

Registration of aggressive incidents in an adolescent forensic psychiatric unit and implications for further practice

S. Tremmery · M. Danckaerts · L. Bruckers ·
G. Molenberghs · M. De Hert · M. Wampers ·
J. De Varé · A. de Decker

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Abstract Although aggression is part of daily life in psychiatric units for adolescents, empirical data on its prevalence are sparse. Only few studies have described prevalence of aggressive incidents in adolescent psychiatric wards, and data in forensic psychiatric care are even more limited. Available studies reported high prevalence rates of aggression, ranging from 0.4 to 2.4 incidents of aggression per day across (forensic) child and adolescent psychiatric units. Between 27 and 78 % of all admitted youth committed an aggressive act. In this study, we collected systematically registered data of all aggressive incidents from the first 2 years (2010–2012) on a newly established forensic adolescent psychiatric unit, which used a formal aggression management program embedded in the social competence model, which is based on early

intervention in the ‘chain of behavior’ to prevent any further escalation. The inclusion of also minor aggressive incidents is unique in the literature and the clinical relevance is highlighted. A mean of one incident a day took place, with each adolescent involved in at least one incident. Notably, 1.7 aggressive incidents per month made seclusion of restraint use necessary. Based on the social competence theory, the aggression management model suggests intervening early in the cascade of aggression, in order to prevent further escalation and reduce the need for intrusive interventions. Evidence supported that aggression is a contextual event, as external factors clearly influence the incidence of aggression. Aggression management should be built on both relational and structural security.

Keywords Adolescents · Aggression · Prevalence · Forensic psychiatry · Aggression management

S. Tremmery (✉) · M. Danckaerts
Department of Child Psychiatry, Psychiatric Centre Campus
Kortenberg, University Hospitals Leuven, Leuvensesteenweg
517, 3070 Kortenberg, Belgium
e-mail: bie.tremmery@uc-kortenberg.be

S. Tremmery · M. Danckaerts · M. De Hert
Department of Neurosciences, KU Leuven, Leuven, Belgium

L. Bruckers · G. Molenberghs
Interuniversity Institute for Biostatistics and Statistical
Bioinformatics, Universiteit Hasselt, Hasselt, Belgium

G. Molenberghs
Interuniversity Institute for Biostatistics and Statistical
Bioinformatics, KU Leuven, Leuven, Belgium

M. De Hert · M. Wampers · A. de Decker
Department of Psychiatry, Psychiatric Centre Campus
Kortenberg, University Hospitals Leuven, Kortenberg, Belgium

J. De Varé
Forensic Department, PC Sint-Jan-Baptist, Zelzate, Belgium

Introduction

Aggressive behavior is a matter of great concern in psychiatric services and should be a key priority in mental health settings [1–3]. Both the frequency of aggression and the strong negative impact on staff and patients are important considerations. Frequent incidents of aggression and violence in inpatient settings militate against achieving the goal of providing the highest quality of health care for mental health service users, stipulated by the English National Service Framework for Mental Health [4, 5]. The international tendency to focus on outpatient and community treatment programs might lead to an increased proportion of violent patients in inpatient care [2, 6]. In children and adolescents, aggression is one of the most frequently reported reasons for psychiatric hospitalization

[1]. The consequences of exposure to aggressive incidents on the ward, either as a victim or as witness, are not yet fully known and research is scarce. Empirical evidence exists about the relationship between aggression and psychopathology [7], there is evidence for a modeling effect on the other (non-aggressive) children [8] and recent data made clear that aggression and group climate have an impact on therapeutic outcome [9]. The presence of aggression has also a clear negative impact on the well-being of employees [10] and staff turn-over [11].

Based on the existing literature, it is difficult to clarify the extent of aggression in child- and adolescent psychiatry. Nijman and colleagues [12] presented an extended and detailed review of aggression in adult psychiatry. A systematic review of the literature in general and forensic child and adolescent psychiatry by Tremmery and colleagues [13] found that in a regular child- and adolescent psychiatric ward the number of aggressive incidents ranged from 0.4 to 3.5 incidents per day, with 33–78 % of the admitted patients committing at least one aggressive act [1, 14–18]. A similar picture was found in a secured setting with 0.5–2.4 incidents per day and 27–54 % children or adolescents committing at least one aggressive act [19–21]. At a forensic adolescent psychiatric unit, 1.1 incidents per day were reported with 55 % of the population committing at least one aggressive act [22]. These strikingly similar numbers across settings and types of aggression need further clarification. The huge variety in the use of operational definitions of aggression and research designs (duration, population, instruments used, etc.) makes it difficult to draw clear conclusions and explain the lack of differences. More research is needed based on a clear definition of aggression.

In this study, we systematically collected detailed data of all aggressive incidents and interventions as registered during the first 2 years on a newly established forensic psychiatric unit for adolescents in Belgium. The fact that these data were part of routine recordkeeping and carefully monitored by the research team, provides a uniquely detailed and independent description of aggressive incidents. They will contribute to the knowledge of the prevalence of aggression in forensic adolescent psychiatry and generate tools to develop a specific aggression management policy. The main aim of this article was to present a detailed description of the prevalence and types of aggression and their interventions. We describe the type and severity of aggressive incidents, but also additional characteristics, such as moment of the day, the relationship with treatment duration and interventions used as a response to the aggressive incidents. No specific a priori hypotheses were made.

