Title: **Determinants of seclusion after aggression in psychiatric inpatients**

Vruwink FJ, Noorthoorn EO, Nijman HLI, VanDerNagel JEL, Hox JJ, Mulder CL

Corresponding author: FJ Vruwink, MD

GGNet, Kenniscentrum, PO Box 2003, 7230 GC Warnsveld, the Netherlands

+31 575 580808; fleurvruwink@gmail.com

Former affiliation where most work was done: Mediant GGZ, Enschede, the Netherlands

Other authors:

**Eric O Noorthoorn**, MD PhD

Senior researcher

GGNet, Kenniscentrum, PO Box 2003, 7230 GC Warnsveld, the Netherlands

e.noorthoorn@ggnet.nl

**Henk LI Nijman**, PhD

Prof. dr. HLI Nijman, PhD

Professor of forensic psychology, Behavioural Science Institute (BSI), Radboud University, Nijmegen, the Netherlands

Senior researcher at Altrecht Aventurijn, Den Dolder, the Netherlands

Address: Dolderseweg 164, 3734 BN Den Dolder, the Netherlands

h.nijman@altrecht.nl

**Joanneke EL VanDerNagel**, MD

Psychiatrist

Mediant GGZ Twente, postbus 775, 7500 AT Enschede, the Netherlands

je.vandernagel@mediant.nl

**Joop J Hox**, PhD

Psychologist and Professor of Social Science Methodology at the Faculty of Social Sciences, University of Utrecht, Utrecht, the Netherlands

Address: PO box 80140, 3508 TC Utrecht, the Netherlands

j.hox@uu.nl

**Cornelis L Mulder**, MD PhD

Prof. dr. C.L. Mulder, psychiatrist

Professor of Public Mental Health

Research Center O3, Erasmus MC

Bavo Europoort, Mental Health Center Rotterdam

Address: Prins Constantijnweg 48-54, 3066 TA Rotterdam, the Netherlands

niels.clmulder@wxs.nl

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**Abstract: Determinants of seclusion after aggression in a psychiatric inpatients**

Some aggressive incidents in psychiatric wards result in seclusion, while others do not. We used the SOAS-R and the mental health trust's database to identify determinants that predicted seclusion after aggression. These consisted of demographic, diagnostic, contextual and aggression characteristics, and were analyzed in a multilevel logistic regression. This showed associations between seclusion and aggression for the following: younger age, involuntary status, history of previous aggression, physical or dangerous violence, aggression being directed against objects, and a more severe incident. Thus seclusion after aggression appears to be mainly predicted by aggression itself.

## 1. **Introduction**

Because seclusion seems to be harmful not only to psychiatric patients, but also to mental health nurses (Hoekstra, Lendemeijer, & Jansen, 2004; VanDerNagel, Tuts, Hoekstra, & Noorthoorn, 2009), Dutch mental health trusts and psychiatric hospitals have increasingly started to focus on reducing seclusion (Abma, Widdershoven, & Lendemeijer, 2005; Landeweer, et al., 2007). For mental health nurses, seclusion could very well compose a risk factor for work-related mental burden and ultimately burn-out symptoms (VanDerNagel, et al., 2009). By requiring considerable time to be devoted to the care of a single patient, it also seems to disrupt ward routine and patient care.

Several international studies have shown that seclusion is often preceded by aggressive incidents (12-100%, the trend being around 50%) (Demeestere, Abraham, & Moens, 1995; El-Badri & Mellsop, 2002; Kaltiala-Heino, Tuohimaki, Korkeila, & Lehtinen, 2003). But not all such incidents are followed by seclusion: two European studies found that about half of the aggressive incidents were followed by the use of a coercive measure, usually seclusion (Abderhalden, et al., 2007; Nijman, Allertz, Merckelbach, a Campo, & Ravelli, 1997). It is barely known which characteristics determine whether or not aggression is followed by seclusion. Staff's decision to seclude a patient may be associated with the nature and severity of the aggressive incident, but also a number of demographic, diagnostic and contextual characteristics (such as type of ward).

