

Objective

This study aims to: i) describe what conflict (aggression, absconding etc.) and containment (de-escalation, restraining etc.) events occur before and after events of medication non-adherence on acute psychiatric wards and ii) identify which patient characteristics are associated with medication non-adherence.

Method

Conflict and containment events for each shift over the first two weeks of admission were coded retrospectively from nursing records for a sample of 522 adult psychiatric in-patients. The frequency and order of the conflict and containment events were identified. Univariate logistic regression models were conducted to examine which patient characteristics were linked with medication non-compliance.

Results

Medication refusals were commonly preceded by aggression whereas demands for pro re nata (PRN) (psychotropic) were commonly preceded by the same patient having been given PRN medication. Refusals and demands for medication were commonly followed by de-escalation and given PRN (psychotropic) medication. Only refusal of PRN medication was commonly followed by forced (intra-muscular) medication. Ethnicity, previous self-harm and physical health problems were also linked to non-adherence.

Conclusions

Greater attention to the conflict and containment events that precede and follow medication non-adherence may reduce the likelihood of medication non-adherence.

Key words

Medication, non-adherence, conflict, containment, psychiatric, in-patients

1. Introduction

The treatment of patients with the use of psychotropic medication is a core function of acute psychiatry [1]. However, non-adherence to psychotropic medication, defined as refusal of regular medication (RRM); refusal of pro re nata (as needed) medication (RPRN) and demand of pro re nata medication (DPRN), is a common problem with serious consequences [2]. Rates of non-adherence range between 28% - 52% for major depressive disorder, 20%-50% for bipolar disorder, and 20% - 72% for schizophrenia depending on the definition of medication refusal, type of admission, and methodology employed [3]. The problem of non-adherence is compounded by the fact that on most wards, in certain circumstances medication can be administered without consent from the patient.

Previous research has focused on patient characteristics as risk factors to medication adherence. Few characteristics, however, have consistently been linked with non-adherence among psychiatric populations [3]. There is mixed evidence on the impact of ethnicity with some studies reporting that a greater percentage of Caucasians refused medication compared to other ethnic groups [4, 5] while others reported that Afro-Caribbeans refused more medication than other groups [6]. Patients diagnosed with schizophrenia and schizoaffective disorder, patients with previous admission and patients with a history of refusal have also been identified with higher rates of medication non-adherence. A recent review indicates that refusers and acceptors of medication did not significantly differ on characteristics encompassing gender, marital status, age, and the legal status at admission[3].

The few patient features associated with medication refusal support the idea that regular medication refusal in acute psychiatry is situational rather than determined by features of a patient's gender or other characteristics. This is consistent with research that links medication non-compliance with higher rates of conflict (aggression,

absconding etc.) and containment (de-escalation, restraining etc.). For example, Bowers and colleagues report positive associations between medication non-adherence and a range of passive resistant patient behaviours (e.g., verbal aggression and refusing either food or drinks) and administration of PRN medication [2].

Surprisingly, however, given the frequency of regular and PRN medication usage in inpatient settings, few studies have explored the role of medication relative to issues of conflict and containment. Those that do have adopted a cross-sectional design with no attention to the order of events over time. However, understanding the sequences of conflict and containment events before and after medication non-adherence may help pinpoint where alternative approaches to nursing practice may be helpful.

In this paper, the sequence of conflict and containment events that precede and follow medication non-adherence (RRM, RPRN and DPRN) over the course of two weeks were examined. Univariate logistic regression models were also conducted to examine which patient demographic (age, gender, ethnicity and marital status) and clinical characteristics (first admission, diagnoses, history of substance misuse, physical health problem, previous self-harm) were linked with the occurrence of medication non-compliance.

2. Methods

2.1 Design and participants

All potential participants were recruited for a larger study [7] and had been admitted onto one of 84 acute psychiatric wards or intensive care unit (PICU) in London and surrounding areas between July 2009 and March 2010. The first two weeks of the current admission was set as a standardised data collection period. Patients were eligible to participate if they were i) inpatients of the selected acute wards; ii) were 18–65 years old; iii) had stayed in hospital for two weeks or more; iv) were present on the ward when the survey was conducted; v) were safe and well enough to be approached as judged by the ward staff and vi) gave informed consent to take part in the study. Six patients per ward that met these inclusion criteria were randomly selected to participate (6 patients was judged to be the maximum that could be recruited per researcher day). Of the 1902 patients eligible to participate, 522 adult inpatients were recruited. 973 patients were too ill to safely approach or were

off the ward at the time of the researcher's visit (e.g., on leave). A further 407 eligible patients refused to participate. Over half the recruited sample (54%) were men, white (68%) and admitted voluntary (60%). The mean (SD) age was 41.1 (13.0) years. Data collection was approved by Kings College Hospital Research Ethics Committee

