0.497**	**<0.001**

ETHICS APPROVAL AND CONSENT TO PARTICIPATE						
1+ *	172 (19.0%)	1160 (11.9%)				
Number of incoming calls from the patient						
0	707 (78.1%)	8426 (86.3%)	**0.35**	**0.299 - 0.416**	**<0.001**	
1+ *	198 (21.9%)	1335 (13.7%)				
Number of outgoing calls to the patient's family and friends						
0	788 (87.1%)	8650 (88.6%)	**0.72**	**0.590 - 0.871**	**<0.001**	
1+ *	117 (12.9%)	1111 (11.4%)				
Number of incoming calls from the patient's family and friends						
0	864 (95.5%)	9426 (96.6%)	**0.64**	**0.470 - 0.879**	**0.006**	
1+ *	41 (4.5%)	335 (3.4%)				
Year VigilanS'Entry						
2015 *	216 (23.9%)	1591 (16.3%)				
2016	272 (30.0%)	2427 (24.9%)	**0.82**	**0.690 - 0.989**	**0.037**	
2017	267 (29.5%)	2776 (28.4%)	0.86	0.719 - 1.041	0.124	**<0.001**[b]
2018	150 (16.6%)	2967 (30.4%)	**0.64**	**0.519 - 0.801**	**<0.001**	
MEANS OF SA						
VDI						
No *	120 (13.3%)	1671 (17.1%)				
Yes	785 (86.7%)	8090 (82.9%)	**1.25**	**1.029 - 1.519**	**0.025**	
Hanging						
No *	889 (98.2%)	9233 (94.6%)				
Yes	16 (1.8%)	528 (5.4%)	**0.33**	**0.203 - 0.548**	**<0.001**	
Phlebotomy						
No *	826 (91.3%)	9051 (92.7%)				
Yes	79 (8.7%)	710 (7.3%)	**1.284**	**1.019 - 1.618**	**0.034**	
Others (Firearms, Lesions, Drowning, Jump)						
No *	884 (97.7%)	9443 (96.7%)				
Yes	21 (2.3%)	318 (3.3%)	0.81	0.524 - 1.249	0.339	

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

[a] Means ± Standard deviation

[b] Global p-value of the multi-modality variable

* reference modality in the variable

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Table 3: Comparison of general characteristics of Suicide reattempt and No Suicide reattempt patients and simple age and sex-adjusted logistic regression

	Primary suicide attempters					Non- Primary suicide attempters				
Variables	**Suicide reattempt (N=271)**	**No Suicide reattempt (N=5429)**	**HR**	**95 % CI**	**P**	**Suicide reattempt (N=634)**	**No Suicide reattempt (N=4332)**	**HR**	**95 % CI**	**P**
AGE	40.0±13.7	39.1±15.2				**41.5±12.9**	**42.2±14.2**			
SEX										
Male	116 (42.8%)	2373 (43.7%)				226 (35.7%)	1689 (39.0%)			
Female	155 (57.2%)	3056 (56.3%)				408 (64.3%)	2643(61.0%)			
Geographic sub region (French "Departement")										
NORTH	134 (49.4%)	2894 (53.3%)	0.96	0.589 - 1.575	0.881	374 (59.0%)	2407 (55.6%)	1.07	0.796 - 1.487	0.692
PAS DE CALAIS	118 (43.6%)	2147 (39.5%)	1.16	0.708 - 1.909	0.551	219 (34.6%)	1630 (37.6%)	0.96	0.686 - 1.356	0.835
OTHERS *	18 (6.6%)	373 (6.9%)				39 (6.1%)	277 (6.4%)			
Alcohol consumption										