Although the determinants of seclusion and aggression have been studied mostly separately, there are some overlaps as far as the predictors of these are concerned. Seclusion has been associated with various demographic and diagnostic characteristics, such as (young) age, (male) sex, psychiatric disorders (mainly psychotic and bipolar disorders), involuntary hospitalization, low GAF-score, and ethnicity (Betemps, Somoza, & Buncher, 1993; Bower,

McCullough, & Timmons, 2000; Brown & Tooke, 1992; Demeestere, et al., 1995; El-Badri & Mellsop, 2002; Fisher, 1994; Lendemeijer & Shortridge-Baggett, 1997; Smith, et al., 2005; Stolker, et al., 2003). Similarly, aggression has been positively associated with (young) age, (male) sex, marital status, involuntary status, and psychotic disorder, mania, and organic brain disorder; aggression has been negatively associated with depression and personality disorder (Abderhalden, et al., 2007; Ketelsen, Zechert, Driessen, & Schulz, 2007; Nijman, et al., 1997; Owen, Tarantello, Jones, & Tennant, 1998; Raja & Azzoni, 2005).

The results of these studies were sometimes inconsistent. For example, some found that substance-related disorder was positively related to aggression (Raja & Azzoni, 2005), while others found it to be negatively related (Abderhalden, et al., 2007; Ketelsen, et al., 2007).

While less study has been devoted to the contextual characteristics that determine either seclusion or aggression, there are once again some overlaps. Secluded patients have been found to have various contextual determinants, such as length of hospitalization, time of day, and number of previous hospitalizations (Busch & Shore, 2000; Demeestere, et al., 1995; El-Badri & Mellsop, 2002; Fisher, 1994; Lendemeijer & Shortridge-Baggett, 1997; Smith, et al., 2005). Other studies have referred more generally to the characteristics of wards, units or even hospitals (Betemps, et al., 1993; Bower, et al., 2000; Brown & Tooke, 1992). Aggressive patients have been found to have contextual determinants similar to secluded patients (i.e. length of hospital stay, time of day, and the number of previous hospitalizations) (Abderhalden, et al., 2007; Ketelsen, et al., 2007; Nijman, et al., 1997).

Although many studies have examined the characteristics associated with either seclusion or aggression, we have found only one study that investigated the characteristics associated with seclusion after aggression (Gudjonsson, Rabe-Hesketh, & Szmukler, 2004). This study focused mainly on ethnicity, for which, after adjustment for demographic and aggression characteristics, no significant association was found. Interestingly, of these

adjusting characteristics, age, gender, agitation, nurse target, and extent of injury were associated with seclusion after aggression. To our knowledge, no other studies have focused on aggression incidents followed by restrictive measures, or have related that information to demographic, diagnostic, contextual, and aggression characteristics.

Therefore the main question of the present study was: which demographic, diagnostic, contextual, and aggression characteristics are associated with seclusion after aggression? By identifying characteristics of seclusion after aggression that underlie staff's decision to seclude patients, we hope to support the formulation of preventive strategies that will reduce the use of seclusion in psychiatric wards, thereby avoiding harm to patients and mental health professionals.

## 2. **Materials and methods**

### *2.1. Setting*

We included all patients admitted to a medium-sized Dutch mental health trust with 265 beds. The trust in question serves a predominantly rural catchment area with almost 400,000 inhabitants and has a yearly cumulative admission incidence rate of approximately $^{5}/_{1000}$.

A total of 16 wards are located at four individual sites. Ten of these are open and six are locked wards; twelve wards are for adults and four are for elderly patients (60+ yrs).