2.3 Measures

Incidents of medication non-adherence (RRM, RPRN and DPRN) and other conflict and containment events were assessed using an updated, electronic version of the Patient–Staff Conflict Checklist (PCC)[8]. Conflict is defined as patient behaviours likely to harm self or others (e.g., verbal aggression, physical aggression against others, refusing to eat) and containment as actions taken by staff to protect patients and others from harm (e.g., time out, show of force, manual restraint, enforced intramuscular (IM) medication). The definitions of medication non-adherence are reported in Table 1 and good interrater reliability for the PCC has been shown [9]. For each patient, the PCC was used to extract information on conflict and containment events retrospectively from the patients case notes. The total number of events for each shift (morning, afternoon and night) during the first two weeks of the current admission were extracted. Shifts with no conflict or containment were recorded as null events. Demographic and patient history information were also extracted including age, gender, ethnicity, diagnosis, previous admissions, history of substance use, history of aggression towards self or others and whether admission was formal or voluntary.

2.4 Procedure

Two university researchers and 18 Mental Health Research Network Clinical Studies Officers were trained to collect data from the participating wards. At each ward, the researcher first liaised with the nursing staff to identify eligible patients. Patients who agreed to discuss the study were given an information sheet and had the opportunity to raise any concerns about the study with the researcher, before being asked to consent. After informed consent was obtained, the researcher accessed the patient's case notes for approximately 60 minutes to

complete the PCC. Data were extracted retrospectively for the first two weeks of the current admission and recorded electronically using a laptop computer.

2.5 Analytic strategy

Analyses were conducted in three phases. In Phase 1, descriptive statistics were calculated for frequency of non-adherence medication events within and across patients. In Phase 2, the sequence of events that preceded and followed an incident of medication non-adherence (RRM, RPRN and DPRN) over the course of two weeks was examined. For each non-adherence event, data were organised so that each patient in the study had 42 rows in the data set, each representing a shift (am, pm, night) during the first two weeks of their admission. Each row detailed the order and type of conflict and containment events (if any) for that shift. Sequences of events were established by counting the frequency of events relating to RRM, RPRN, and DPRN. Events that occurred before and after each medication non-adherence incident (RRM, RPRN and DPRN) were categorised into five stages defined as i) the first event of the shift (sequence start), ii) all precursors during the shift, iii) the most proximal event prior, iv) the most proximal events immediately after and v) all events that occurred after (sequence end). If more than one of the focal medication non-adherence events was recorded in a day, the sequence of events for each was analysed separately (i.e. the number of sequences equals the number of refusals of RRM, DPRN and PRN). Infrequent events recorded in the notes as occurring simultaneously (e.g. PRN involving refusal of PRN) were excluded from the sequence analysis. In Phase 3, patients with one or more incidents of medication non-adherence (RRM, RPRN and DPRN) during the first two weeks of admission were compared with the remainder of the sample for whom these events were not recorded during this period. A series of univariate logistic regression models were conducted to explore if demographic (age, gender, ethnicity and marital status) and clinical characteristics (first admission, diagnoses, history of substance misuse, physical health problem, previous self-harm) were linked with the occurrence (yes/no) of medication non-adherence (RRM, DPRN, RPRN).

3. Results

3.1 Descriptive statistics (Phase 1)

A total of 9691 events were recorded among the sample of 522 inpatients. The total number of medication non-adherence events during the first two weeks of admission were: RRM (592; 6.2%); RPRN (178; 1.8%) and DPRN (114; 1.2%). **Table 2** reports descriptive statistics for the three medication non-adherence behaviours by patient including the number of patients reporting non-adherence events, the mean (SD) number and range of medication incidents per patient and the number of repeated incidents per patient.

3.2 Sequences (Phase 2).

The sequence of events before and after incidents of medication non-adherence are summarised in **Tables 3-5** for RRM (Table 3), RPRN (table 4) and DPRN (table 5)

3.2.1 RRM

Of a total 583 incidents of RRM, 81% were the first event in the sequence and therefore excluded from further analysis of precursors. Of events that preceded RRM, verbal aggression was the most frequent followed by refusing to eat. Of the remaining events, de-escalation and refusing to see workers were the next most common albeit fairly infrequently. The same pattern of results was recorded for the most *immediate* precursors to RRM.