Materials and method

Setting and general treatment program

The forensic adolescent treatment unit is a eight-bed unit newly established in 2010 that is part of the child and adolescent department of a large university psychiatric hospital in Belgium. The target population is between 12 and 18 years old with forensic status (e.g. juvenile justice record) in combination with psychiatric problems. Patients are referred by the juvenile court for a treatment period of 6 months, once renewable with a maximum period of another 6 months. The referred youngsters have a need for medium to high level care, within a medium security setting and have a medium to high risk of recidivism [23]. A need for medium to high level care means that a residential psychiatric treatment is necessary because of the youngster does not function anymore on all the important life domains such as family (or institutional context), school and social relations. The forensic treatment is based on the principles that security and care are not contrasting concepts, but are combined in the concept of safe care. This concept of safe care is based on the social competence model [24], which is translated into different phase with gradual freedom expansion embedded in structural and relational protective measures. The adolescent proceeds during treatment through five phases, starting from a totally individualized program on the unit with very restricted and limited freedom. Transition to a next phase in the program involves each time a further gain in the re-socialization process including more participation in developmental tasks, such as contacts with family and peers, school, hobbies, access to internet, mobile phone, etc. In the final phase of treatment, the adolescents go to school or work and hobby clubs outside of the ward, having full access to social media. The *American Academy of Child and Adolescent Psychiatry* guidelines, which stress that aggression management should focus on prevention, early intervention and de-escalating techniques [25], were implemented in the social competence model, which is based on early intervention in the 'chain of behavior' to prevent any further escalation [13].

Participants

The sample consisted of 21 inpatients admitted during the first 2 years to the forensic adolescent treatment unit. The age range at the time of admission was 12–17 years, with a mean age of 15.2 years ($SD = 1.3$) and a median of 15 years. There were 15 males (71.4 %) and six females (28.6 %). The mean duration of stay was 176 days ($SD = 135$), with a range between 18 and 442 days.

The population was a compilation of patients with complex psychiatric disorders and various comorbidities. Before admission, a multidisciplinary extensive diagnostic intake procedure took place during which information of self-report diagnostic surveys was integrated with collateral information from parents, earlier caregivers and juvenile records. Based on this diagnostic report and a clinical investigation, the departmental psychiatrist assigned diagnoses based on the *Diagnostic and Statistical Manual of Mental Disorder*, Fourth edition [26]. All patients received two to three DSM IV axis 1 diagnoses, with the most frequent being within the class of disruptive behavior disorders: conduct disorder (17), ADHD (8) and impulse control disorder (4). The reactive attachment disorder (7) and parent child problems (5) form a second substantial group of diagnosed problems. Other problems such as pervasive developmental disorder (3), anxiety disorder (3), mood disorder (3) or substance dependency (2) were less common in this population. Additionally, 11 patients received an axis 2 diagnosis, more than half of them because of lower intellectual functioning. The axis 5 scores for global assessment of functioning (GAF) at admission were between 20 and 55, with a mean score of 37 (SD = 8).

All patients were classified with a high risk on recidivism for violent behavior, based on the structured assessment of violence risk in youth (SAVRY) [27], which is part of the diagnostic intake procedure by the criminologist of the department. The mean number of violent offenses, prior to admittance was 9.2 (SD = 3.8), and a mean of 12.8 different nonviolent offenses (SD = 5.4) were rated for the research population.¹

Procedures

Data are systematically collected in an electronic data base, in which as a matter of routine record keeping, each aggressive incident committed by a patient, is recorded by the staff, based on the modified overt aggression scale of Kay et al. [28]. For each incident, type (verbal aggression, aggression against property, physical aggression and auto-aggression) and severity (mild, moderate, strong and extreme) of aggression is scored on this scale. Multiple types of aggression can co-occur on one incident. For example: an incident can be registered as consisting of strong verbal aggression, in combination with moderate aggression against property, mild physical aggression and no auto-aggression. In addition to this scale, other relevant variables about the incident are scored in our electronic data base, including time of the incident and interventions

that followed.² All staff members were trained and supervised regularly for the registration of aggressive incidents by the researcher. Steinert and colleagues [29] report good inter-rater reliability for the MOAS (mean weighted kappas = 0.90). The years of expertise and local guideline-driven use of the MOAS that existed already in the hospital, facilitated the implementation on our unit.

On a weekly basis, the main researcher screened the electronic observation files and checked whether all aggressive incidents were registered. In case of doubt, the situation was reviewed together with the involved staff members and it was decided whether or not additional events should be registered. Serious aggressive incidents were thoroughly registered, but the mild and more subtle forms of aggression were sometimes overlooked and handled differently by staff members. This is in line with the findings in adult research [12].