### *2.2. Design*

Using a longitudinal study in a dynamic cohort, we drew on data from the trust's database. The Staff Observation Aggression Scale- Revised (SOAS-R) was used to prospectively assess aggression incidents. Determinants consisted of demographic, diagnostic, contextual and aggression characteristics. Data were gathered from November 15, 2006 until November 14, 2007. The principles outlined in the Declaration of Helsinki were followed. Study procedures were reviewed and approved by the Northern Chamber of the Dutch Ethics Review Board.

### *2.3. Data and instruments*:

#### 2.3.1. *Demographic characteristics*

Data on demographic, diagnostic and contextual characteristics were gathered from the trust's databases. Demographic characteristics included date of birth, country of birth (Western or non- Western (Keij, 2000)), gender, and marital status (married or unmarried).

#### 2.3.2. *Diagnostic characteristics*

Diagnoses were established by psychiatrists or licensed psychologists in clinical routine procedures according to the DSM-IV (APA, 1994). Diagnoses on Axis I were grouped into nine main categories: anxiety disorders, depressive disorders, pervasive disorders, bipolar disorders, psychotic disorders, psycho-organic disorders, substance abuse disorders, other conditions that may be a focus of clinical attention (social problems Axis I); and none/ unknown diagnosis. Because some patients had multiple Axis I diagnoses, they sometimes fitted more than one diagnostic category. For Axis II, patients were categorized under two crude categories, as either having or not having a personality disorder.

2.3.3. *Contextual characteristics*

Unlike demographic and diagnostic characteristics, which are stable, the contextual characteristics cover an array of continuously changing characteristics related to the patient in the context of hospitalization. Contextual characteristics included in the current study were the length of hospital stay (i.e. the time between hospitalization and the aggression incident); type of ward (open or locked); history of hospitalization (i.e. first stay or previous hospitalizations in this mental health trust), and time of aggression (during late shift or night/ early shift).

In the Netherlands, seclusion against a patient's will is legally permissible only within the context of involuntary legal status (MinisterieVWS, 1992). As a potential predictor of seclusion, we therefore included voluntary or involuntary legal status *the day before* the aggression incident, rather than the patient's legal status on the day the seclusion started.

2.3.4. *Aggression characteristics*

Data on aggression incidents were gathered by means of the Staff Observation of Aggression Scale-Revised (SOAS-R) (Nijman, et al., 1999). The SOAS-R comprises five columns pertaining to specific aspects of aggressive behavior (i.e. the provocation, the means used by the aggressor, the target of aggression, the consequence(s) for victim(s), and the measure(s) taken to stop aggression).

Since 2003, routine security procedures at this mental health trust have used the SOAS-R. After each incident of aggression a staff member who witnessed it - usually a nurse - completed the SOAS-R form stating the location, date, time, and nature of the incident. He or she also rated the severity of the incident on a Visual Analogue Scale (VAS) ranging from "not severe at all" to "extremely severe" (0-100 mm). Multiple options could be chosen per column. We analyzed the most serious options per column. Some were combined into one variable; for example, physical means used and dangerous means used (for all characteristics: table 1).

2.3.5. *Dependent variable, either or no seclusion*

In the fifth and last column of the SOAS-R, the measures taken to stop or control the aggression were noted by the reporting staff member. One of the options in this column is "seclusion". This category was used to establish the dependent variable "seclusion after aggression". It does not rule out other restraint measures.

Seclusion is defined as locking a patient in a room designed for that purpose with no opportunity to leave on the patient's own initiative. Such rooms have to meet a specific set of strict criteria formulated by the Dutch health inspectorate (College bouw ziekenhuisvoorzieningen, 2003).

*2.4. Analysis*

Using the statistical software of SPSS, version 17.0, each SOAS-R form, which contained information about one aggression incident, was entered as a separate record in the database. The corresponding demographic, diagnostic and contextual characteristics were added to these records.

