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Staff and ward factors associated with aggression development on an acute closed psychiatric ward: an experience sampling method study

Irene Weltens , Marjan Drukker, T van Amelsvoort, Maarten Bak

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Department of Psychiatry and Neuropsychology, Maastricht University, Maastricht, The Netherlands

Correspondence to
Drs Irene Weltens;
irene.weltens@maastrichtuniversity.nl

ABSTRACT

Aggression on psychiatric wards develops under influence of patient, staff and ward factors. Assessment of naturalistic derived staff and ward factors might increase better understanding of how aggressive incidents develop on psychiatric wards.

Objective Studying staff and ward factors including interactions between patients and nurses prior and after development of aggression, within a naturalistic closed ward setting.

Design A prospective naturalistic experience sampling method (ESM) study.

Setting and participants A high intensive care unit of a mental health institution in The Netherlands where 29 nurses answered beeps generated by an app during approximately 7 consecutive days with questions regarding their subjective feelings, ward atmosphere, location, interaction they had with patients and their colleagues and whether an incident took place.

Main outcome measures Associations were established between different staff and ward factors and the occurrence of aggressive incidents on the ward.

Results Risk for aggression was associated with the nurse being with a patient (OR=2.26, 95% CI 0.99 to 5.15, p=0.05). No significant association was found between discussing with the patient and setting a limit or physical absence of the nurse on the one hand and aggression on the other. More experienced nurses encountered more aggression (OR=3.5, 95% CI 1.32 to 8.26, p=0.01). Age and gender of the nurse were not associated with aggression development. Exceeding the maximum bed capacity was associated with a greater risk for aggression (OR=5.36, 95% CI 1.69 to 16.99, p=0.004). There was no significant association when analysing a more positive atmosphere on the ward or positive affect of the nurse, but negative affect of the nurses showed a trend for an association with less aggression.

Conclusion Aggression is a problem that should be managed from a multidimensional perspective. The quality of interaction between nurses and patients is crucial. Exceeding the maximum bed capacity is likely associated with more aggression.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This is a prospective study on staff and ward factors contributing to the development of aggression on the psychiatric ward.
⇒ With this experience sampling study, the different factors are studied in a naturalistic, daily life setting and results show the contributing factors from moment to moment.
⇒ During the study period only a limited number of incidents occurred. Clinically this is positive, but it hampers the power of the study.
⇒ The different factors were analysed separately while they are interacting with each other.

INTRODUCTION

Aggression on acute psychiatric admission wards is problematic for staff, nurses and other admitted patients. A recent systematic review including 146 articles on this subject showed that development of aggression can be explained by three main factors; patient related factors, ward related factors and staff related factors.[1] Most published studies have been on patient related factors (89 studies) and showed that psychotic disorder, bipolar disorder, substance abuse, history of aggression (also in the same admission) and younger age are risk factors. Ward and staff related factors have been studied to a lesser extent with 37 articles and 36 articles, respectively.[1] Gaining more insight into these factors may offer valuable information for targeted prevention and intervention of aggression.

Ward factors that are more likely to contribute to aggression are the level of bed occupation and the number of admissions.[1] Also places with increased patient–patient or patient–staff interaction are at risk for aggression development.[2–5]

Staff factors that have been related to aggression include male gender, job strain, job dissatisfaction, overwork, dissatisfaction with leadership, tiredness, lack of good introduction of a new nurse, poor collaboration between nurses, more temporary staff and higher levels of anxiety in nurses.[1] The nature

of patient–staff interaction is also a factor in the development of aggression on the ward and seems important, since aggression arises in the communication between people.[1] It is mainly the interaction where nurses have to deny the patient something or where they offer medication or have a discussion with the patient that leads to aggression.[1] All these factors have been described, but prospective research is largely lacking, especially when it comes to interactional causes of aggression.[1]