The remaining conflict and containment events preceding and immediately preceding incidents of RRM occurred infrequently (*ns* ranged from 2 to 8 for events before and from 2 to 4 for events immediately before)

Of the conflict and containment events that immediately followed RRM, verbal aggression and given PRN (psychotropic) were the most frequently recorded followed by de-escalation and then refusing to eat. Of the total number of events post RRM, given PRN (psychotropic) was most frequent followed by verbal aggression

and to a lesser extent de-escalation. The remaining recorded conflict and containment events occurred infrequently immediately post (*ns* ranged from 1 to 8) and post (*ns* ranged from 4 to 23) incidents of RRM.

3.2.2 RPRN

Of a total 165 incidents of RPRN, 59% were the first event in the sequence and therefore excluded from further analysis of precursors. Of events that preceded RPRN, verbal aggression was the most frequent followed by aggression to objects, a combination of de-escalation and DPRN, and physical aggression against others. Of the *immediate* precursors, verbal aggression was again the most frequent followed by physical aggression against others, aggression to objects and de-escalation. The remaining recorded conflict and containment events occurred very infrequently both preceding (*ns* ranged from 2 to 7) and immediately preceding (*ns* ranged from 1 to 4) incidents of RPRN.

Of the incidents that were recorded immediately after RPRN, given PRN (psychotropic) was most frequently reported followed by forced intramuscular medication and de-escalation. Of the remaining events, incidents of verbal aggression and manual restraint were the next most common albeit fairly infrequently. The same pattern of results was reported for all events that occurred after RPRN. The remaining recorded conflict and containment events occurred very infrequently immediately post (*ns* ranged from 2 to 4) and post (*ns* ranged from 3 to 9) RPRN incidents.

3.2.3 DPRN

Of a total 113 incidents of DPRN, 75% of events were the first event in the sequence and therefore excluded from further analysis of precursors. Of the total number of precursors, Given PRN (psychotropic) was the most frequent event followed by verbal aggression. The same pattern of precursors was reported for the *immediate* precursors. Of the remaining *immediate* precursors, aggression to objects, and refusing to eat were the next most common albeit fairly infrequently. The remaining recorded conflict and containment events preceding or immediately preceding DPRN occurred very infrequently (*ns* ranged from 1 to 4, preceding and from 1 to 2, for immediately preceding). Following the DPRN event, de-escalation was most frequently reported followed by

Given PRN (psychotropic) and to a lesser extent verbal aggression. Of the total number of events after incidents of DPRN verbal aggression was most frequent followed by given PRN (psychotropic), de-escalation and verbal aggression. The remaining recorded conflict and containment events occurred infrequently both immediately post (n s ranged from 1 to 2) and post (n ranged from 1 to 3) DPRN incidents.

3.3 Demographic and clinical characteristics (Phase 3).

The occurrence of all three types of medication non-adherence events were recorded for six patients only; RRM and DPRN for 20 patients; RRM and RPRN for 51 patients and DPRN and RPRN for 16 patients. The results of the univariate regression models are reported in **Table 6**. Of the demographic factors, ethnicity (non-white versus white) was a statistically significant predictor of RPRN and DPRN ($p < .05$) but not for RRM. RPRN is more likely for a non-white person than a white person (OR = 1.88, 95%CI = 1.20 to 2.93) whereas DPRN is less likely for a non-white person than a white person (OR = .34, 95%CI = .17 to .69). There were no effects for age, gender or marital status. First admission approached statistical significance for DPRN ($p = .05$) and shows that DPRN is less likely for patients admitted for the first time. (OR = .52; 95% CI = .33 to .81). Physical health problem was marginally or statistically significant for RPRN ($p = .05$) and DPRN ($p = .01$). RPRN is less likely for patients with a physical health problem (OR = .57, 95%CI = .33 to .99) whereas DPRN is more likely for patients with a physical health problem (OR = 1.14, 95%CI = .67 to 1.9). Previous self-harm was a predictor of RPRN ($p = .00$) showing that RPRN is less likely for patients with a history of self-harm (OR = .52; 95%CI = .33 to .81). Previous Physical harm towards others approached statistical significance for RRM ($p = .07$) and RPRN ($p = .05$). RRM (OR = 1.42; 95%CI = .97 to 2.09) and RPRN (OR = 1.57, 95%CI = 1.0 to .2.49) are more likely for patients with a history of physical harm. There were no effects for diagnoses and history of substance misuse (alcohol and other drugs).

4. Discussion

4.1 Refusal of regular medication

Where refusal of medication was not the initiating event, verbal abuse was the most common event preceding this form of medication refusal. This would suggest that the actual refusal of medication occurred during the course of a dispute between patient and staff, or at the very least anger being expressed by the patient. The fact that the abuse preceded the actual medication refusal in a third of cases implies that in these circumstances the refusal of medication might represent the patient's anger, or be a way for the patient to show and demonstrate their anger about what might be a different issue. In this way the act of refusing medication might not be about the medication or its side effects or any other intrinsic aspect of the medication, instead being about other issues not identified by our data collection, perhaps anger at formal detention in hospital or some other aspect of care being provided. For example, Appelbaum and Gutheil (1980) found that some patients refused medication because of their angry responses to tight spaces and administrative restrictions [10]. Attention to these other areas of conflict may thus bring reductions in regular medication refusal. As documented de-escalation was also a common precursor, this suggests that staff were attempting to negotiate with patients and resolve their anger.