Naturally, a single patient may cause more than one incident. If so, the separate incidents are likely to be related by unobserved patient-specific variables. The same applies to wards: incidents displayed in one ward are likely to be related by unobserved ward-specific

variables. To take account of this, we used a hierarchical structure in the logistic regression, using multilevel logistic regression with the HLM software (Raudenbush, Bryk, Ceong, & Condon, 2004). There were three hierarchical levels: (1) incident; (2) patient; (3) ward.

Because individual patients could have been admitted to different wards, the hierarchical structure of the multilevel logistic regression needed to be crossed (Hox, 2010).

First, all characteristics were analyzed separately to establish their relationship with seclusion after aggression. This was presented as their Odds Ratio (OR) and 95%-confidence interval. If the univariable analyses produced characteristics with a significance of $p<0.20$, these were entered into a multivariable (Peters, 2008) multilevel logistic model, as recommended when building models for regression (Hosmer & Lemeshow, 2000).

The regression was done in four steps. (1) Demographic characteristics were entered into the model, followed by (2) diagnoses, (3) contextual characteristics, and (4) aggression characteristics. The idea behind these consecutive steps was that a decision to seclude a patient after aggression is the end result of a chain of characteristics. In other words, a patient with her/ his demographic characteristics and diagnosis is admitted for a period of time to a certain ward with its own contextual characteristics. It is within this context that he or she might become aggressive. Each characteristic, whether demographic, diagnostic, contextual or related to aggression, might play a role in whether or not the aggressor is secluded.

As age and severity of the aggression incident are continuous variables, their effects in the logistic regression are difficult to interpret. We have therefore presented effect of age as an adjusted OR for each ten-year increase, and effect of severity of the aggression incident as an adjusted OR for each ten-millimeter increase on the VAS.

A two-tailed significance level of $\alpha=0.05$ was used for all analyses.

## 3. **Results**

### *3.1. Subjects*

During the 365-day study period, 744 patients were admitted, 49% of whom were male (n=366). During this year, 395 aggression incidents were reported, pertaining to 91,417 days of hospitalization spread over 265 beds. The number of incidents per occupied bed per year was [395/ (91417/365) =] 1.58. For the locked wards (77 beds; 235 incidents; 26,071 days of hospitalization), this rate was 3.29; for the open wards (188 beds; 150 incidents; 65,346 days of hospitalization), it was 0.84.

Seven cases had to be excluded from analyses because the aggressor could not be identified (the forms contained neither name nor registration number). Eighteen cases were added because some SOAS-R forms contained multiple aggressors. In 21 cases, the aggression took place in the seclusion room, and could not therefore be taken into account for the current study aims. For analyses, we thus included 385 cases involving 118 patients. In 41.3% of these aggressive incidents (n=159), the aggression had been followed by the seclusion of the aggressor.

### *3.2. Univariable analyses*

#### 3.2.1. *Levels*

The multilevel analyses were performed at three levels, the lowest being the incident itself, the second level being the patient, and the highest level being the ward. Twenty two percent of the variance of outcome was explained by the ward-level, and 26% by the patient-level. Together, these comprised almost half of the total variance, making it important to account for these levels. The significance of each was $p<0.05$.

Table 1 shows the results of the separate univariable analyses of the demographic, diagnostic, contextual and aggression characteristics.

Insert Table 1 about here

3.2.2. *Demographic characteristics*

Seclusion after aggression was significantly related to age: the older a patient was, the lower the risk that he or she would be secluded after aggression. Besides age, marital status was selected for the multivariable analyses, because it had a p-value of below 0.20.

3.2.3. *Diagnostic characteristics*

Seclusion after aggression was significantly associated with none of the diagnostic characteristics. But because psycho-organic disorder, social problems at Axis I and personality disorder all had a p-value lower than 0.20, they were selected for the multivariable analyses.

3.2.4. *Contextual characteristics*

Seclusion after aggression was significantly associated with involuntary status one day before the incident and aggression during late shift. In addition to these characteristics, previous hospitalizations was also selected for the multivariable analyses.