Statistics

Variables

Aggressive incidents were characterized in terms of their primary features, type and severity. Type of aggression was categorized as verbal aggression ('verbal'), aggression against property ('object'), physical assaults of others ('person') and auto-aggression ('self'). For each aggressive incident, this information was summarized into a four-variate binary response. For example, an aggressive incident with the four-variate binary response (1,0,1,0) represents an incident with verbal aggression and physical assaults of others, while aggression against property and auto-aggression were not present.

For each type of aggression, the severity was scored as mild, moderate, strong or extreme. For the statistical analyses, binary severity indicators were created by combining the levels mild/moderate and strong/extreme. This resulted in a four-variate severity variable. For example, an incident with strong verbal aggression, mild aggression against property, mild physical assault of others and extreme auto-aggression has the following value for the four-variate severity variable (1, 0, 0, 1). This definition is conditional on the fact that a specific type of aggression was registered for the incident.

For each stay, the total number of incidents per each hour of the day was calculated. This results in 24 counts per stay, one for each hour of the day. The variable defined in this way summarizes the number of incidences throughout the

¹ The number of offenses is a huge underestimation of the actual number of offenses. Repeated similar offenses were only rated once. For example daily fights at primary school will be rated as only 1 offense.

² A list of possible interventions is presented and the staff member denotes which of these are applicable for the incident. In Fig. 5 these interventions are all presented. Multiple interventions can be scored for one incident.

day, as an average of all days within a stay. Next, the hours were grouped into four timeslots: 10 p.m. to 7 a.m., 9–12 p.m., 1–2 p.m., 4–5 p.m.. All other timeslots constitute the background period. This choice was data driven; visual inspection of the number of incidents per hour showed that these four timeslots show a high or low number of incidents per hour. The goal is to test these four timeslots versus a ‘background’ period without peaks.

To study the change in the number of incidents as a function of treatment duration, data were first summarized at a weekly level. For each stay, this resulted in repeated measurement data, with the number of incidents per week registered over time.

Statistical analyses

For descriptive purposes, continuous variables (like age at admission, duration of stay) are presented in terms of their mean, median and standard deviation. Binary variables (e.g., presence or absence of a type of aggression) are summarized via proportions. Categorical variables are presented via frequency tables.

Type of aggression Differences in prevalence of the types of aggression were evaluated at the level of an incident. The four-variate binary response—representing the aggression types involved in the incident—was modeled via a logistic regression model for correlated data [30]. The correlation that is obviously present between the responses of the same adolescent, was incorporated into the statistical model via a random adolescent intercept. By including a fixed effect for the type of aggression in the model, differences in the probability for a specific aggression type could be investigated. The results will be presented by means of odds-ratios.

Severity of aggression To compare the severity between the types of aggressive acts, a logistic regression model for correlated data was applied [30]. The four-variate binary severity is the dependent variable and type of the aggression is the independent variable. The model allowed to investigate if the probability/odds for a strong/extreme aggressive act differed according to the type of aggression. The results will be presented by means of odds-ratios.

Time of the day The number of incidents throughout the day, and number of incidents as a function of treatment duration were both modeled by means of a zero-inflated Poisson model for repeated data [31].

The repeated measurements obtained for an adolescent throughout time cannot be considered to be independent. Correlation between the measurements over time, should be allowed for in the statistical model. A mixed effects

model, with a random intercept at the adolescent level, allows for correlation between the repeated measurements of a patient [30]. The response to be modeled as a function of time is count data, i.e., the number of incidences per hour or per week. A Poisson model can be used for this. However it is seen that data exhibited an excess of zero counts, are not well predicted by the Poisson distribution. Zero-inflated Poisson regression is used to model count data with an excess of zero counts. The zero-inflated Poisson model has two parts, a Poisson count model and the logit model for predicting excess zeros [31].

The zero-inflated Poisson model for hourly repeated measurements data was used to test for differences between the identified peak timeslots and the background timeslot. Since the number of incidents per hour will be higher for longer stays, the model incorporated a correction for the length of the stay via an offset.

Treatment duration The repeated count data model for the number of incidents per week as a function of treatment durations was used to check if transitions from one phase to the next phase in the treatment model, were reflected in changes in the number of incidences.

Results

Prevalence of incidents

Seven hundred thirty-one aggressive incidents were reported during the 2 years study period. This gave a mean number of one incident per day or, occupancy taken into account, 0.16 incidents per patient a day. As can be seen in Fig. 1, on half of the days, no incident at all occurred. One single incident was registered in 26 % of the days and on 24 % of the days more than one incident took place. The team was confronted with frequent aggressive incidents (more than three incidents) in only a small proportion of the days (5 %). All patients were involved with at least one aggressive incident.

Aggressive incidents were categorized in terms of their primary features, including type of aggression used and severity (cfr. supra). Different types of aggression can co-occur within the same incident. Over the 731 incidents, 1,010 types of aggression were registered. This means that for each incident a mean of 1.4 types of aggression were scored.

The distribution of the different aggression modes was highly skewed (see Fig. 2): less serious expressions of aggression were most frequently reported, both with regard to type as to severity of aggression.

