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## ORIGINAL ARTICLE

# Factors influencing the length of stay in a unit with mixed rehabilitation and psychiatric care after a suicide attempt by jumping: a cohort observational retrospective study

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## ABSTRACT

**BACKGROUND:** Persons who have attempt suicide by jumping often require intensive treatment for their somatic injuries and the high risk of future completed suicide. The FSEF (French Student Health Foundation) developed a Transdisciplinary unit specifically designed for these people. **AIM:** The aim of this study was to investigate psychiatric and somatic factors associated with Length Of Stay (LOS) in this unit.

**DESIGN:** Cohort observational retrospective study.

**SETTING:** The Transdisciplinary unit provide a dual approach, combining rehabilitation (physiotherapy, balneotherapy, occupational therapy, speech therapy, cognitive rehabilitation, social and family support) and psychiatric care.

**POPULATION:** Men and women admitted into the Transdisciplinary unit, after a suicide attempt by jumping from a height with severe somatic injuries.

**METHODS:** We examined the associations between potential predictors and LOS with Stepwise regressions: model 1 included all variables assessed at admission (age, sex, occupational status, psychiatric disorder history, height of the fall, type of injury, LOS in acute care units and dependences at admission); model 2: all variables at discharge (main psychiatric diagnosis, orientation at discharge, psychotropic treatments, pain treatments, arms mobility limitation, legs mobility limitation, sphincter disorders and dependences at discharge); final model: all significant variables in models 1 and 2.

**RESULTS:** One hundred ninety-seven subjects were included (49.7% of men; mean age: 25.6 years,  $\pm 6.21$ ). Most factors associated with LOS were related to injuries due to the suicide attempt. LOS in the Transdisciplinary unit increased with longer LOS in acute care ( $\beta=0.589$ ;  $P=0.003$ ), higher dependence for continence at admission ( $\beta=44.640$ ;  $P<0.001$ ) and sphincter disorders at discharge ( $\beta=78.034$ ;  $P<0.001$ ). LOS was also longer with higher dependence for behavior at discharge ( $\beta=30.182$ ;  $P=0.042$ ) and unemployed status ( $\beta=59.496$ ;  $P=0.008$ ), which could reflect psychiatric disorders severity. LOS was shorter when subjects had arms mobility limitation at discharge ( $\beta=-42.591$ ;  $P=0.018$ ).

**CONCLUSIONS:** The persons admitted into this unit have serious physical injuries due to their fall. These injuries require intensive rehabilitation and their severity is the largest contributing factor to the LOS. Some findings also advocate for influence of psychiatric factors on LOS, underlying the need for both concomitant psychiatric and somatic care for these people.

**CLINICAL REHABILITATION IMPACT:** People should ideally receive both psychiatric and rehabilitation care after a suicide attempt by jumping.

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**KEY WORDS:** Suicide, attempted; Interdisciplinary research; Length of stay.

Suicide prevention is a major public health issue worldwide. Suicide is the second leading cause of death in young adults, accounting for about 8.5% of all deaths among people 15-29 years of age.<sup>1</sup> For every suicide, there are many more suicide attempts. Jumping from a height is a relatively uncommon means of suicide attempt<sup>2</sup> but this kind of attempt by violent methods typically cause severe injuries,<sup>3,4</sup> significant mortality<sup>2-4</sup> and have been found to predict later completed suicide.<sup>5,6</sup>

Survivors of suicide attempt by jumping commonly suffer from multiple traumatic injuries, especially spine, pelvis and limbs with associated neurological damage.<sup>3</sup> These severe injuries require extensive treatment leading to long hospitalisation in general hospitals.<sup>7,8</sup>

Jumping has been found to be associated with severe mental disorders, particularly schizophrenia.<sup>3,9</sup> In individuals admitted into general hospitals after a suicide attempt by jumping, the presence of a psychotic disorder increases length of stay (LOS).<sup>7</sup> Studies also find significant prolonged LOS for trauma patients with psychiatric disorders or self-inflicted injury partly due to complicated course and higher need for placement into a psychiatric or rehabilitation clinic.<sup>10</sup>

Taken together, these findings suggest that people who have attempt suicide by a violent method require particular care with multidisciplinary management in acute stage as well as in the functional rehabilitation stage for the most severe cases, if needed.