Up to 88% of nurses experienced verbal aggression during the preceding year, 56% experienced physical aggression.[6] Physical aggression was associated with burn-out, anxiety and depression in nurses.[7 8] But nurses also contributed in the development of aggression,[1] for example, because of their own personality traits.[9] One of the consequences of experienced aggression was sick leave; about 10% of nurses reported missing work at some point due to aggression and 60% reported some post-traumatic symptoms.[10] Both state and trait variables of nurses and nursing teams had their influence on the development of aggression on the ward: nursing teams with a higher mean team scored on extraversion experienced more verbal aggression.[9] But during a day on the acute ward, nurses showed a great variation in behaviour (helping the patient with Activities of Daily Living (ADL), administering medication, laughing together, going for a walk in the garden or having serious, sometimes confronting, conversation with patients, etc). They showed different emotions and affect towards the patient in preventing agitation (de-escalating techniques), but are also involved in potentially aggression provoking behaviours in patients by setting limits or discussing ward rules.[5]

A more personalised understanding of behaviour and moment-to-moment variation of affect in nurses in experiencing agitation and subsequently aggression development in a patient, offers opportunities for timely prevention of an aggressive outburst. Various personal and environmental factors changing between persons and over time define the individual reaction of nurses towards aggression. Given the interactive nature of momentary behavioural and affect variation in nurses, this calls for an ecological valid assessment procedure addressing the behavioural and emotional variations.[11] The experience sampling method (ESM) is used to assess a multitude of thoughts, emotions and behaviours in the ever changing contexts of daily life and to study the dynamics of multiple subjective states of a nurse in changing ward and private related contexts.[12] ESM provides an ecologically valid momentary assessment[13] of the actual staff and ward factors contributing to both the development and the de-escalation of aggression.

Aim of the study

As the environment (including both staff present on the ward and the ward itself) is thought to be an important factor in explaining aggression development, we aim to study the dynamics of ward configurations (whereabouts of nurses and nurse–patient interactions) and behavioural and emotional variations of nurses associated with development of aggression, within an ecological valid naturalistic setting of an acute closed admission ward, by asking the nurses working on the ward what interaction they have with the patient, where they are and what they are doing. This will be followed by analysing nurses' behaviour, nurse–patient interaction, nurses emotions during their workday and correlating this to incidents happening on the ward in order to identify high-risk situations for aggression and ultimately prevent aggressive incidents.

METHOD

The study was carried out on the high intensive care unit (HIC) of a large mental health institution in the Netherlands. The unit consisted of 23 beds with predominantly involuntary admissions of patients with acute psychosis, manic state or personality disorder. The 23 beds were located on the high care ward, a closed ward working conform guidelines of the HIC manual.[14] When a patient causes some form of danger for himself or others, he can be treated on the intensive care unit (ICU): a room secluded from the ward where the patient can spend the day and night and is always accompanied by at least one nurse. When on this ICU safety is not restored the patient can be treated even more secluded in the high security room (HSR): a room that is locked and has only a bed, toilet and a touchscreen (for the patient to choose lighting or music). A nurse is always (24/7) present behind a window.

During each day and evening shift seven nurses are present, and during the night shift two nurses are present. The staff entails two psychiatrists working a total of 48 hours per week, two residents, one full-time nurse practitioner and there is always the possibility to consult a clinical psychologist or social worker.

Participants

All nurses working on the HIC were asked to fill in the PsyMate app, an application that can be downloaded to the participant's mobile phone. This app sends a beep 16 times in 24 hours for 7 days in a row and at that moment they answered the presented questions, which took approximately 2 minutes. Nurses were instructed to answer the beeps any time they were awake, whether at work (day and nightshift) or at home. All participants signed informed consent.

Patient and public involvement

Patients were involved in this study only as subject of the questions answered by the nurses. In future research, it would be very interesting to work together with patients in finetuning the ESM questionnaire. The general public was not involved.