Regardless of the severity, clear differences in prevalence of the different types of aggression can be found

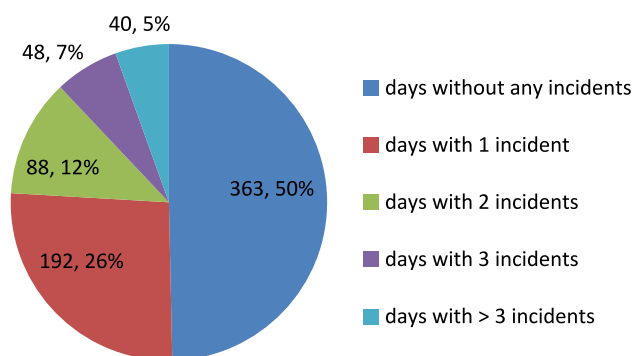


Fig. 1 Distribution of days in function of number of incidents per day (absolute number; percentage)

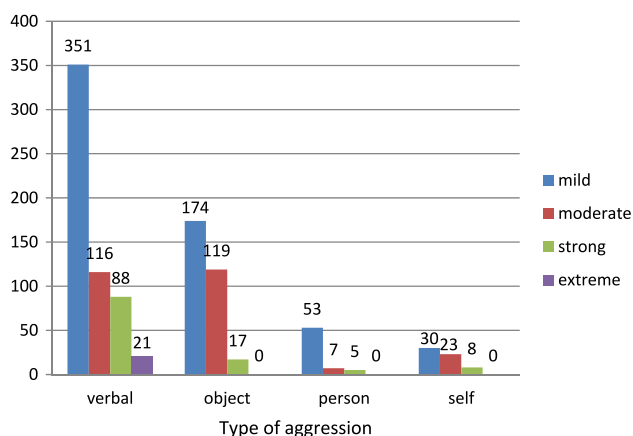


Fig. 2 Prevalence of aggressive incidents

[$F(3,2900) = 267, p < 0.0001$]. In Table 1 the odds ratios are given for the different types of aggression. Given the fact that an incident took place, the chance that verbal aggression was involved, was 5 times higher than the risk for aggression against objects, 38 times higher than the risk for aggression against persons and 41 times higher than the risk for auto-aggression. The risk for aggression against objects was more than seven times higher than the risk for aggression against persons and eight times higher than the risk for auto-aggression. No differences were found in the prevalence of aggression against persons and auto-aggression.

A similar pattern can be found in the severity of the aggressive act. Regardless of the type of aggression, 60 % of all reported incidents concerned mild levels of aggression, whereas the most extreme levels were only present in 2 % of the incidents. If a comparison was made of the frequency distributions of severity of aggression within each category it was clear that there are marked differences. For the analyses the categories of mild and moderate aggression were aggregated into a new category of 'limited aggression' whereas the categories of strong and extreme aggression were labeled as 'serious aggression'. Within the

Table 1 Odds ratios of occurrence of aggression

	Odds ratio	Pr > t	Confidence interval
Verbal vs object	5.02	<0.0001	3.98–6.32
Verbal vs person	38.23	<0.0001	28.01–52.18
Verbal vs self	40.99	<0.0001	29.85–56.28
Object vs person	7.62	<0.0001	5.67–10.23
Object vs self	8.17	<0.0001	6.04–11.04
Person vs self	1.07	0.71	0.74–1.55

Table 2 Odds ratios of serious aggression

	Odds ratio	Pr > t	Confidence interval
Verbal vs object	3.81	<0.0001	2.21–6.56
Verbal vs person	3.05	0.0228	1.17–7.95
Verbal vs self	1.48	0.3385	0.66–3.28
Object vs person	0.80	0.6791	0.28–2.31
Object vs self	0.39	0.0408	0.16–0.96
Person vs self	0.48	0.2411	0.14–1.63

category of verbal aggression, the proportion of serious aggressive acts versus limited aggressive acts was 3.8 times higher than this proportion within the category of aggression against objects and 3 times higher than this proportion within the category of aggression against persons. Otherwise stated, within the category of verbal aggression, more serious verbal aggressive acts were registered proportional to limited verbal aggressive acts, whereas this proportion of serious versus limited aggressive acts was lower for the other categories of aggression (see Table 2).

Prevalence as a function of moment of the day

As can be seen in Fig. 3, incidents did not occur randomly throughout the day. The highest number of incidents occurred between 4 and 5 p.m. ($p < 0.05$). Another significant peak of incidences was observed between 9 and 12 a.m. ($p < 0.05$). At night (between 10 p.m. and 7 a.m.) and between 1 and 2 p.m., significantly fewer incidents occurred on the unit (resp. $p < 0.01$ and $p < 0.05$).

Prevalence in function of treatment duration

Given our phased treatment model, even more interesting is the distribution of incidents in function of treatment duration (Fig. 4).