There are only few known instances of mixed medical/psychiatry inpatient units for these people after a suicide attempt.<sup>11</sup> To our knowledge, only one study in the international literature reported experience with mixed rehabilitation and psychiatric treatments after suicide attempts by jumping.<sup>12</sup> This Japanese study aimed to investigate factors influencing LOS but it examined only the global LOS, including the period of acute somatic and advanced critical care. They did not focus on LOS in the rehabilitation period specifically and the publication did not describe the type of rehabilitation given at the center.<sup>12</sup>

Our team has developed and implemented such a Transdisciplinary unit since 1993.<sup>13</sup> It is a unit with mixed psychiatric and rehabilitation care designed specifically for individuals to receive comprehensive medical treatment after a suicide attempt. Based on Todorov *et al.*,<sup>7</sup> we hypothesized that LOS in this population was linked with both somatic and psychiatric factors and aimed to study the characteristics of subjects who have attempted suicide by jumping admitted to this Transdisciplinary unit and their impact on LOS.

## Materials and methods

### Participants

We conducted a retrospective study including all subjects admitted into the Transdisciplinary unit after a suicide attempt by jumping from 1<sup>st</sup> January 2011 to 31 December 2017. In cases of multiple admissions for the same person during this period, only the first stay was considered (it concerned only one person who was admitted twice).

Exclusion criteria were: subjects who did not attempt suicide by jumping (about 10% of hospitalized people in the Transdisciplinary unit had attempted suicide by other violent methods, mostly by jumping in front of a train or a metro).

Approval for this study was obtained from the French national ethics and scientific committee (*Comité éthique et scientifique pour les recherches, les études et les évaluations dans le domaine de la santé, CESREES*), number 1883202, and by the French Commission on Information Technology and Liberties (*Commission Nationale de l'Informatique et des Libertés, CNIL*), number DR-2021-018.

In accordance with French legislation, information to the subjects of this study was provided on the FSEF website and in the clinic. The non-opposition of the subjects was a prerequisite for the use of their data (no refusals in this study).

This procedures information is registered online on the public French directory Health Data Hub (N° T18832022020072): <https://www.health-data-hub.fr/projets/etude-du-devenir-apres-une-hospitalisation-dans-un-service-transdisciplinaire-somato-0>

### Setting: the Transdisciplinary unit

The Transdisciplinary unit is located in the FSEF (French student health foundation) clinic of Bouffémont (Val-d'Oise, Paris region). It has 20 beds and admits individuals between 15 and 35 years old after a violent suicide attempt that leads to heavy injuries, primarily jumps from a height or jumps in front of motor vehicle.<sup>14,15</sup> The Transdisciplinary unit is an open psychiatric ward with premises whose architecture is organized to facilitate communication and social activities. The facilities are adapted for functional rehabilitation. Its staff is coordinated by a psychiatrist and includes two psychiatrists, a physician, a psychologist, a speech therapist, an occupational therapist, a social worker, three physiotherapists and fifteen nurses.<sup>14,16</sup>

The Transdisciplinary unit provides a dual approach,

combining rehabilitation and psychiatric care. Psychiatric care includes regular individual and family psychiatric consultations, interviews with nurses, as well as psychotropic medication if required. In addition, group activities are proposed, deploying various creative and occupational therapies, support groups, and psycho-education groups.

Rehabilitation includes physiotherapy, balneotherapy, occupational therapy, speech therapy when necessary, cognitive rehabilitation when necessary, and social and family support to help community re-integration. The staff can assess disabilities by placing people in everyday life situations (cooking, driving, etc.). Depending on the context, a social assessment, an educational assessment or employment assistance are provided.<sup>14</sup> The rehabilitation program is scheduled and individually adapted to the type of injuries<sup>17</sup> and to the psychiatric condition, thanks to interactions with the psychiatrists.