Procedure

After signing informed consent nurses were individually briefed by the first author to fill in the PsyMate app for 7 days in a row when they worked at least three shifts in the week they participated. All participants were provided with an iPod on which the PsyMate was installed. During the briefing, the PsyMate was also installed on their private phone (the PsyMate is available for Android and iOS). Nurses were instructed to answer the beeps on the iPod when at work and answer the beeps on their phones when at home. For data analysis these data were merged using subject number and time. During the briefing, a test questionnaire was filled in to familiarise the nurse with the ESM procedure and sociodemographic details were provided in the PsyMate.

The app provided 16 beeps every 24 hours in a semi-random fashion: for the nurses it appeared completely random, but the app is programmed in a way there are never more than 3 hours between beeps and always more than 15 min.

The data obtained from the PsyMate were anonymously provided to the researcher for analyses. After the first six nurses who completed their 7 days ESM, feedback on the questionnaire resulted in adding questions on the use of de-escalating techniques.

Measurements

The PsyMate is a web-based platform for moment-to-moment assessment of mood and behaviour of participants which included an app. It is designed by Maastricht University and Maastricht UMC+. For this study, a specific protocol for PsyMate was designed and implemented in the app. The full list of questions is presented in online supplemental appendix. The participant answered questions on mood (both positive and negative affect such as 'I feel cheerful' and 'I feel irritated') on a 7-point Likert scale. These were followed by questions about where they were at the moment of the beep, with who they were and whether they liked this or not. When they answered the questions at work a different set of questions was loaded on the app regarding the work situation at that point: who are you with (patients or colleagues), how many patients are admitted at this moment, what have you done with the patients since the last beep and have there been aggressive incidents since the last beep.

The answers to 'what did you do with the patient' were: took a walk, helped with ADL, accompanied the patient to ICU or HSR, sat with the patient in the garden or living room, talked with the patient, ate or drank coffee with the patient, something else and did nothing with the patient. A dummy variable was created for all the actions in which the nurse did something with the patient other than accompanying the patient on the ICU or HSR. These are the variables: 'nurse doing something with a patient' and 'nurse with the patient to ICU or HSR'.

Dummy variables were also created for working experience (0–5 years, 6–10 years and >20 years of experience), nurse not being with a patient and for the nurse setting a limit ('I had a discussion on cigarettes', 'I had a discussion on privileges', 'I had to set a limit' and 'I refused the patient something' were coded as nurse setting a limit).

Measurement of work satisfaction was conceptualised as a combination of the answers to the items 'I feel safe', 'I feel supported' and 'I feel content'. Mood items were combined and averaged in positive (cheerful, relaxed, calm, satisfied, safe) and negative (tired, insecure, irritated, frightened, down) affect. The independent variables used were: working experience, gender and age of staff, nurse not interacting with the patient, nurse taking care of the patient on the ICU or HSR, nurse in the reception area or an office without a patient, nurse interacting in a more paternalistic way (discussion about cigarettes, privileges and setting a limit), negative affect of the nurse, positive affect of the nurse, nurses' work satisfaction, bed occupancy, time and ambiance on the ward (rated by nurses). The number of patients present on the ward was also entered by the participant at every beep. When this number was higher than the beep before this was interpreted as an admission that had taken place.

When an incident occurred, extra questions popped up asking what the incident entailed (verbal aggression, physical aggression to the fellow patient or to staff), whether it was serious (1–7 Likert scale), what the nurse did to de-escalate the behaviour (with a set of options of behaviour), whether any coercive measures were used, whether any injury was sustained because of the incident, whether the nurse felt safe during the incident, whether the intervention went as planned and whether the incident could have been prevented. Finishing all questions (including the extra questions when an incident had occurred) took a maximum of 3 minutes.

In addition to the questions on beep level, participants were asked to answer a set of questions every morning on quality of sleep and motivation to start the day. At the end of the week, participants answered a debriefing questionnaire to assess whether the past week was a normal week and to evaluate the usability of the PsyMate.