Refusal to eat also seems to be one of the more common precursors. Without further information this is difficult to interpret, but may represent again a form of protest with some other aspect of care, or both behaviours may have their root in paranoid ideation about poisoning. A statistical link between medication refusal and refusal to eat has been reported previously [2, 11]

Continued de-escalation and the giving of PRN medication, also verbal abuse, were the most common events after refusal. These indicate continued resistance and anger by the patient, coupled with staff attempts to negotiate, and the resolution of the situation via the giving of PRN medication, presumably of a type more acceptable to the patient than the regular medication they were refusing. Whilst only a minority of medication refusals were met with staff force and coercion, these still represent about one in twenty events of regular medication refusal, confirming that not all coercion of medication and rapid tranquillisation is necessarily about

aggression control. Some is clearly about the legal compulsion of treatment, usually accompanied by a show of staff force and manual restraint.

The few patient features that predicted medication refusal support the idea that regular medication refusal in acute psychiatry is situational rather than determined by features of a patient's illness, their gender or other characteristics. This should focus future research attention on the personal medication adherence history of a patient and how it links to their experience of psychiatric care. Alternatively, it could be that there are many different motivations for regular medication refusal, some of which may be more closely associated with patient characteristics and diagnoses than others, and in countervailing ways.

4.2 PRN medication refusal

The dominant precursor of refusal of PRN medication was aggression, most frequently verbal but also aggression to objects or actual physical aggression to others. This indicates that one of the primary nursing responses to aggression is to offer PRN medication, and our results show what occurs when that offer is refused. Other precursors of refusal of PRN medication are very diverse.

Aggression does continue, albeit to a lesser extent, after the offer of PRN medication has been refused. De-escalation occurs much more frequently after PRN medication has been refused, perhaps indicating that nurses' first line intervention is the offer of PRN medication rather than talking. Whilst this runs counter to usual recommendations to use de-escalation first [12] there may be sound underpinning reasoning behind this. Nurses may consider that de-escalation is much more likely to be successful if the patient has first taken PRN medication, and talking can then continue whilst the medication starts to take effect [13]. In addition, if the patient can be persuaded to take PRN medication, it indicates the start of co-operation that can be built on in further conversation. Indeed, whilst PRN medication was initially refused, in a large proportion of our cases it was eventually accepted. Where it was not, there was significant use of manual restraint and coerced IM medication, however the latter was twice as frequent as the former, showing that actual use of force was not always required. This raises the interesting question as to why patients who took IM medication without

physical resistance did not accept the same medication orally? Possibly as a show of resistance without risking the discomfort and potential injury involved in struggling with large numbers of staff.

Although associated with aggression, refusal of PRN medication was not associated with the typical patient characteristics that are themselves associated with aggressive behaviour amongst inpatients, youth, male gender, and diagnosis of schizophrenia [11]. Instead such refusal is much less likely amongst those patients who might feel more vulnerable, Non-white minority patients, those with physical health problems or a past history of self-harm. This might be due to racial stereotypes influencing clinicians' perceptions of the behaviour of non-White patients (and therefore decision-making regarding its prescription and use), a higher level of acuity of symptoms in these patient groups, or a lack of effort made by clinicians to encourage meaningful engagement in treatment [13]. Perhaps such patients might be far too ready to accept coercion from the staff, and may require extra assistance from advocacy services to assert their wishes and rights.

4.3 Demanding PRN medication

The requesting or demanding of PRN medication where it was not required in the view of staff was the least frequent of the behaviours studied. Aggression was again prominent as a precursor, but in this context perhaps indicated a 'show' or 'display' of distress on the part of the patient in order to obtain the desired medication. Actual physical aggression was not present as a precursor, supporting the interpretation that whatever aggression was displayed was relatively minor or clearly directed at the goal of acquiring medication [2]. For extra PRN medication, as in a large proportion of these sequences PRN medication had already been given and the patient concerned was clearly requesting more. In addition, the most common resolution of these conflicts was to give the patient the medication they were demanding, and/or to use de-escalation skills to arrive at a negotiated compromise. Use of any form of force by staff in this situation was very rare.