### Data collection

Data was obtained from the computerized medical records of the clinic. For each subject, the psychiatric diagnoses were coded according to the International Classification of Diseases, 10th revision (ICD-10) and recorded for the French hospital discharge database (*Programme de médicalisation des systèmes d'information*, PMSI) at the end of the hospitalization by the psychiatrist. The diagnoses were categorized in three classes: schizophrenia (ICD-10 F2 codes: schizophrenia, schizotypal and delusional disorders), mood disorders (F3 codes) and "Other diagnoses" as in Todorov *et al.*<sup>7</sup> which studied the same kind of population. The number of injured body parts were recorded considering the following regions: head or face, chest, abdomen, spine, pelvis, arms, legs as in Omi *et al.*<sup>12</sup> Functional dependences were systematically rated by the head nurse of the unit for each person and recorded in PMSI at admission and at discharge. They are derived from Katz's Activities of Daily Living.<sup>18</sup> They consist in 6 items (getting dressed, mobility, eating, continence, behavior, communication) rated from 1 to 4 (1 corresponding to independence, 2 requiring supervision, 3 partial assistance, 4 major or total assistance). This kind of data from PMSI can be reused for medical research.<sup>19</sup>

### Statistical analysis

Our statistical analyses were based on Todorov *et al.*<sup>7</sup>

Statistical analyses were performed using R Studio software (version 1.2.5033).

Means and standard deviations (SD) were calculated for quantitative variables, and frequencies were calculated

for categorical variables. Preliminary analyses were performed to compare socio-demographic and clinical variables according to the main psychiatric diagnoses<sup>7</sup> using Chi-squared tests and analyses of variance (ANOVA). When differences were observed, analyses were completed with pairwise Chi-squared and Student's t tests. Considering the number of tests, the differences were considered significant for  $P < 0.001$ .

Linear regression analysis with a Stepwise method was then used to identify predictors of increasing LOS. For this analysis, people who had LOS above 600 days were excluded because they were considered as outliers (mean LOS in the unit: 183 days ( $\pm 183$ ); LOS above 600 days concerned 6 subjects of the 197 included). Quantile-quantile plots were observed to establish residual's normality and Shapiro-Wilk tests were performed to assess the normality of the residuals ( $W = 0.99$ ;  $P = 0.62$ ).

We examined the associations between socio-demographic and clinical variables with LOS in three models:

- Model 1 examined all variables assessed at admission: socio-demographic variables (age, sex, occupational status), psychiatric disorder history (previous psychiatric episode, history of psychiatric care, history of psychiatric hospitalization, previous suicide attempt, previous suicide attempt with violent methods, substance use), height of the fall, type of injury (head, chest, abdomen, spine, pelvis, arms, legs), LOS in acute care units and dependences at admission.

- Model 2 examined all variables assessed at discharge: main psychiatric diagnosis, orientation at discharge, antidepressants, mood stabilizers, neuroleptics, nociceptive pain treatments, neuropathic pain treatments, arms mobility limitation, legs mobility limitation, sphincter disorders and dependences at discharge.

- Model 3: final global model included all variables which were retained in models 1 and 2, except dependence for continence at discharge to avoid multicollinearity because it was significantly associated with dependence for continence at admission ( $r = 0.496$ ,  $P < 0.0001$ ).

For these models, statistical significance was defined as  $P < 0.05$ .

Measure of model fit was the squared correlation between the observed LOS and the predictors of LOS ( $R^2$ ).