3.2.5. *Aggression characteristics*

Seclusion after aggression was significantly associated with all of the following: previous aggression during the study period; physical and/or dangerous aggression, the targeting of aggression on staff members, the aggressor's inflicting pain and/or injury on the victim, and more severe aggression. Remarkably, in cases where the observed aggressive behavior was targeted against fellow patients, the likelihood of being secluded was significantly lower than when the aggression was directed against other targets. As another three characteristics had a p-value below 0.20, the following characteristics were also selected

for the multivariable analyses: “provocation: patient being denied something”; “target: object(s)”; and “no consequence for the victims”.

*3.3. Multivariable analyses*

Table 2 presents the outcome of the multivariable crossed multilevel logistic regression.

Insert Table 2 about here

In the multivariable logistic regression it was possible to analyze 333 of the 385 incidents. The data of the remaining incidents (13.5%) contained one or more characteristics with missing values. Hundred thirty-six incidents (40.8%) had resulted in seclusion.

At the first step, age significantly contributed to the model of predicting seclusion after aggression. The risk of being secluded after aggression halved for each ten-year age increase (OR= 0.51). In the second step, diagnoses did not contribute significantly to the model. However, when contextual characteristics were added in the third step, age and legal status contributed significantly to the model. Involuntary legal status increased the risk almost five-fold (OR= 4.8).

In the last step, aggression characteristics were added to the model. As in the previous step, age (OR= 0.47) and legal status (OR= 4.8) contributed significantly to the model. In addition, seclusion after aggression was significantly associated with the following aggression characteristics: “previous aggression during study period”, “physical and/or dangerous aggression”, “target: object(s)”, and severity of the aggression. Within this last model, the part of variance explained by the ward level was significant (p=0.01).

## 4. **Discussion**

### *4.1 Discussion of results*

The results of this study suggest that seclusion after aggression is associated with lower age, involuntary status, previous aggression, physical or dangerous aggression, targeting objects and the severity of the aggression. Most of these characteristics constitute characteristics of the aggression incident itself. No other demographic, diagnostic, or contextual characteristics were associated with seclusion after aggression.

In other words, it appears that seclusion of the aggressor is determined largely by the nature and severity of the aggressive incident. Seclusion after aggression is highly independent of diagnosis or the patient's other characteristics except age. Because the variance explained by the ward level was significant, future research should explore ward characteristics in more detail. As this variance is explained only by unobserved ward variables, we will also need to investigate ward characteristics that were not included in this study.

Some of the characteristics found by Gudjonsson et al. (2004) in their study on seclusion after aggression were similar to those found in ours, such as the influence of age and legal status. Neither study found an association with diagnoses. Unlike Gudjonsson's study, however, we found no association with gender. This difference might be explained by the larger scale of their study, which was carried out in an urban hospital; and also by the relative overrepresentation of aggression incidents committed by males and patients from ethnic minorities. With regard to aggression characteristics, their study found other predictors. But in general, both studies suggest that aggression characteristics themselves play an important role in whether or not a psychiatric patient is secluded after aggression.

### *4.2. Clinical implications*

It is not possible to alter some of the characteristics (such as age and legal status) that are associated with seclusion after aggression. But since the nature and severity of the aggression were clearly associated with seclusion, the greatest effect in reducing the use of seclusion after aggression may be achieved by de-escalation techniques during aggression, and by interventions that prevent aggression from arising.

There is some research that suggests that a significant reduction in patient aggression can be achieved (Irwin, 2006). Irwin states in his review that "research suggests that one of the most significant variables in all prevention strategies is nursing practice, with personal and contextual factors of the nurse, such as age, experience and gender, determining behaviors and attitudes towards potentially aggressive individuals". In addition, Privitera et al. (2005) have suggested that "safer provision of mental health services might be accomplished by carrying out personal safety training for clinicians and non-clinicians together as a team to enhance cohesion and communication". Such prevention and de-escalation techniques should be used especially in situations in which the aggressor has the highest likelihood of being secluded (for example in young adults, and patients with an involuntary legal status).