Few incidents occurred during the first week on the unit. However, a steep increase was found from week two, with a high frequency of aggression in week three, trailing off

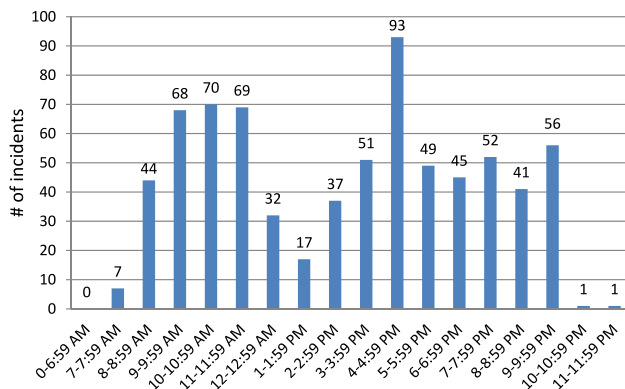


Fig. 3 Prevalence of incidents according to hour of the day

from week four on. The peak of incidents that was seen in week three differed statistically significantly from 2 weeks earlier and later ($p < 0.005$). This period is the transition period from phase one with the individual program (generally the first 2 weeks) to phase two, when the youngster participate fully in the group program. The first transition and adaptation was accompanied by an increase in the number of aggressive incidents. During the treatment program, three more transitions are made for most adolescents (after week 8, 20 and 32). These transitions to a higher phase in the program involve a next step in the re-socialization trajectory, including more participation in developmental tasks such as contacts with peers, school, hobbies, more access to internet, mobile phone, etc. These transitions were not accompanied with significant increases

of incidents. In this way, in the later phases, gradual increase in contact with others and degree of freedom was no longer accompanied by an increase in aggressive incidents. The observed peaks in Fig. 4 around week 16 and week 25 were not statistically significant.

Interventions

As pointed out in the description of the setting, a clear aggression management model exists within the unit, based on the social competence model and in accordance with the guideline of the *American Academy of Child and Adolescent Psychiatry* [25]: intervention should be as early as possible in the chain of aggression behavior and enhance the patient's autonomy and dignity as much as possible, while assuring a safe and secure environment for all patients and staff.

Only a small proportion (less than 5 %) of incidents was not followed by any intervention at all. The remaining 699 incidents were followed by 1,143 interventions, as a combination of different interventions was possible in reaction to a single incident. It is clear from Fig. 5, that the most frequent interventions were talking to the youngster, increased observation and room referral. This triad of interventions accounted for almost 93 % of all interventions. More restrictive interventions such as oral medication, seclusion, mechanical restraint or assistance of additional persons were scarcely used interventions.

The high frequency of low impact interventions is congruent with the social competence model, because these

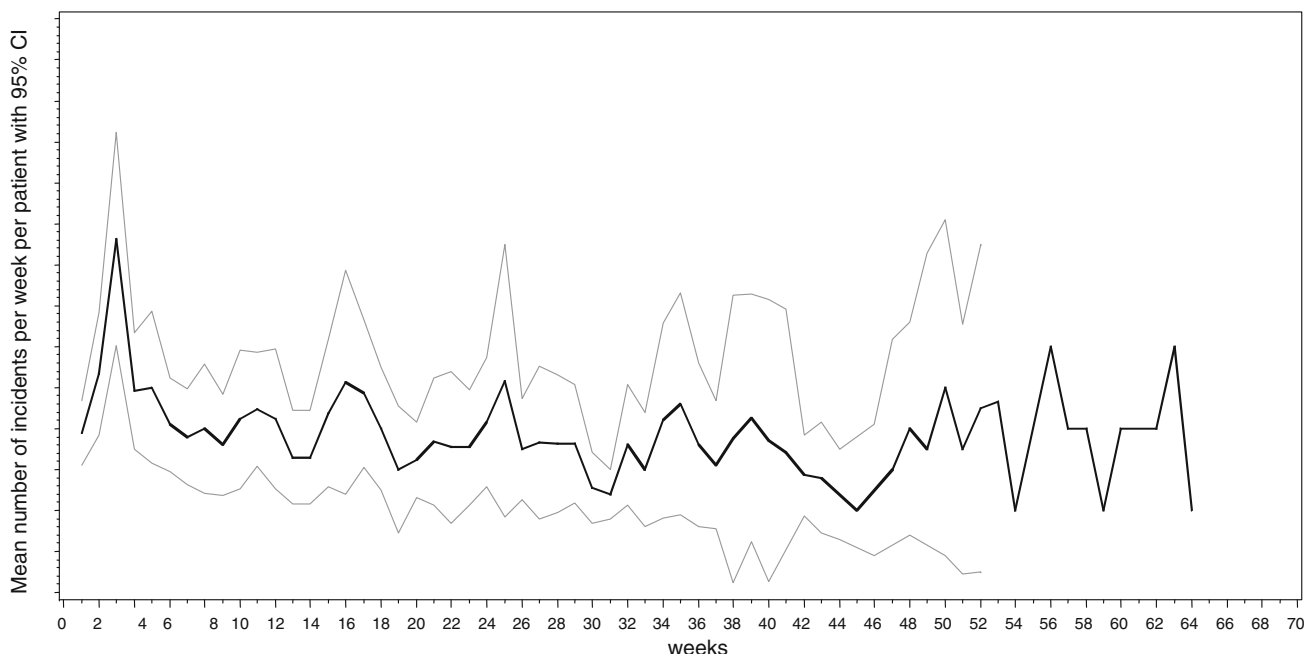


Fig. 4 Prevalence of incidents according to duration of treatment (weeks)