## Results

The study sample consisted of 197 subjects (Figure 1). Half of them were men (49.7%). Their mean age was 25.6 years ( $\pm 6.21$ ) and mean LOS was 183 days ( $\pm 183$ ;

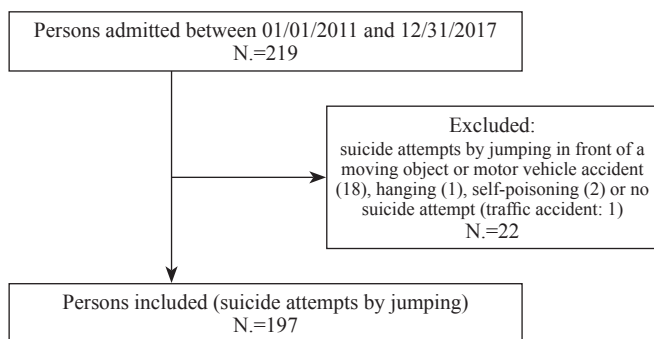


Figure 1.—Flow chart.

min=10; max=1190). Among them, there were 44.7% individuals suffering from schizophrenia, 34.5% from mood disorders and 20.8% from other diagnoses, mainly personality disorders (13.2%). The mean number of injured body parts was 3.43 ( $\pm 1.46$ ).

The comparison of the characteristics of people admitted into the Transdisciplinary unit after a suicide attempt according to the psychiatric diagnoses are presented in Table I. In brief, the subjects diagnosed with schizophrenia were significantly older than the group with “other diagnoses”. This group also showed a higher frequency of previous psychiatric episodes, history of psychiatric care, previous hospitalizations and neuroleptic treatments at discharge than people with mood disorders or other diagnoses. The subjects with mood disorders had more frequently antidepressant treatments at discharge than those with schizophrenia.

The model 1 at admission is displayed in Table II. Being unemployed (compared to active status), having a longer LOS in acute hospital and a higher dependence for continence at admission were significantly associated with a longer LOS in the Transdisciplinary unit.

The model 2 at admission is displayed in Table III. LOS was shorter when subjects had “other diagnoses” compared to schizophrenia. Conversely, LOS was longer when dependence for behavior at discharge was higher and when the individuals had sphincter disorders.

The global model is displayed in Table IV. LOS in the Transdisciplinary unit was longer when subjects were students or unemployed (compared with active status), when LOS in acute hospitals was longer, when dependences were higher for both continence at admission and behavior at discharge and when the people had sphincter disorders at discharge. Conversely, LOS was shorter when the subjects had arms mobility limitation at discharge. This linear regression analysis yielded a significant global model that explained 45.8% of the variation in LOS.

## Discussion

This study aimed to describe the characteristics of people admitted to a transdisciplinary unit (with mixed psychiatric and rehabilitation care) and their impact on LOS. To our knowledge, this is the first study to investigate LOS in individuals who have attempt suicide by jumping hospitalized in that kind of transdisciplinary unit.

The two most frequent psychiatric disorders were schizophrenia and mood disorders. The mean LOS in the Transdisciplinary unit was long, 183 days. Our study showed that most factors influencing LOS were related to physical consequences of the suicide attempt as evidenced by the association with LOS in acute care and with sphincter disorders that persist at discharge.

In our sample, the subjects with schizophrenia had more frequently a previous psychiatric episode, a history of psychiatric care and psychiatric hospitalizations than subjects with mood disorders or other diagnoses. This could be linked with the severity of this kind of diagnosis and with a longer duration of illness since they were older than other persons admitted.<sup>20, 21</sup> The same differences were found in researches studying hospitalizations of people after a suicide attempt by jumping.<sup>7, 12</sup> Except for psychotropic treatments at discharge, there were no other differences between psychiatric diagnostic groups in our study.

Concerning LOS, we could only find one study exploring the same kind of population in rehabilitation.<sup>12</sup> LOS was much shorter in this Japanese medical center whereas their LOS included the period of acute somatic and advanced critical care: 126 days for people with a schizophrenia diagnosis, 84 for others.<sup>12</sup> The publication did not describe the type of rehabilitation given at the center.<sup>12</sup> However, this unit included an advanced critical care center, a psychiatric inpatient unit and an advanced rehabilitation center in a cooperative system and the study included the persons who were referred into the psychiatric unit after a suicide attempt by jumping and who may have had different needs of functional rehabilitation than our sample admitted in a mixed psychiatric and rehabilitation unit. Indeed, their population had a lower total number of injuries and half as many spine injuries.<sup>12</sup> In the Japanese study, people with schizophrenia had much longer LOS than the subjects with other diagnoses<sup>12</sup> which could also partly explain the LOS difference, since more people had schizophrenia in our population. LOS in the Transdisciplinary unit is also longer than in other rehabilitation units (39 days<sup>22, 23</sup>). Nevertheless, dependences scores (based on Activities of Daily Living) were higher than 3 (out of a