The most common PRN medications which accounted for nearly half of PRN administrations was lorazepam [14]. Other common PRN medications were haloperidol (18%), zopiclone (11%), olanzapine (8%), and diazepam (4%) [14]. The demanding of PRN medication or repeated doses of PRN medication

highlights that some patients on wards may have dependency problems relating to benzodiazepine use which are not being recognised by patients or staff, and are not being treated or dealt with. Benzodiazepine dependency is a widespread problem for patients in the community [15] and decreased dosages may provoke withdrawal symptoms [16] which may be very difficult for patients already admitted and in distress to manage. The possible association with dependency and past psychiatric treatment is strengthened by the fact that demanding PRN is much less likely amongst those who are on a first admission to hospital. Greater attention to the issue of dependency on prescribed drugs in inpatient care is probably required.

4.5 Limitations

Although the sample was randomly selected, a large number of patients refused consent for participation. The demographic characteristics were well matched to a previous sample of over 11,000 acute admissions in England in terms of age (53% vs 49%), and the proportion white British (68% vs 73%) and the proportion of the sample detained under the Mental Health Act (1983) on admission (40% vs 47%) (Care Quality Commission 2010)[17] which indicates that the sample is fairly representative. All information about the sequence of events was drawn from nursing notes. Although these were comprehensive and detailed, varying quality and accuracy may have led to an unknown number of errors. Prospective observational data might be more accurate, but impractical to collect on such a large scale. For approximately 75-80% of medication refusals, and 60% of medication demands, there were no identified precursors to non-adherence. This indicates that situational factors other than the conflict and containment events assessed precede medication non-adherence. For example, patients may refuse one anti-psychotic in preference of a different one or a different type of medication such as benzodiazepines [3].

4.7 Summary/conclusions

It may be possible to achieve greater medication compliance and treatment outcomes through improved management of other conflict and containment events that precede and follow events of medication non-adherence. Further research into the patient's subjective experience of taking (or refusing) medication and

nurses role in contributing to, and alleviating medication related conflict could lead to the identification of other important modifiable situational antecedents to medication non-adherence.

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Appendices

Table 1. Labels and definitions of medication non-adherence behaviours

| | |
|-----------------------------------|--|
| Refusing regular medication (RRM) | Psychotropic medication (not analgesia, antacids, anti parkinsonian etc). <i>Note:</i> Include initial refusal even if followed by eventual compliance. Also includes the discovery of pouching or hoarding. |
| Refusing pro re nata (RPRN) | Psychotropic medication (not analgesia, antacids, antiparkinsonian etc). <i>Note:</i> Include initial refusal even if followed by eventual compliance. Also includes the discovery of pouching or hoarding. |
| Demanding pro re nata (DPRN) | Asking for , requesting or demanding PRN medication when it is not required or justified (Psychotropic only) |

Table 2 Descriptive statistics for medication behaviours among 522 inpatients.

| Medication behaviour | Patients reporting event n (%) | Number of incidents per patient | | | |
|-------------------------|--------------------------------------|---------------------------------|-------|----------------------|-----------------------|
| | | Mean (SD) | Range | One incident only | Repeated incidents |
| RRM | 161 (31%) | 3.68 (4.02) | 1-28 | 63/161(39%) | 98/161 (61%) |
| RPRN | 101(19%) | 1.76 (1.52) | 1-11 | 85/101(84%) | 16/101 (16%) |
| DPRN | 65 (12%) | 1.75 (1.05) | 1-5 | 34/65(52%) | 31/65 (48%) |

Note: RRM = refused regular medication; RPRN = refused pro re nata; DPRN = demand pro re nata