Statistical analysis

STATA/SE V.16.1 was used for the statistical analysis. Participants were included if they answered more than 23 beeps. Descriptive statistics were used for demographic characteristics of the nurses. Data collected with the PsyMate have a multilevel structure. Multilevel logistic regression analyses (xtmelogit) were run to assess associations between the independent variables and the occurrence of an incident. A two-sided significance level of 0.05 was used.

The dependent variable was a dichotomous incident variable (an incident took place, or it did not). To relate this occurrence of an incident with the environment or the factors within staff the escalation was linked to the beep before the incident.

Table 1 Characteristics of the participants and incidents

Nurses	n=29	Male/female: 45%/55%	Mean age 36.4 years	Working experience: 0–5 years (43%), 5–20 years (39%), >20 years (18%)
Admissions	n=141	Male/female: 62%/38%	73% involuntarily admitted	
Incidents (n=53)	Verbal aggression to patient or nurse: 39 (48%)	Physical aggression to patient or nurse: 25 (28%)	Physical aggression to materials: 14 (15%)	Something else: 13 (14%)

RESULTS

Participants

From November 2019 until March 2020 a total of 29 nurses completed the ESM questionnaires. The nurses recorded a total of 1540 beeps. There were 12 beeps removed because of incomplete data. In these, the nurse ended filling in the questionnaire before the end of the questionnaire. There were 11 nurses that filled in the questionnaire more than 7 days, which was more than the protocol prescribed. Since the data from these additional beeps might contain valuable information and add to the power of this study it was decided to use these data. After cleaning up the data, 1471 beeps remained for analyses.

The mean age of the nurses was 36.4 years (SD=2.1, 95% CI 31.1 to 39.7, range of 22–60 years) (table 1). Forty-three per cent had 0–5 years of working experience.

Location

Five hundred and sixty-five (38%) beeps were filled in at work, 49% at home and 13% in other places such as on the road, in someone else's place, on the road or somewhere else. Of the 565 beeps filled in at work, 5 beeps had a missing value for location of the nurse at the time of the beep. Of the 560 remaining beeps, 36% were answered at the reception of the ward and 27% when the nurse was in the doctor's office (which was also used as an office for the nurses to make daily reports) (figure 1). In 78% of these beeps they were not in the company of a patient at the moment of the beep. Of the 565 beeps that were filled in at work, 464 (82%) nurses did something with a patient on the ward since the last beep, 10% of nurses accompanied a patient on the ICU/HSR and 8% had not been with a patient since the last beep.

Incidents

There were 53 separate incidents registered, during one incident multiple types of aggression could be registered (table 1).

The incidents were linked to the beep answered before the incident to be able to relate the incident to potential risk factors. With this procedure, 15 incidents were dropped, because no beep was answered before the incident. This left 38 incidents for further analysis.

Staff factors

When a nurse was in the presence of a patient this was significantly correlated with the development of aggression. In addition, nurses with higher levels of working experience had a greater risk for encountering aggression. Negative affect of the nurse showed a negative trend level of significance for the development of aggression. Gender and age of the nurse, interacting with the patient in a more paternalistic way, positive affect and the nurse not being with a patient in the reception area or doctor's office were not significantly associated with aggression.

In 97% of the beeps, nurses felt content, supported and safe (score of 4 or higher on the Likert scale 1–7), which made further analysis for the association with the development of aggression on the ward not feasible. There were no incidents recorded when the nurse did nothing with the patient, so analysis of this factor was impossible. All results are depicted in table 2.

Ward factors

Exceeding the maximum capacity of the ward was associated with significantly more aggressive incidents. No significant association was found for admission since the last beep, atmosphere on the ward or time of day. All results are depicted in table 2.