TABLE I.—Comparison of socio-demographic and medical data of people admitted into the Transdisciplinary unit after a suicide attempt according to psychiatric diagnoses.

| Psychiatric diagnoses                      | Number (percentage) or mean (standard deviation) |                      |                       | NA | P value               |
|--|--|----------------------|-----------------------|----|-----------------------|
|  | Schizophrenia N.=88                              | Mood disorders N.=68 | Other diagnoses N.=41 |    |                       |
| <b>Socio-demographic data</b>              |  |                      |                       |    |                       |
| Men  | 51 (58.0%)                                       | 31 (45.6%)           | 16 (39.0%)            | 0  | 0.094                 |
| Age at admission (years)                   | 27.7 (±5.81)                                     | 24.8 (±5.90)         | 22.6 (±6.10)          | 0  | <0.001 <sup>b</sup>   |
| Occupational status                        |  |                      |                       | 2  | X                     |
| Student                                    | 21 (24.1%)                                       | 29 (43.3%)           | 22 (53.7%)            |    |                       |
| Active                                     | 21 (24.1%)                                       | 25 (37.3%)           | 15 (36.6%)            |    |                       |
| Unemployed                                 | 35 (40.2%)                                       | 12 (17.9%)           | 3 (7.32%)             |    |                       |
| Disabled status                            | 10 (11.5%)                                       | 1 (1.49%)            | 1 (2.44%)             |    |                       |
| <b>Medical history</b>                     |  |                      |                       |    |                       |
| Previous psychiatric episode               | 75 (86.2%)                                       | 42 (61.8%)           | 20 (48.8%)            | 1  | <0.001 <sup>a,b</sup> |
| Psychiatric care history                   | 69 (79.3%)                                       | 32 (47.8%)           | 15 (36.6%)            | 2  | <0.001 <sup>a,b</sup> |
| Number of psychiatric hospitalization      |  |                      |                       | 5  | <0.001 <sup>a,b</sup> |
| 0  | 21 (25.0%)                                       | 48 (71.6%)           | 29 (70.7%)            |    |                       |
| 1  | 15 (17.9%)                                       | 6 (8.96%)            | 8 (19.5%)             |    |                       |
| ≥ 2  | 48 (57.1%)                                       | 13 (19.4%)           | 4 (9.76%)             |    |                       |
| Number of previous suicide attempts        |  |                      |                       | 13 | 0.842                 |
| 0  | 49 (64.5%)                                       | 46 (67.6%)           | 25 (62.5%)            |    |                       |
| 1  | 12 (15.8%)                                       | 13 (19.1%)           | 7 (17.5%)             |    |                       |
| ≥ 2  | 15 (19.7%)                                       | 9 (13.2%)            | 8 (20.0%)             |    |                       |
| Previous suicide attempt by violent method | 13 (17.1%)                                       | 8 (11.8%)            | 4 (10.0%)             | 13 | 0.489                 |
| Substance abuse                            | 39 (45.9%)                                       | 25 (37.3%)           | 15 (36.6%)            | 4  | 0.462                 |
| <b>Context of care</b>                     |  |                      |                       |    |                       |
| Height of the fall (meters)                | 9.39 (4.34)                                      | 9.67 (3.91)          | 9.88 (4.08)           | 0  | 0.805                 |
| LOS in acute hospital (days)               | 71.2 (±58.0)                                     | 59.6 (±38.0)         | 52.9 (±31.8)          | 0  | 0.089                 |
| <b>Injuries</b>                            |  |                      |                       |    |                       |
| Head or face                               | 31 (36.0%)                                       | 27 (39.7%)           | 13 (32.5%)            | 3  | 0.747                 |
| Chest                                      | 32 (36.4%)                                       | 27 (39.7%)           | 14 (34.1%)            | 0  | 0.830                 |
| Abdomen                                    | 20 (22.7%)                                       | 20 (29.4%)           | 13 (31.7%)            | 0  | 0.477                 |
| Spine                                      | 67 (76.1%)                                       | 57 (83.8%)           | 32 (78.0%)            | 0  | 0.493                 |
| Pelvis                                     | 45 (51.1%)                                       | 36 (52.9%)           | 14 (34.1%)            | 0  | 0.125                 |