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

No *	119 (43.9%)	2819 (51.9%)					281 (44.3%)	1958 (45.2%)				
Yes	152 (56.1%)	2610 (48.1%)	**1.36**	1.066 - 1.737	**0.013**		348 (54.9%)	2363 (54.6%)	1.01	0.858 - 1.180	0.939	
Accompanying person												
No	62 (22.9%)	1133 (20.9%)					228 (36.0%)	1265 (29.2%)				
Yes *	209 (77.1%)	4296 (79.1%)	1.10	0.828 - 1.463	0.508		406 (64.0%)	3067 (70.8%)	**1.18**	**1.003 - 1.390**	**0.047**	
Hospitalization stay (days)												
0 *	45 (16.6%)	797 (14.7%)					78 (12.3%)	602 (13.9%)				
1	110 (40.6%)	2691 (49.6%)	0.71	0.502 - 1.006	0.0538		303 (47.8%)	2016 (46.5%)	1.12	0.876 - 1.442	0.357	
2+	116 (42.8%)	1941 (35.7%)	1.06	0.746 - 1.494	0.759	**0.008** [b]	253 (39.9%)	1714 (39.6%)	1.23	0.956 - 1.592	0.107	0.232 [b]
Number of outgoing call issued succesfully												
0	257 (94.8%)	5202 (95.8%)	0.82	0.386 - 1.742	0.606		476 (75.1%)	3399 (78.5%)	**0.69**	**0.561 - 0.856**	**<0.001**	
1+ *	14 (5.2%)	227 (4.2%)					158 (24.9%)	933 (21.5%)				

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Number of incoming calls from the patient										
0	247 (91.1%)	5099 (93.9%)	**0.45**	**0.291 - 0.683**	**<0.001**	460 (72.6%)	3327 (76.8%)	**0.62**	**0.521 - 0.747**	**<0.001**
1+ *	24 (8.9%)	330 (6.1%)				174 (27.4%)	1005 (23.2%)			
Number of outgoing calls to the patient's family and friends										
0	264 (97.4%)	5122 (94.3%)	2.12	1.001 - 4.491	0.05	524 (82.6%)	3528 (81.4%)	1.12	0.910 - 1.375	0.286
1+ *	7 (2.6%)	307 (5.7%)				110 (17.3%)	804 (18.6%)			
Number of incoming calls from the patient's family and friends										
0	268 (98.9%)	5325 (98.1%)	1.67	0.535 - 5.221	0.377	596 (94.0%)	4101 (94.7%)	0.90	0.649 - 1.252	0.536
1+ *	3 (1.1%)	104 (1.9%)				38 (6.0%)	231 (5.3%)			
Year VigilanS' Entry										
2015 *	50	859				166	732			

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

	(18.4%)	(15.8%)					(26.2%)	(16.9%)			
2016	78 (28.8%)	1360 (25.0%)	1.08	0.756 - 1.546	0.669		194 (30.6%)	1067 (24.6%)	**0.67**	**0.541 - 0.822**	**<0.001**	
2017	88 (32.5%)	1567 (28.9%)	1.28	0.894 - 1.833	0.178	0.529[b]	179 (28.2%)	1209 (27.9%)	**0.70**	**0.565 - 0.871**	**0.001**	**<0.001[b]**
2018	55 (20.3%)	1643 (30.3%)	1.08	0.724- 1.619	0.700		95 (15.0%)	1324 (30.6%)	**0.47**	**0.364- 0.614**	**<0.001**	
MEANS OF SA												
VDI												
No *	38 (14.0%)	932 (17.2%)					82 (12.9%)	739 (17.1%)				
Yes	233 (86.0%)	4497 (82.8%)	1.21	0.854 - 1.720	0.281		552 (87.1%)	3593 (82.9%)	**1.35**	**1.067 - 1.702**	**0.012**	
Hanging												
No *	264 (97.4%)	5085 (93.7%)					625 (98.6%)	4148 (95.7%)				
Yes	7 (2.6%)	344 (6.4%)	**0.40**	**0.188 - 0.853**	**0.018**		9 (1.4%)	184 (4.3%)	**0.40**	**0.206 - 0.771**	**0.006**	
Phlebotomy												
No *	248 (91.5%)	5065 (93.3%)					578 (91.2%)	3986 (92.0%)				
Yes	23 (8.5%)	364 (6.7%)	1.32	0.861 - 1.993	0.203		56 (8.8%)	346 (8.0%)	1.09	0.826 - 1.431	0.551	