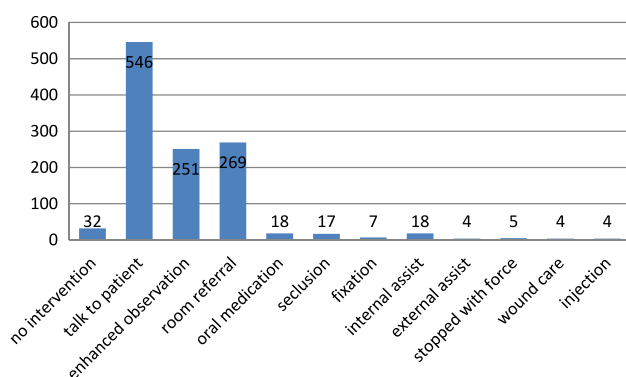


Fig. 5 Interventions after aggressive incidents

represent the recommended interventions of the first steps in the cascade of aggression. The use of these early interventions, makes more intrusive interventions less necessary.

In order to compare the data of this study with other published data, we calculated the number of ‘critical incidents’, incidents which are followed by any seclusion or restraint use. For this purpose we used the broadest definition of restraint, as also room referral was counted as a restrictive intervention. As such, 299 incidents took place during the first 2 years, thus 0.4 incidents a day. However, room referral is in the model we used, not seen as a restrictive intervention (cfr. *infra*). When room referral is not taken into account, only 0.06 incidents a day took place that required seclusion or restraint use.

Discussion

The main aim of this article was to present a detailed description of the prevalence and types of aggression and their interventions. On average, one aggressive incident a day took place on the unit. However, the majority of incidents consisted of mild forms of aggression that often are not reported in the literature. A small proportion (although more within the category of verbal aggression) of incidents escalated to more serious aggressive incidents. Only 0.06 incidents a day made seclusion or restraint use necessary. The main interventions used on the unit were talking, increased observation and room referral. The data made clear that aggression can be seen as a contextual event, in which for example certain moments of the day and critical periods in treatment duration correlated with a higher prevalence of aggression.

Prevalence of incidents

In line with the prevalence rate found in the literature, aggressive incidents are part of daily life at a forensic

psychiatric unit for adolescents. During the first 2 years, this unit was confronted with one aggressive incident a day on average. This number corresponds quite well with the literature. When the capacity of the unit was taken into account, the aggression ratio was still within the range that was found on other units [13]. This similarity is striking. We expected much higher prevalence data because of differences in operationalization of aggression and the careful monitoring of registration. In this article, we chose to use a very broad definition of aggression, including mild verbal aggression, based on the aggression management model that is adhered on the unit (cf. *supra*). The majority of aggressive incidents with which the unit had to deal, consisted of mild forms of aggression, particularly verbal aggression. This form of aggression is often not registered or mentioned in the literature, where the main focus is on more severe forms of aggression, such as critical incidents that require seclusion or other restraint use.

These kinds of restrictive interventions are seldom used on the unit we describe here. Less than 6 % of the registered incidents were followed by interventions that implied seclusion, technical or chemical restraint use (that is 0.06 incidents per day). This is an extremely low rate compared with previous studies [32]. Room referral is an intervention that was regularly used on the unit. In our aggression policy, room referral is not defined as a restrictive sanction on a serious incident use. Room referral is used as an early step in the cascade of aggression to prevent escalation and to regulate aggression, early in the process. The referral is limited in time, by an evaluation system in which, through a personal contact, every 5 min a team member together with the youngster evaluate whether reintegration is possible and appropriate. However, in literature, some authors consider room referral as the use of restraint. In an attempt to compare our data with the data of the literature, we counted the number of incidents, with this broad definition of seclusion and restraint use, thus, room referral included. The number of incidents found with this operationalization was 0.4 incidents a day. This figure is low, compared to the literature of critical incidents in both forensic child and adolescent psychiatry (1.1 critical incidents a day [22]), secured child and adolescent psychiatry (0.7–2.4 critical incidents a day [21, 33]) as well as general child and adolescent psychiatry (0.6–2.4 incidents a day [1, 16, 18]). Although it is difficult to compare these prevalences, it is at least remarkable that the prevalence in our forensic population is not higher than the prevalence in general child and adolescent psychiatry. One can hardly suppose that the forensic population with a clearly and diagnosed risk on violent behavior should be less aggressive than the population on a general child and adolescent psychiatry. On our unit all youngsters were involved within at least one incident, whereas in the literature these numbers varied

between 27 and 78 %. The difference with the Finnish forensic unit should also be interpreted with cautiousness. Different research paradigms but also different research populations make it hard to draw any conclusions. It seems, for example, that the Finnish forensic population consists of more adolescents with a diagnosis of schizophrenia [22, 34, 35]. In literature on adult psychiatry, there is some evidence that suffering from schizophrenia might elevate the risk to commit violent acts [36].