| Arms                                       | 40 (45.5%)                                       | 32 (47.1%)           | 13 (31.7%)            | 0  | 0.246                 |
| Legs                                       | 66 (75.0%)                                       | 45 (66.2%)           | 30 (73.2%)            | 0  | 0.465                 |
| Numbers of injured body region             | 3.42 (1.45)                                      | 3.59 (1.48)          | 3.17 (1.45)           | 3  | 0.366                 |
| <b>Dependences at admission</b>            |  |                      |                       |    |                       |
| Getting dressed                            | 3.52 (0.61)                                      | 3.38 (0.73)          | 3.41 (0.87)           | 0  | 0.442                 |
| Mobility                                   | 3.49 (0.66)                                      | 3.46 (0.74)          | 3.37 (0.80)           | 0  | 0.665                 |
| Eating                                     | 2.36 (0.55)                                      | 2.43 (0.53)          | 2.44 (0.50)           | 0  | 0.672                 |
| Continenence                               | 3.40 (0.56)                                      | 3.24 (0.74)          | 3.20 (0.71)           | 0  | 0.164                 |
| Behaviour                                  | 3.61 (0.51)                                      | 3.38 (0.49)          | 3.41 (0.50)           | 0  | 0.010                 |
| Communication                              | 3.35 (0.50)                                      | 3.15 (0.40)          | 3.10 (0.30)           | 0  | 0.002                 |
| <b>Dependences at discharge</b>            |  |                      |                       |    |                       |
| Getting dressed                            | 2.67 (1.03)                                      | 2.49 (1.08)          | 2.61 (1.12)           | 2  | 0.601                 |
| Mobility                                   | 2.71 (0.93)                                      | 2.63 (0.97)          | 2.83 (0.95)           | 2  | 0.557                 |
| Eating                                     | 2.16 (0.57)                                      | 2.03 (0.63)          | 2.27 (0.50)           | 2  | 0.103                 |
| Continenence                               | 2.71 (1.02)                                      | 2.45 (1.09)          | 2.59 (1.12)           | 2  | 0.313                 |
| Behaviour                                  | 3.57 (0.52)                                      | 3.45 (0.56)          | 3.56 (0.50)           | 2  | 0.308                 |
| Communication                              | 3.32 (0.47)                                      | 3.13 (0.46)          | 3.24 (0.43)           | 2  | 0.044                 |
| <b>Other data at discharge</b>             |  |                      |                       |    |                       |
| LOS (days)                                 | 211 (±201)                                       | 168 (±178)           | 148 (±143)            | 0  | 0.139                 |
| <b>Orientation at discharge</b>            |  |                      |                       |    |                       |
| Home                                       | 70 (83.3%)                                       | 62 (92.5%)           | 38 (95.0%)            |    |                       |
| Transfer to surgery or medical service     | 4 (4.76%)  | 3 (4.48%)            | 1 (2.50%)             |    |                       |
| Transfer to psychiatry service             | 10 (11.9%)                                       | 2 (2.99%)            | 1 (2.50%)             |    |                       |
| Arms mobility limitation                   | 25 (30.1%)                                       | 22 (32.8%)           | 7 (17.5%)             | 7  | 0.212                 |
| Legs mobility limitation                   | 66 (81.5%)                                       | 49 (74.2%)           | 36 (90.0%)            | 10 | 0.133                 |
| Sphincter disorders                        | 27 (31.8%)                                       | 16 (23.9%)           | 10 (25.0%)            | 5  | 0.513                 |
| Antidepressant treatments                  | 20 (24.4%)                                       | 43 (65.2%)           | 13 (34.2%)            | 11 | <0.001 <sup>a</sup>   |
| Neuroleptics                               | 81 (98.8%)                                       | 21 (31.8%)           | 13 (34.2%)            | 11 | <0.001 <sup>a,b</sup> |
| Mood stabilizers                           | 19 (23.2%)                                       | 7 (10.6%)            | 4 (10.5%)             | 11 | 0.068                 |
| Nociceptive pain treatments                | 54 (67.5%)                                       | 38 (59.4%)           | 22 (56.4%)            | 14 | 0.421                 |
| Neuropathic pain treatments                | 29 (35.4%)                                       | 25 (39.7%)           | 25 (62.5%)            | 12 | 0.015                 |