Table 3 Refusal of regular medication sequences

| | Start event | | All events prior to RRM | | Immediate event prior to RRM | | Immediate event post RRM | | All events post RRM | |
|---|-------------|------------|-------------------------|------------|------------------------------|------------|--------------------------|------------|---------------------|------------|
| | N (544) | % | N (162) | % | N (101) | % | N (168) | % | N (347) | % |
| Patient behaviours (conflict events) | | | | | | | | | | |
| Verbal aggression | 46 | 8.5 | 61 | 37.7 | 41 | 40.6 | 36 | 21.4 | 52 | 15.0 |
| Aggression to objects | - | - | 8 | 4.9 | - | - | 2 | 1.2 | 7 | 2.0 |
| Physical aggression against others | - | - | - | - | 2 | 2.0 | 6 | 3.6 | 12 | 3.5 |
| Refusing to eat | 18 | 3.3 | 26 | 16.0 | 22 | 21.8 | 15 | 8.9 | 17 | 4.9 |
| Refusing to drink | - | - | 2 | 1.2 | - | - | - | - | - | - |
| Refusing to go to bed | - | - | - | - | - | - | 8 | 4.8 | 9 | 2.6 |
| Refusing to see workers | 7 | 1.3 | 11 | 6.8 | 7 | 6.9 | 14 | 8.3 | 21 | 6.1 |
| Refusing to attend to personal hygiene | - | - | 2 | 1.2 | 2 | 2.0 | 1 | 0.6 | 7 | 2.0 |
| Smoking in a no smoking area | - | - | 5 | 3.1 | 2 | 2.0 | - | - | - | - |
| Attempted abscond | - | - | - | - | - | - | - | - | 4 | 1.2 |
| Returned from abscond | - | - | 2 | 1.2 | 2 | 2.0 | - | - | - | - |
| Refused regular medication | 473 | 86.9 | n/a | n/a | n/a | n/a | 4 | 2.4 | 9 | 2.6 |
| Refused PRN | - | - | 3 | 1.9 | - | - | 4 | 2.4 | 12 | 3.5 |
| Demanding PRN | - | - | 3 | 1.9 | - | - | - | - | - | - |
| Exposing self | - | - | 3 | 1.9 | 3 | 3.0 | - | - | - | - |
| Physical aggression against self | - | - | 2 | 1.2 | - | - | - | - | 4 | 1.2 |
| Ward staff behaviours (containment events) | | | | | | | | | | |
| Start detention | - | - | 4 | 2.5 | - | - | - | - | 5 | 1.4 |
| Admitted direct to PICU or ICA on a section | - | - | - | - | 2 | 2.0 | - | - | - | - |
| End seclusion | - | - | - | - | 2 | 2.0 | - | - | - | - |
| Start special observation (intermittent) | - | - | 5 | 3.1 | 4 | 4.0 | - | - | - | - |
| Start special observation (continuous) | - | - | - | - | - | - | - | - | 4 | 1.2 |
| De-escalation | - | - | 15 | 9.3 | 9 | 8.9 | 27 | 16.1 | 41 | 11.8 |
| Given PRN (psychotropic) | - | - | 3 | 1.9 | - | - | 36 | 21.4 | 70 | 20.2 |
| Given IM medication (enforced) | - | - | 2 | 1.2 | - | - | 5 | 3.0 | 23 | 6.6 |
| Show of force | - | - | 2 | 1.2 | - | - | 8 | 4.8 | 20 | 5.8 |
| Manually restrained | - | - | - | - | - | - | 2 | 1.2 | 18 | 5.2 |
| Time out | - | - | 3 | 1.9 | 3 | 3.0 | - | - | 12 | 3.5 |
| Total number of events | 544 | 100 | 162 | 100 | 101 | 100 | 168 | 100 | 347 | 100 |

PRN = pro re nata; IM = intramuscular; PICU = psychiatric intensive care unit; ICA = intensive care area