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

				2.029						1.431	
Others (Firearms, Lesions, Drowning, Jump)											
No *	265 (97.8%)	5250 (96.7%)				619 (97.6%)	4193 (96.8%)				
Yes	6 (2.2%)	179 (3.3%)	0.73	0.326 - 1.655	0.457	15 (2.4%)	139 (3.2%)	0.81	0.487 - 1.360	0.433	

VARIABLES OF D10-D21 CALLS ISSUES SUCCESSFULLY (Reattempt=321)(No Reattempt=2302)

Evolution of discomfort since SA											
Favorable *	-	-	-	-	-	199 (62.0%)	1521 (66.1%)				
Stationary	-	-	-	-	-	106 (33.0%)	699 (30.4%)	0.92	0.723 - 1.163	0.473	
Unfavorable	-	-	-	-	-	16 (5.0%)	82 (3.5%)	1.20	0.720 - 1.999	0.485	0.559 [b]
Need help											
No *	-	-	-	-	-	69 (21.5%)	525 (22.8%)				
Yes	-	-	-	-	-	252 (78.5%)	1777 (77.2%)	1.01	0.776 - 1.323	0.925	

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Followed by a Psychiatrist outside VigilanS										
No *	-	-	-	-	-	86 (26.8%)	810 (35.2%)			
Yes	-	-	-	-	-	235 (73.2%)	1492 (64.8%)	00.96	0.748 -1.229	0.741
Patient's state at the end of the interview										
Good *	-	-	-	-	-	138 (43.0%)	901 (39.1%)			
Poor, not in crisis	-	-	-	-	-	160 (49.8%)	1328 (57.7%)	0.86	0.680 - 1.080	0.191
In crisis	-	-	-	-	-	23 (7.2%)	73 (3.2%)	1.00	0.643 - 1.558	0.998

[b] Global p-value of the multi-modality variable

* reference modality in the variable

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Table 4: Multiple regression of Suicide reattempt and No Suicide reattempt patients

	All patients			Primary suicide attempters			Non- Primary suicide attempters		
Variables	**HR**	**95% CI**	**P**	**HR**	**95% CI**	**P**	**HR**	**95% CI**	**P**
Suicide attempters *" Non-Primary suicide attempters "*	**4.85**	**4.171 - 5.646**	**<0.001**	-	-	-	-	-	-
Alcohol consumption "*Yes*"	1.11	0.973 - 1.269	>0.1	**1.26**	**1.102 - 1.440**	**<0.001**	-	-	-
Accompanying *"No"*	1.14	0.991 - 1.319	0.066	-	-	-	**1.38**	**1.203 - 1.592**	**<0.001**
Hospitalization stay									
"1 day"	0.92	0.749 - 1.124	>0.1	0.92	0.754 – 1.129	>0.1	-	-	-
"2 days"	1.13	0.918 - 1.388	>0.1	1.14	0.932 - 1.404	>0.1	-	-	-
Number of outgoing intermediate call issued successfully *"0 call"*	-	-	-	-	-	-	**0.78**	**0.611 – 0.999**	**0.049**
Number of incoming intermediates calls *"0 call"*	**0.61**	**0.518 - 0.723**	**<0.001**	**0.36**	**0.307 - 0.425**	**<0.001**	**0.40**	**0.327 - 0.487**	**<0.001**
Number of outgoing calls to the patient's family and friends *"0 call"*	**1.23**	**1.013 - 1.682**	**0.037**	-	-	-	-	-	-
VDI *"Yes"*	**1.32**	**1.036 - 1.682**	**0.025**	-	-	-	-	-	-
Hanging *"Yes"*	**0.49**	**0.288 - 0.828**	**0.008**	**0.34**	**0.205 - 0.555**	**<0.001**	**0.36**	**0.218 - 0.590**	**<0.001**

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Phlebotomy *"Yes"*	**1.34**	**1.013 1.770**	**-**	**0.040**	**-**	**-**	**-**	**-**	**-**	**-**