<sup>a</sup>schizophrenia group differed from other diagnoses group; <sup>b</sup>schizophrenia group differed from mood disorders group; <sup>c</sup>mood disorders group differed from other diagnoses group; X: not calculable due to small group size. NA: not available.

TABLE II.—Variables at admission retained in model 1 to explain LOS by Stepwise analysis.

|  | Estimated parameter | Standard deviation | p value |
|--|---------------------|--------------------|---------|
| Age at admission                       | 3.116               | 1.721              | 0.072   |
| Occupational status                    | Reference: active   |                    |         |
| - Student                              | 40.597              | 23.463             | 0.085   |
| - Unemployed                           | 64.952              | 23.204             | 0.006   |
| Disabled status                        | 66.607              | 41.470             | 0.111   |
| Height of the fall                     | 4.081               | 2.361              | 0.086   |
| LOS in acute hospital                  | 0.603               | 0.209              | 0.005   |
| Arms injuries                          | Reference: no       |                    |         |
| - Yes                                  | -27.271             | 16.789             | 0.107   |
| Legs injuries                          | Reference: no       |                    |         |
| - Yes                                  | 35.921              | 18.904             | 0.059   |
| Dependence for continence at admission | 62.985              | 12.373             | <0.001  |

TABLE III.—Variables at discharge retained in model 2 to explain LOS by Stepwise analysis.

|  | Estimated parameter      | Standard deviation | p value |
|--|--------------------------|--------------------|---------|
| Psychiatric diagnose                   | Reference: schizophrenia |                    |         |
| - Mood disorders                       | -29.364                  | 19.323             | 0.131   |
| - Other diagnoses                      | -70.714                  | 22.663             | 0.002   |
| Dependence for continence at discharge | -15.865                  | 8.521              | 0.065   |
| Dependence for behavior at discharge   | 41.533                   | 15.818             | 0.010   |
| Arms mobility limitation               | Reference: no            |                    |         |
| - Yes                                  | -28.159                  | 18.754             | 0.135   |
| Legs mobility limitation               | Reference: no            |                    |         |
| - Yes                                  | 39.412                   | 22.746             | 0.085   |
| Sphincter disorders                    | Reference: no            |                    |         |
| - Yes                                  | 121.458                  | 23.223             | <0.001  |
| Neuropathic pain treatments            | Reference: no            |                    |         |
| - Yes                                  | 26.482                   | 18.754             | 0.165   |

maximum score of 4) reflecting an important need of assistance. These scores decreased significantly during the hospitalization for dressing, feeding, continence and locomotion.<sup>16</sup> Mental illness-related stigma also creates barriers to quality care<sup>24</sup> and this kind of transdisciplinary unit may hospitalize persons with more severe psychiatric and somatic troubles than other hospital services.

Concerning physical consequences of the suicide attempt, LOS in our unit was longer when LOS in acute care had been longer, which is likely reflects the severity of injuries caused by the jump, as previously described.<sup>25, 26</sup> In line with this, the literature describes a link between the height of the fall and the severity of injuries.<sup>27, 28</sup> This association can explain that the higher height of the fall was associated with longer LOS in the Transdisciplinary unit (trend).