More than only counting the number of the incidents, it is important to observe the content of the incidents, namely the form and severity of aggression. It is clear that the unit was confronted with a high number of mild aggressive incidents and only a few serious incidents, although the admitted youngsters were known to have a history of serious aggressive incidents. The frequent (mild) incidents in which all youngsters were involved, show that aggression was still present and could escalate to critical incidents. Only a very small proportion of these mild incidents escalated into more serious incidents. This break in the trend of serious aggressive behavior that was present before admittance to the unit (as can be seen in the SAVRY data [27]), is remarkable. Further research is necessary to make clear whether the prevention of serious incidents is due to the risk management of early intervention in the escalation process or not. However, it may be clear that even serious disruptive and aggressive behavior in adolescence is in some way modifiable and there is a chance for positive change in this developmental period.

Though, within the category of verbal aggression, this trend was less clear. The proportion of serious versus limited verbal aggressive acts was significantly higher than it was within the other categories of aggression. Otherwise stated, verbal aggressive acts seemed to escalate more to the serious forms and were less limited to the mild forms of aggression, as this was the case for the other forms of aggression. Two explanations are possible. First, interventions for verbal aggression were not adequate. We see that there was, compared to the other forms of aggression, more escalation from limited aggression to serious verbal aggression. This raises the question whether the staff has a more tolerant attitude toward verbal aggression, which reflects more the cultural and societal attitudes of seeing verbal aggression as unavoidable during adolescence than the unit policies of taking serious any kind of aggression. Further research will focus more in detail to the used interventions per category of aggression type to see whether such differences can be found. Because of a lack of comparable data from other similar units, no benchmarking is possible so that we cannot conclude whether we have a high proportion of escalation in verbal aggression, or a low proportion of escalation in the other forms of aggression. Second, another possible explanation is that there might

have been a shift of the more serious form of aggression against objects toward (serious) verbal aggression. To explore both hypotheses, further research will be necessary.

Interventions

The aggression management model postulates that interventions should be implemented as early as possible in the chain of aggression behavior and enhance the patient's autonomy and dignity as much as possible, while assuring a safe and secure environment for all patients and staff. As such, continuous vigilance is needed to give attention to even the smallest expression of aggression because this is seen as a possible first step in the chain of aggressive behavior. An early and adequate reaction in accordance with the severity of the act can avoid a more serious form of aggression that would require a more restrictive intervention. The systematic registration, carefully monitored by the researcher, keeps staff alert for minor aggression and acts against blurring the moral standards.

The predominantly used interventions, that account for more than 90 % of all interventions, were: talking to the youngster, increased observation and room referral. Room referral means in our model that the youngster is asked to go to his/her room for a short period of time. Every 5 min the patient is checked by a personal contact whether the youngster has calmed down enough to again participate in group activities. These interventions are rather nonrestrictive with maximal dignity and autonomy for the patient. As such we try to stay out of any power conflict, with the aim of enhancing the autonomy and anger management coping styles. We focus more on repetition rather than intensity of the interventions. A high frequency of low impact interventions is congruent with the stepped model of the social competence model that recommends interventions of the first step in the cascade of aggression. Seclusion and fixation are seen as last stage and thus last choice interventions. As can be seen in the data, seclusion and fixation were seldom used intervention on this forensic ward (2 % of all interventions). The choice of interventions used on the unit, is in line with the findings from Berg and colleagues [34]: staff of adolescent forensic units in four European countries preferred verbal interventions to manage aggressive behavior and considered the use of coercive measures as the last option.

Aggression as a contextual event

Aggression is a contextual event, in which not only individual factors come into play but also characteristics of the context might contribute to a safe or dangerous climate. To account for this, a focus on relational and structural security plays an important role in our treatment model. The data that we presented in this article supports our view.

A clear example of the influence of external factors is the fact that risk of aggression was higher at certain times of day. In the literature on aggression in psychiatric units for adults, clear evidence exists for a greater number of incidents during daylight hours, starting at breakfast and increasing during the day, with a higher frequency in the afternoon and trailing off only at bedtime [37–41]. In line with these results, on this unit, no incidents occurred between 10 p.m. and 7 a.m.. This is a period in which the adolescents are in their own room, supposed to sleep. The pattern of incidents throughout the day that was found in this study was somewhat different. No steadily increase during the day was found. We see at the time of individual rest, between 1 and 2 p.m., a marked decline in incidents. The most pronounced increase in aggressive incidents is found between 4 and 5 p.m.. This critical moment in the late afternoon coincides with the moment on which the therapeutic part of the day is ending, what results in an evaluation of the day, followed by a substantial portion of staff leaving the unit. Between 9 a.m. and noon, an elevated risk of aggression was found, compared to the rest of the day. This is a period in which the most verbal, demanding and confronting therapeutic sessions take place with the whole group of youngsters. In the afternoon, more active and mainly non-verbal therapeutic sessions within small subgroups of youngsters are planned. In contrast with the literature, a quite stable pattern is found in the afternoon and during the evening hours (2–10 p.m.), with the exception of the peak at the end of the working day. However during the first months of working on this unit, we did notice an elevated risk for aggression during the evening hours. Substantial changes of the evening program were carried out such as moving less structured activities (taking a shower, housework) to moments earlier on the day, with more staff available and organizing more structured activities during the evening hours. Systematic analyses of the impact of these structural intervention will be reported in a later paper. The analysis of the timeframe pattern can be used to define critical moments during the day which has clear clinical implications, for example adapt the daily structure to provide more structured activities on critical moments. This is in line with the findings of Bowers and colleagues [42] that the degree to which a ward is well ordered and organized has a clear relationship with the number of conflicts on that ward.