*4.3. Strengths and limitations:*

As we have included data from an entire mental health trust, ours is a reasonably large study that has more power than those focusing on a single ward. Because the data were gathered over an entire year, we assume that seasonal influences had been eliminated. The other strengths of our study were its prospective nature and its use of a standardized, widely used instrument to assess aggression incidents.

Limitations of the study included possible underreporting of aggression incidents. Such underreporting has previously been found to concern mainly mild incidents (Abderhalden, et al., 2007). Tenneij et al (2009) found that also other indicators of inpatient aggression are

subject to underreport. As the use of SOAS-R was implemented three years before this study, we assume that attention shifting and registration fatigue in nurses (de Niet, Hutschemaekers, & Lendemeijer, 2005) have now stabilized. Diagnoses were obtained from the trust's database and not confirmed by standardized instruments. Even though we analyzed many characteristics, we did not cover every possible aspect of predicting seclusion after aggression: as we point out above, our analyses showed that a significant role in this is still played by unobserved ward characteristics. Our results should be generalized very cautiously, particularly because the study was conducted in a predominantly rural area in the Netherlands in a single mental health trust that had both open and closed wards and a wide variety of patients.

## 5. **Conclusion**

Seclusion after aggression was predicted mainly by aggression characteristics. To prevent such seclusion, nursing practice should focus on de-escalating aggression when it arises. Particular attention should be paid to young patients and those with an involuntary legal status.

Our findings should be explored and verified in further research, ideally in a multicenter study with a large sample. It should include ward characteristics as potential determinants of seclusion after aggression.

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Table 1: Univariable associations between demographic, diagnostic, contextual and aggression characteristics versus seclusion after aggression using crossed multilevel logistic regression