Similarly, longer LOS was strongly associated with

TABLE IV.—Model 3: global model explaining LOS in the Transdisciplinary unit.

|  | Estimated parameter | Standard deviation | P value |
|--|---------------------|--------------------|---------|
| Age at admission                       | 3.1843              | 1.6355             | 0.054   |
| Occupational status                    | Reference: active   |                    |         |
| - Student                              | 47.077              | 22.1571            | 0.035   |
| - Unemployed                           | 59.496              | 22.0621            | 0.008   |
| - Disabled status                      | 41.766              | 39.5812            | 0.293   |
| Height of the fall                     | 3.422               | 2.2424             | 0.129   |
| LOS in acute hospital                  | 0.589               | 0.1954             | 0.003   |
| Legs injuries                          | Reference: no       |                    |         |
| - Yes                                  | 26.598              | 17.9087            | 0.140   |
| Dependence for continence at admission | 44.640              | 12.7693            | <0.001  |
| Dependence for behavior at discharge   | 30.182              | 14.7033            | 0.042   |
| Arms mobility limitation at discharge  | Reference: no       |                    |         |
| - Yes                                  | -42.591             | 17.8679            | 0.019   |
| Sphincter disorders at discharge       | Reference: no       |                    |         |
| - Yes                                  | 78.034              | 20.7133            | <0.001  |

both dependence for continence at admission and sphincter disorders at discharge. These neurologic symptoms that persisted after spine or pelvic injuries corresponded with severity of the lesions and the need of intensive rehabilitation care. This is consistent with other researches on persons with multiple trauma that found that higher functional dependence at admission is associated with longer LOS in rehabilitation.<sup>29</sup> Moreover the polytrauma subjects with spinal cord injury have longer LOS than those without this kind of injury.<sup>29</sup>

The subjects who had arms mobility limitations at discharge had shorter LOS which could reflect the fact that they had less severe disabilities and that they reach stability faster or that they could shift sooner to ambulatory rehabilitation care.

These results are congruent with the fact that the hospitalization discharge in the Transdisciplinary unit is determined by the end of the intensive rehabilitation care. If a person needs longer psychiatric treatments, he or she is discharged to a psychiatric inpatient ward.

Nevertheless, dependence for behavior at discharge was associated with longer LOS. This could be the expression of some neurological sequelae of the trauma and/or of the severity of mental disorders that interfere with functional rehabilitation care. The model 2 at discharge supports this latter idea since the diagnosis of schizophrenia was significantly related with longer LOS compared to “other diagnoses”. This finding confirms the results of Omi *et al.* who showed that jumpers with schizophrenia had longer LOS

than those with other psychiatric diagnoses in an hospital that include acute care, a psychiatric inpatient unit and a rehabilitation center.<sup>12</sup> This impact of psychiatric factors is also found in orthopedic rehabilitation, where mental health concerns increase LOS.<sup>30</sup> As these associations were found only at discharge in our study, we could assume that they are an expression of difficulties in stabilizing the treatment of more severe mental disorders.

Finally, unemployment was significantly associated with longer LOS. This could reflect the severity of the psychiatric disorder, independently of the diagnosis.<sup>31</sup> More surprisingly, student status was associated with longer LOS compared to active status (no explanation has yet been found for this).

### Limitations of the study

First, data collection was retrospective from clinical records without standardized interviews for psychiatric diagnoses or use of the Functional Independence Measure to follow rehabilitation progress. We could not collect some data that could influence LOS such as family environment or social integration. Furthermore, we had no information on number or types of psychiatric or rehabilitation care that received each person.

### Conclusions

This study aimed to investigate the factors associated with LOS among people who have attempted suicide by jumping in a unit combining psychiatric and somatic approaches. The persons who are admitted in the Transdisciplinary unit have severe physical injuries due to their fall. These injuries require intensive rehabilitation and their severity largely contributes to the LOS. We also found some evidences that the severity of psychiatric disorder can influence LOS, underlying the need for both concomitant psychiatric and somatic care for these persons after a suicide attempt.

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