Another example of how external factors play an important role in the expression of aggression, can be found in the critical periods in terms of length of stay on the unit. In contrast with adult literature [37], few incidents occurred during the first week after admission to the unit. In this period, the youngsters follow a mainly individual program, focused on risk taxation, self-reflection and introduction to the new unit and staff members. After

2 weeks, the first transition is made from the mainly individual work in phase one to participating fully in the group program in phase two. At the start of this phase, in week three, a steep increase in aggressive incidents was found. The introduction in the group program, the contact with the other youngsters and the associated increases in freedom, seemed to be an important trigger for aggressive incidents. Remarkably the successive transition periods (week 9, week 21 and week 33) were not accompanied by an increase in aggressive incidents. Thus, in the later phases gradual increases in freedom and developmental tasks were no longer triggers to extra incidents. This might suggest that there was a change in the coping skills of the youngsters, what is a major therapeutic aim of the social competence model. Although there are some milestones in the resocialization process of the youngsters in which more behavioral and social skills are expected, no increases were found in aggression rates in these periods. These data, indicate that a good balance has been found between skills and tasks in these critical periods. Careful monitoring of skills and limitations, in accordance with tasks and degree of freedom, helps to prevent the possible damaging influence of contextual factors on the prevalence of aggression.

It might be clear from these data that external influences play an important role in the prevalence of aggression. The way of making use of these influences in therapy, taking them into account in the treatment trajectory and dealing with aggressive incidents does matter and contributes to the prevention of (serious) aggression on the unit. It might also be clear that the behavior of staff is crucial. How staff's activities, but also other external factors, such as structural changes in the treatment program, staffing hours, changes in staffing patterns, etc., impact aggression and vice versa will be the focus of further research.

Strengths and limitations

In this paper we focused on the general prevalence of aggression on a newly established forensic psychiatric adolescent unit. Regular moments of reflection with the staff made the registration more reliable and kept staff members alert for even the most subtle forms of aggression and prevented blurring the moral standards. This has been done to maximize the registration of incidents, but also influences the daily routine. Nijman and colleagues [12] also describe the fact that the increased sensitivity due to registration, might impact the way aggression is handled and as such influence the prevalence. As the continuous vigilance for minor aggression is part of the aggression management policy, this is no problem for the clinical work that has been done, but from a research point of view can be seen as a confounding variable that might influence the outcome, namely the number of aggressive incidents.

No inter-rater reliability was measured for the registration of the incidents of this study, but previous research done by Steinert and colleagues [29] mentions good inter-rater reliability for the used scale (cfr. *infra*).

To analyze the data on severity of the different types of aggressive acts, a logistic regression model for correlated data was applied to the four-variate binary severity response. Note however, that this analyses cannot tackle the fact that the different severity levels for the four types of aggression are not necessarily comparable, although a similar hierarchy of severity exists among the different types.

Another limitation of this study is that it covers the aggression on only one forensic ward, with a relatively small number of patients. As such, questions can be raised with regard to the generalizability across units and patients. Further research on similar but other forensic units and with a higher amount of patients will be necessary.

The contribution of this paper is the careful recording of all aggressive incidents, including minor incidents that are seldom reported in other studies. This gives a comprehensive insight in the developmental processes of aggression and generates possibilities for managing and prevention of serious incidents. In future research we will focus on the one hand on characteristics of the youngsters themselves and try to distillate different risk profiles, while on the other hand, we will explore more into detail the contextual factors. These contextual factors might generate further possibilities to influence the aggression on the unit and provide handles to evaluate or change the aggression management policy. Moreover, knowledge about detailed risk profiles makes it possible to adapt the aggression management policy in function of specific needs of some youngsters and/or context variables.

Conclusion

The forensic psychiatric unit for adolescents that is described here, is populated by a very vulnerable group of adolescents, known to be at high risk of aggressive behavior. However, the existing focus on aggression management on the unit appears to result in a calm atmosphere with lower than expected rate of aggressive incidents. On half of the days, no aggressive incident took place and on the remaining days when any incident occurred, it consisted mainly of mild forms of aggression so that high impact or very intrusive interventions were seldom necessary. The systematic and continuous registration of all aggressive incidents, mild verbal aggression included, helps to focus on the first signals of aggression and helps to prevent any escalation. This data, together with the clinical experience of earlier work in adolescent forensic psychiatric unit, provide the basis of the

development and monitoring the aggression management on the unit. We believe that aggression is a contextual event, that, as such, can be influenced by the context and this is one of our most important goals of the aggression management policy. A good forensic treatment can only work in a safe therapeutic climate.

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