| | **Total**[#] | | **No seclusion** | | **Seclusion** | | **Test statistic** | |
|---|---|---|---|---|---|---|---|---|
| | **n** | **%** | **n** | **%** | **n** | **%** | **OR** | **95% CI** |
| Total | 385 | 100 | 226 | 58.7 | 159 | 41.3 | - | |
| **Demographic characteristics** | | | | | | | | |
| Female | 178 | 46.2 | 93 | 41.2 | 85 | 53.5 | 1.5 | 0.67- 3.5 |
| Unmarried | 354 | 91.9 | 197 | 87.2 | 157 | 98.7 | 5.5° | 0.78- 38 |
| Non-Western n= 384 | 29 | 7.6 | 18 | 8.0 | 11 | 6.9 | 1.0 | 0.24- 4.4 |
| Age (median years [IQR]) | 41 [33-47] | | 43 [35-61] | | 35 [31-42] | | **0.51**[*•] | **0.37-0.72** |
| **Diagnostic characteristics** | | | | | | | | |
| Diagnosis Axis I[§] | | | | | | | | |
| Anxiety disorder | 25 | 6.5 | 20 | 8.8 | 5 | 3.1 | 0.41 | 0.067- 2.5 |
| Depressive disorder | 18 | 4.7 | 15 | 6.6 | 3 | 1.9 | 0.78 | 0.14- 4.2 |
| Bipolar disorder | 24 | 6.2 | 10 | 4.4 | 14 | 8.8 | 0.58 | 0.11- 3.2 |
| Psychotic disorder | 185 | 48.1 | 103 | 45.6 | 82 | 51.6 | 1.6° | 0.67- 4.0 |
| Psycho-organic disorder | 61 | 15.8 | 39 | 17.3 | 22 | 13.8 | 0.30 | 0.052- 1.7 |
| Substance abuse | 55 | 14.3 | 43 | 19.0 | 12 | 7.5 | 0.60 | 0.20- 1.8 |
| Pervasive disorder | 40 | 10.4 | 13 | 5.8 | 27 | 17.0 | 2.1 | 0.42- 11 |
| Social problems Axis I | 42 | 10.9 | 21 | 9.3 | 21 | 13.2 | 4.2° | 1.0- 18 |
| None/ unknown diagnosis on Axis I | 32 | 8.3 | 18 | 8.0 | 14 | 8.8 | 0.61 | 0.10- 3.6 |
| Personality disorder | 152 | 39.5 | 102 | 45.1 | 50 | 31.4 | 0.53° | 0.23- 1.2 |
| **Contextual characteristics** | | | | | | | | |
| Involuntary status | 250 | 64.9 | 111 | 49.1 | 139 | 87.4 | **5.3**[*] | **2.1- 14** |
| Locked ward | 235 | 61.0 | 111 | 49.1 | 124 | 78.0 | 2.4 | 0.57- 9.9 |
| Previous hospitalizations | 309 | 80.3 | 165 | 73.0 | 144 | 90.6 | 2.0° | 0.76- 5.4 |
| Late shift n= 377 | 203 | 53.8 | 105 | 47.5 | 98 | 62.8 | **2.0**[*] | **1.1- 3.6** |
| Length of stay in weeks (median [IQR]) | 26 [6.1 -178] | | 39 [6.4- 181] | | 21 [5.7 -176] | | 1.0 | 0.997-1.003 |
| **Aggression characteristics** | | | | | | | | |
| Previous aggression | 267 | 69.4 | 134 | 59.3 | 133 | 83.6 | **2.8**[*] | **1.4- 5.4** |
| No understandable provocation | 83 | 21.6 | 49 | 21.7 | 34 | 21.4 | 0.65 | 0.33- 1.3 |
| Provocation: Patient being denied something | 84 | 21.8 | 41 | 18.1 | 43 | 27.0 | 1.7° | 0.88- 3.2 |
| Provocation: staff required patient to take medication | 5 | 1.3 | 2 | 0.9 | 3 | 1.9 | 3.1 | 0.30- 33 |
| Physical and/ or dangerous means used | 219 | 56.9 | 106 | 46.9 | 113 | 71.1 | **2.4**[*] | **1.3- 4.7** |
| Target: object(s) | 56 | 14.5 | 25 | 11.1 | 31 | 19.5 | 1.8° | 0.80- 3.8 |
| Target: other patient(s) | 94 | 24.4 | 64 | 28.3 | 30 | 18.9 | **0.49**[*] | **0.25- 0.96** |
| Target: patient self | 19 | 4.9 | 7 | 3.1 | 12 | 7.5 | 0.64 | 0.14- 2.8 |
| Target: staff member(s) | 271 | 70.4 | 152 | 67.3 | 119 | 74.8 | **2.6**[*] | **1.3- 5.0** |
| Target: other person(s) | 7 | 1.8 | 3 | 1.3 | 4 | 2.5 | 2.1 | 0.32- 14 |
| No consequences for victim(s) | 78 | 20.3 | 50 | 22.1 | 28 | 17.6 | 0.60° | 0.29- 1.2 |
| Victim felt threatened | 241 | 62.6 | 144 | 63.7 | 97 | 61.0 | 1.2 | 0.68- 2.2 |
| Victim had pain and/ or injury | 84 | 21.8 | 35 | 15.5 | 49 | 30.8 | **2.4**[*] | **1.2- 4.6** |
| Severity score on VAS[•] (mean score [SD]) n= 341 | 59.3 [20.4] | | 56.1 [20.4] [†] | | 64.0 [19.5] [‡] | | **1.3**[*•] | **1.1- 1.6** |

[#] Due to missing values, the total number of incidents may have been less than 385. In these cases the exact number of analyzed incidents is added;
[§] A patient could have more than one Axis I diagnosis;
[•] Because this variable is continuous, an adjusted OR was calculated for every ten-year increase (age) or ten-mm increase (severity of aggression on Visual Analogue Scale [VAS]);
[†] n= 202;
[‡] n= 139;
[*] p-value <0.05;
° p-value <0.20;
IQR= interquartile range; SD= standard deviation; OR= Odd's ratio; CI= Confidence Interval