Table 4 Refusal of pro re nata (PRN) medication sequences

| | Start event | | All events prior to RPRN | | Immediate event prior to RPRN | | Immediate event post RPRN | | All events post RPRN | |
|---|-------------|------------|--------------------------|------------|-------------------------------|------------|---------------------------|------------|----------------------|------------|
| | N (152) | % | N (168) | % | N (68) | % | N (91) | % | N (218) | % |
| Patient behaviours (conflict events) | | | | | | | | | | |
| Verbal aggression | 19 | 12.5 | 36 | 21.4 | 14 | 20.6 | 9 | 9.9 | 22 | 10.1 |
| Aggression to objects | 9 | 5.9 | 27 | 16.1 | 7 | 10.3 | 4 | 4.4 | 9 | 4.1 |
| Physical aggression against others | 2 | 1.3 | 14 | 8.3 | 8 | 11.8 | 3 | 3.3 | 7 | 3.2 |
| Refusing to eat | - | | 2 | 1.2 | 2 | 2.9 | - | | 5 | 2.3 |
| Refusing to go to bed | - | | 4 | 2.4 | 2 | 2.9 | - | | - | |
| Refusing to see workers | - | | 3 | 1.8 | 1 | 1.5 | - | | 4 | 1.8 |
| Attempted abscond | 2 | 1.3 | 7 | 4.2 | 1 | 1.5 | 2 | 2.2 | 4 | 1.8 |
| Abscond official report | | | - | | - | - | 2 | 2.2 | 4 | 1.8 |
| Refused regular medication | 3 | 2.0 | 7 | 4.2 | 4 | 5.9 | - | | 5 | 2.3 |
| Refused PRN | 98 | 64.5 | n/a | n/a | n/a | n/a | 3 | 3.3 | 8 | 3.7 |
| Exposing self | - | | 2 | 1.2 | 1 | 1.5 | - | | - | |
| Suicide attempt | 2 | 1.3 | 2 | 1.2 | - | - | - | | - | |
| Physical aggression against self | 2 | 1.3 | 7 | 4.2 | 3 | 4.4 | - | | - | |
| Ward staff behaviours (containment events) | | | | | | | | | | |
| Start detention | 2 | 1.3 | 6 | 3.6 | 4 | 5.88 | - | | - | |
| Informal/involuntary start | 2 | 1.3 | 2 | 1.2 | - | - | - | | - | |
| Admitted direct to PICU or ICA on a section | - | | - | | - | - | 2 | 2.2 | - | |
| Sent to PICU or ICA | - | | 2 | 1.2 | | | - | | 3 | 1.4 |
| Start seclusion | - | | - | | - | - | - | | 5 | 2.3 |
| End seclusion | - | | - | | - | - | - | | 3 | 1.4 |
| Start special observation (intermittent) | - | | 2 | 1.2 | 1 | 1.47 | - | | 4 | 1.8 |
| Start special observation (continuous) | - | | 2 | 1.2 | 1 | 1.47 | - | | 5 | 2.3 |
| Special observation (intermittent) ends | - | | - | | 1 | 1.47 | - | | - | |
| De-escalation | 6 | 3.9 | 6 | 3.6 | 7 | 10.29 | 11 | 12.1 | 27 | 12.4 |
| De-escalation and demanding PRN | - | | 16 | 9.5 | - | - | - | | - | |
| Given PRN (psychotropic) | 2 | 1.3 | 5 | 3.0 | 2 | 2.94 | 29 | 31.9 | 46 | 21.1 |
| Given IM medication (enforced) | - | | - | | - | - | 14 | 15.4 | 31 | 14.2 |
| Show of force | - | | 6 | 3.6 | 4 | 5.88 | 4 | 4.4 | 6 | 2.8 |
| Manually restrained | 3 | 2.0 | 5 | 3.0 | 3 | 4.41 | 8 | 8.8 | 15 | 6.9 |
| Time out | - | | 5 | 3.0 | 2 | 2.94 | - | | 5 | 2.3 |
| Total number of events | 152 | 100 | 168 | 100 | 68 | 100 | 91 | 100 | 218 | 100 |

Table 5 Demand of pro re nata (PRN) medication sequences

| | Start event | | All events prior to DPRN | | Immediate event prior to DPRN | | Immediate event post DPRN | | All events post DPRN | |
|---|-------------|------------|--------------------------|------------|-------------------------------|------------|---------------------------|------------|----------------------|------------|
| | N (105) | % | N (43) | % | N (28) | % | N (46) | % | N (69) | % |
| Patient behaviours (conflict events) | | | | | | | | | | |
| Verbal aggression | 6 | 5.7 | 7 | 16.3 | 5 | 17.9 | 7 | 15.2 | 9 | 13.0 |
| Aggression to objects | 3 | 2.9 | 4 | 9.3 | 3 | 10.7 | 1 | 2.2 | 1 | 1.4 |
| Refusing to eat | 2 | 1.9 | 3 | 7.0 | 3 | 10.7 | - | - | - | - |
| Refusing to go to bed | - | - | 1 | 2.3 | - | - | - | - | 1 | 1.4 |
| Refusing to see workers | - | - | - | - | - | - | - | - | 1 | 1.4 |
| Alcohol use | - | - | 2 | 4.7 | 2 | 7.1 | - | - | - | - |
| Attempted abscond | 1 | 1.0 | 1 | 2.3 | - | - | - | - | - | - |
| Abscond | - | - | - | - | - | - | - | - | 1 | 1.4 |
| Returned from abscond | - | - | 1 | 2.3 | - | - | - | - | - | - |
| Refused regular medication | - | - | 1 | 2.3 | 1 | 3.6 | 2 | 4.3 | 3 | 4.3 |
| Refused PRN | - | - | 2 | 4.7 | 1 | 3.6 | - | - | 1 | 1.4 |
| Demanding PRN | 85 | 81.0 | n/a | n/a | n/a | n/a | - | - | 2 | 2.9 |
| Exposing self | - | - | 1 | 2.3 | 1 | 3.6 | - | - | - | - |
| Non-consensual sexual touching of another patient | - | - | - | - | - | - | - | - | 1 | 1.4 |
| Public masturbation | - | - | - | - | - | - | 1 | 2.2 | 2 | 2.9 |
| Physical aggression against self | - | - | - | - | - | - | 1 | 2.2 | 1 | 1.4 |
| Ward staff behaviours (containment events) | | | | | | | | | | |
| Start detention | - | - | 1 | 2.3 | 1 | 3.6 | - | - | - | - |
| Sent to PICU or ICA | - | - | 1 | 2.3 | - | - | - | - | - | - |
| Returned from PICU or ICA | - | - | 1 | 2.3 | - | - | - | - | - | - |
| Start seclusions | - | - | - | - | - | - | 1 | 2.2 | 1 | 1.4 |
| Start special observation | - | - | - | - | - | - | - | 0.0 | 1 | 1.4 |
| De-escalation | - | - | 1 | 2.3 | 1 | 3.6 | 17 | 37.0 | 21 | 30.4 |
| Given PRN (psychotropic) | 8 | 7.6 | 14 | 32.6 | 9 | 32.1 | 15 | 32.6 | 22 | 31.9 |
| Given IM medication (enforced) | - | - | - | - | - | - | 1 | 2.2 | 1 | 1.4 |
| Show of force | - | - | 2 | 4.7 | 1 | 3.6 | - | - | - | - |
| Total number of events | 105 | 100 | 43 | 100 | 28 | 100 | 46 | 100 | 69 | 100 |