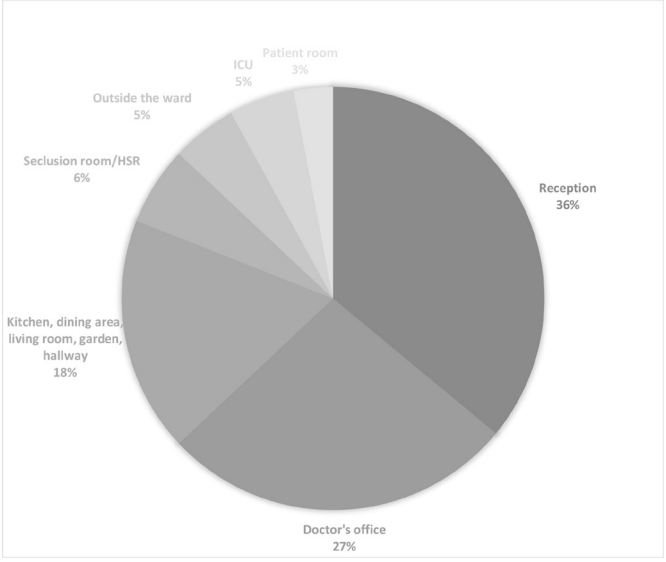

Figure 1 Whereabouts of the nurse on the ward. This figure depicts the places where nurses answered a beep with the percentages of how often they were in the different places. HSR, high security room; ICU, intensive care unit.

Table 2 Main results of staff and ward factors influencing the development of aggression

Factor	Percentage/mean (range)	SD	OR	95% CI	P value
Nurse in the company of a patient	–	–	2.26	0.99 to 5.15	0.05
Working experience	–	–			
0–5 years (reference)					
6–20 years			1.72	0.68 to 4.39	0.3
>20 years			3.50	1.32 to 9.26	0.01
Negative affect of the nurse	1.6 (1–7)	0.55	0.37	0.13 to 1.03	0.06
Age	36.9 (24–55)		1.03	1.00 to 1.06	0.1
Paternalistic interaction	32%		1.6	0.75 to 3.60	0.2
Nurse without patient in reception area or doctor's office	89%		1.74	0.78 to 3.88	0.2
Gender	21 incidents with male nurse, 17 incidents with female nurse		0.78	0.34 to 1.78	0.6
Positive affect of the nurse	6.03 (1–7)	0.77	1.07	0.60 to 1.92	0.8
Nurse with the patient on the ICU/ HSR			1.03	0.32 to 3.32	1.0
Bed occupancy maximum or exceeding maximum			5.36	1.69 to 16.99	0.004
Bed occupancy	21 (10–25)	3.0	0.92	0.83 to 1.03	0.1
Admission			1.05	0.80 to 1.36	0.7
Atmosphere on the ward	'Very good' in 49%		0.98	0.74 to 1.29	0.9
Time	Morning shift: 19 incidents Evening shift: 17 incidents Night shift: 2 incidents		Morning vs evening: 0.80 Morning vs night: 0.38	0.41 to 1.56 0.09 to 1.66	0.5 0.2
Feeling content, safe, supported	98%		Insufficient data		
Nurse doing something with the patient			Insufficient data		

Percentage/mean (range): in this column number are percentages when followed by %, otherwise it is a mean with range in brackets, p<0.05 is significant.

DISCUSSION

The multi-factorial mechanisms and relationship with aggression were studied here focusing exclusively on staff and ward factors. Bearing in mind the low number of incidents that were included in this study, the staff factors 'working experience' and 'nurse being in the company of a patient' and the ward factor 'exceeding maximum bed capacity' were found to be significant risk factors, a negative affect showed a trend for being a protective factor. No significance was found for staff factors gender, age, positive affect of the nurse, 'paternalising interaction between nurse and patient', 'nurse being without a patient', 'nurse with a patient on ICU or HSR', positive ward atmosphere, new admission and time of day.

The current study is the first to our knowledge using ESM and studying aggression development and patient–nurse interaction within an ecological valid fashion. Without the need for informed consent from the patient, who is often too ill to sign this, it was possible to obtain very valuable information on the dynamics of the ward and the interaction between nurses and patients.