Table 2: Predictors (demographic, diagnostic, contextual and aggression characteristics) of seclusion after aggression in a multivariable crossed multilevel logistic regression model°.

| | *Step 1* | | | *Step 2* | | | *Step 3* | | | *Final model* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **β** | **OR** | **95%CI** | **β** | **OR** | **95%CI** | **β** | **OR** | **95%CI** | **β** | **OR** | **95%CI** |
| Constant | 1.75 | | | 2.0 | | | 0.31 | | | -2.1 | | |
| ***Demographic*** | | | | | | | | | | | | |
| Unmarried | 0.01 | 1.0 | 0.12- 8.9 | -0.20 | 0.82 | 0.065-10 | -0.71 | 0.49 | 0.038- 6.4 | -1.2 | 0.29 | 0.012- 6.9 |
| Age | -0.68• | **0.51** | **0.33- 0.77** | -0.69• | **0.50** | **0.32- 0.78** | -0.60• | **0.55** | **0.35- 0.85** | -0.75• | **0.47** | **0.29- 0.78** |
| ***Diagnostic***[§] | | | | | | | | | | | | |
| Psycho-organic disorder | | | | -0.0079 | 0.99 | 0.68- 1.4 | -0.050 | 0.95 | 0.66- 1.4 | -0.085 | 0.92 | 0.60- 1.4 |
| Social problems Axis 1 | | | | 0.17 | 1.2 | 0.80-1.7 | 0.25 | 1.3 | 0.87- 1.9 | 0.31 | 1.4 | 0.88- 2.1 |
| Personality disorder | | | | -0.039 | 0.96 | 0.76-1.2 | -0.0091 | 0.99 | 0.79- 1.2 | 0.083 | 1.1 | 0.83- 1.4 |
| ***Contextual*** | | | | | | | | | | | | |
| Involuntary status | | | | | | | 1.6• | **4.8** | **1.6- 14** | 1.6* | **4.8** | **1.4- 17** |
| Previous hospitalizations | | | | | | | 0.72 | 2.0 | 0.63- 6.7 | 0.044 | 1.0 | 0.26- 4.2 |
| Late shift | | | | | | | 0.53 | 1.7 | 0.92- 3.1 | 0.56 | 1.8 | 0.87- 3.5 |
| ***Aggression*** | | | | | | | | | | | | |
| Previous aggression | | | | | | | | | | 1.2* | **3.5** | **1.3- 9.1** |
| Provocation: Patient being denied something | | | | | | | | | | 0.72 | 2.0 | 0.85- 4.9 |
| Physical/ dangerous means used | | | | | | | | | | 0.91* | **2.5** | **1.1- 5.7** |
| Target: objects | | | | | | | | | | 1.1* | **3.1** | **1.1- 9.0** |
| Target: other patient(s) | | | | | | | | | | -0.49 | 0.61 | 0.21- 1.7 |
| Target: staff member(s) | | | | | | | | | | 0.89 | 2.4 | 0.92- 6.4 |
| No consequences for victim(s) | | | | | | | | | | -0.15 | 0.86 | 0.33- 2.3 |
| Victim had pain/ injury | | | | | | | | | | 0.039 | 1.0 | 0.41- 2.6 |
| Severity score on VAS[‡] | | | | | | | | | | 0.28• | **1.3** | **1.1- 1.6** |

°333 aggression incidents analyzed. 136 incidents (40.8%) had resulted in seclusion;
[§] A patient could have more than one Axis I diagnosis;
[†] n.s.= not significant with $\alpha<0.05$;
* p-value <0.05;
• p-value < 0.01;
[‡] Odds ratio and its 95%confidence interval was calculated for each ten-mm increase on the VAS-scale
OR= Odd's ratio; CI= Confidence Interval; VAS= Visual Analogue Scale