PRN = pro re nata; IM = intramuscular; PICU = psychiatric intensive care unit; ICA = intensive care area

Table 6. Logistic regression models examining participant characteristics as predictors of medication non-adherence.

| | | Refused Regular Medication (RRM) Yes (n = 161) No (n = 361) | | | | Refused PRN (RPRN) Yes (101) No (421) | | | | Demand PRN (DPRN) Yes (65) No (457) | | | |
|-------------------------|--|---|------|-------|-------|---|-------------|-------------|-------------|---|-------------|-------------|-------------|
| | | 95% CI | | | | 95% CI | | | | 95% CI | | | |
| | | Odd s ratio | p | Lower | Upper | Odd s ratio | p | Lower | Upper | Odd s ratio | p | Lower | Upper |
| Age | 516 | 1.01 | 0.42 | 0.99 | 1.02 | 1.00 | 0.75 | 0.98 | 1.01 | 1.01 | 0.34 | 0.99 | 1.03 |
| Gender | female (n = 243) vs. male (n = 279) (ref) | 1.00 | 0.99 | 0.69 | 1.45 | 0.82 | 0.37 | 0.53 | 1.27 | 1.01 | 0.84 | 0.99 | 1.03 |
| Ethnicity | Non-white (n = 168) vs. white (n = 352)(ref) | 1.19 | 0.87 | 0.80 | 1.77 | 1.88 | 0.01 | 1.20 | 2.93 | 0.34 | 0.00 | 0.17 | 0.69 |
| Marital status | single (n = 96) vs. married (n = 423) (ref) | 1.05 | 0.85 | 0.65 | 1.70 | 0.76 | 0.32 | 0.45 | 1.30 | 0.98 | 0.96 | 0.50 | 1.92 |
| First admission | Yes (n = 77) vs. no (n = 438) (ref) | 1.04 | 0.89 | 0.62 | 1.75 | 0.74 | 0.38 | 0.39 | 1.44 | 0.35 | 0.05 | 0.12 | 1.00 |
| Diagnosis | affective disorders (n = 219) vs. schizophrenia (n = 190) (ref) | 1.11 | 0.64 | 0.72 | 1.69 | 1.38 | 0.19 | 0.85 | 2.23 | 0.81 | 0.49 | 0.45 | 1.46 |
| Diagnosis | Personality disorders (n = 54 ADD) vs. Schizophrenia (n = 190) (ref) | 1.51 | 0.19 | 0.81 | 2.84 | 0.54 | 0.19 | 0.21 | 1.37 | 1.40 | 0.41 | 0.64 | 3.12 |
| Alcohol | Yes (n = 203) vs. no (n = 304) (ref) | 1.03 | 0.88 | 0.70 | 1.51 | 1.04 | 0.86 | 0.66 | 1.63 | -0.02 | 0.95 | -0.56 | 0.52 |
| Drugs | Yes (n = 188) vs. no (n = 326) (ref) | 1.15 | 0.48 | 0.78 | 1.69 | 1.12 | 0.62 | 0.71 | 1.77 | 1.27 | 0.38 | 0.75 | 2.16 |
| Physical health problem | Yes (n = 134) vs. no (n = 388) (ref) | 1.03 | 0.88 | 0.68 | 1.58 | 0.57 | 0.05 | 0.33 | 0.99 | 1.14 | 0.01 | 0.67 | 1.93 |
| Previous self- harm | Yes (n = 326) vs. no (n = 190) (ref) | 1.17 | 0.44 | 0.79 | 1.72 | 0.52 | 0.00 | 0.33 | 0.81 | 1.00 | 0.99 | 0.58 | 1.71 |

Embodened figures = statistically (p <.05) or marginally statistically (p = .05) significant.