The lack of statistical significance on some of the studied factors may be due to lack of power, especially a lack of number of incidents, which is in contrast clinically a positive result. There were 38 incidents included in the analysis. Incidents were exclusively indicated during ESM assessment. Therefore, aggressive incidents outside the ESM assessment were not registered by the nurses in the ESM. This risk was reduced by instructing the nurse during the briefing to make sure they included every incident in the app. Because the data included only 38 incidents, power was limited. For this reason, only one independent variable and one dependent variable were included in the multilevel logistic regression models. Although this also reduced the risk of overfitting, this is a limitation, because the different variables can be confounders in the other analyses.

The findings of this study are partly in line with earlier research. Contact with a patient was a contributing factor in this study, but it was not possible to distinguish the type of contact between nurse and patient. A paternalising way of communicating with the patient was significant in developing aggression in earlier research[1 5 15] in contrast to verbal de-escalating techniques and a less restrictive culture on the ward that are ways of reducing aggression.[1 16] The number of nurses present on the ward is an ambivalent factor in contributing to the development of aggression as more aggression arises both when more nurses are absent and when more nurses are present.[1 17 18] This also implies that the way contact is made, and the quality of the contact is more important than the actual numbers of personnel being present. Since most patients on the HIC are psychotic patients, they might consider contact as intrusive, which makes the way contact is made even more important.

The finding that negative affect on nurses is associated with less incidents seems counterintuitive. However, nurses with a negative affect possibly diminish their contact rate because of their own negative feelings and therefore encounter less aggression. This does contradict a study by Bowers *et al* where higher burnout scores enlarged the risk of experiencing verbal abuse, but it is questionable whether negative affect measured by ESM encompasses the same symptoms as burnout.[18] It does imply the need for further research since it does not seem appropriate to have more nurses with negative affect working on the ward to prevent aggression.

The admission of more patients than number of beds available does lead to a greater risk for aggression, which is a confirmation of earlier research.[1] Where the admission of a male patient was found to be a contributing factor earlier,[1] this was not replicated here, which might be a result of the way patients are admitted to this ward in a very welcoming and friendly manner, no matter what happened before admission.[14]

With this study dynamics of the ward and the behaviour and emotions of nurses were studied as well as the interactions nurses have with patients. This concept of research is proven to be very useful to explore daily ward dynamics and find associations between these dynamics and the occurrence of incidents on the ward.

Despite the limitations both nurses and management may learn important lessons from these findings: when there is contact between nurses and patients there is a higher risk of incidents. This confirms the experience mental health workers have that aggression arises from the interaction between two people and it confirms the importance of respectful communication and de-escalating communication in this interaction to prevent this aggression to occur in the interaction. Nurses need to be trained to be present on the ward but with use of the appropriate de-escalation techniques and use a respectful and empathetic way of interacting with the patient. Management should be aware that maximum bed capacity is not exceeded, as it is associated with increased risk for aggressive incidents. This study may be regarded as a proof-of-concept study, in that it is research within a natural environment with momentary assessment offering prospective designs for predictive factors and therefore improving prevention of aggression on closed mental health wards.

Contributors IW designed the study, managed data collection, did the statistical analysis and wrote the article; is the guarantor of this study. MD participated in the statistical analysis and revised the article. TvA supervised the study and revised the paper. MB designed the study and revised the paper.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involved healthy human participants and was approved by the Institutional Scientific Board of Mondriaan, the mental health institution where it took place. Since no patient information was used in this study, no medical ethical board needed to review the protocol, hence there is no ethics committee. All data were used for the intended purpose and this article is a transparent writing of the actual study that took place. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. Data (all registered beeps from the ESM including all answers from all participants) are available upon reasonable request.

ORCID iD

Irene Weltens http://orcid.org/0000-0003-2559-0919

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