

Psychiatric Use of Unscheduled Medications in the Pennsylvania State Hospital System: Effects of Discontinuing the Use of P.R.N. Orders

Gregory M. Smith · Robert H. Davis · Aidan Altenor · Dung P. Tran · Karen L. Wolfe · John A. Deegan · Jessica Bradley

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Abstract The objective of this prospective study was to assess patient exposure to the psychiatric use of unscheduled medications at all nine Pennsylvania state hospitals and to unify practice guidelines in this regard. In August 2004, a decision was made to discontinue the use of p.r.n. orders for psychiatric indications. All unscheduled medications, (p.r.n. and STAT physician's order) administered for psychiatric indications were entered into a uniform database. A total of 46,913 unscheduled medications were administered to people served in the hospital system throughout this 15 month study. During March 2004, 87.7 unscheduled medications per 1,000 days-of-care were administered in the hospital system. During the last month of this study, May 2005, this rate had decreased to 17 per 1,000 days-of-care. Many hospital safety measures significantly improved as a result of this change. Cessation of p.r.n. medication use for psychiatric indications has significantly decreased patient exposure to unnecessary psychotropic medications and has resulted in a safer hospital system.

Keywords Medication · Hospital · Practice · PRN · Restraint

G. M. Smith (✉) · D. P. Tran · K. L. Wolfe
Allentown State Hospital, 1600 Hanover Avenue,
Allentown, PA 18109, USA
e-mail: grsmith@state.pa.us

G. M. Smith · R. H. Davis · A. Altenor ·
D. P. Tran · K. L. Wolfe · J. A. Deegan · J. Bradley
Office of Mental Health & Substance Abuse Services,
Harrisburg, PA, USA

J. A. Deegan
Wernersville State Hospital, Wernersville, PA, USA

Introduction

The use of p.r.n. medication (*pro re nata*, i.e. “as the occasion arises”) is a common practice in the management of psychiatric symptoms and behaviors within mental health settings. P.r.n. orders are written by a physician and enable a nurse to administer medication, for specific indications, at predefined doses without requiring the physician to see the patient prior to its administration. This practice study assesses whether p.r.n. medication orders expose patients to unnecessary psychotropic medications and how the discontinuation of these orders affected hospital safety measures.

The literature suggests that the use of psychiatric p.r.n. orders is common. However, little guidance is provided that would allow for the establishment of a best practice (Craven et al. 1987; Usher et al. 2001) Craven et al. found that 88 out of 100 admissions to a psychiatric teaching hospital had p.r.n. medication orders for psychiatric medications and 75 of the 88 received at least one unscheduled medication. Thapa et al. (2003) found that 79% of acute care admissions to a state hospital received at least one unscheduled medication. Usher et al. found 63% of inpatients received p.r.n. psychiatric medications during a 1 month study of an urban and rural psychiatric inpatient setting. Craig and Bracken (1995) discovered that 22.9% of the patients in a large state hospital received at least 1 STAT (*statim*, i.e. immediately) or p.r.n. dose of psychiatric medication during a 1-month period. Mason and DeWolfe (1974) reported that p.r.n. medication orders tend to be maintained beyond the period of time immediate to the admission of psychiatric inpatients.

In 1985, Ayd cautioned against the potential risks associated with p.r.n. medication orders and stated that “the safety of an order for medications as needed depends

on assumptions and knowledge that may or may not accompany that order.” Craven et al. (1987) commenting on their findings noted that, “A disquieting finding of this survey concerns the high frequency of incomplete instructions for p.r.n. medications.” Usher et al. (2001) found that nurses failed to document the reason for administration of p.r.n. medications in 36% of the cases and failed to record outcomes of the use of the medication in 55% of the cases. Sullivan (1994) found that the administration of p.r.n. psychotropic medication is related to a nurse’s knowledge of the medications and their attitude toward the patient and their conditions. However, there is minimal education for nursing staff in the use of psychiatric medication (Usher et al.). Geffen et al. (2002) found that there are disparities between doctors and nurses on identifying the indications for p.r.n. medication in the acute management of psychosis.

Therefore, the literature suggests that not only are there no clear guidelines about when to use p.r.n. psychiatric medications, but there is a lack of consensus on what medications should be used in order to manage a person who is agitated (Geffen et al. 2002). Additionally, despite literature suggesting there is evidence that benzodiazepines are safer and better tolerated in the management of agitation, only 32% of doctors believe p.r.n. benzodiazepines are effective in treating psychotic symptoms (Salzman et al. 1991). Finally, while there is evidence that oral or intramuscular lorazepam is as effective and safer than the similar use of haloperidol and equally as effective as using the two in combination, the practice of using both lorazepam and haloperidol together is common (Geffen et al. 2002; Salzman et al. 1991).

The psychiatric use of unscheduled medications first became an issue for Pennsylvania state hospital’s during the 1990s when community-based programs were being expanded for people served by the system. In 1991 the first Community Hospital Integration Projects Program (CHIPP) was funded by state government for the community placement of people with extensive lengths-of-stay in any of the state hospitals (Allentown State Hospital 2006). It was reported that people who were high users of p.r.n. medications as inpatients had difficulty adjusting due to the limited availability of unscheduled medications in community-based programs. Unscheduled medication refers to medications given by p.r.n. and STAT physician’s order.

There was greater concern that ongoing efforts to decrease the use of seclusion and restraint would increase the psychiatric use of unscheduled medications (Smith et al. 2005). However, even prior to this, hospital staff was unsure of their use. Nurses expressed concern about inadequate and inconsistent orders that did not explain why and when a p.r.n. psychiatric medication should be given. In fact, one hospital eliminated the use of psychiatric p.r.n.

medication orders in 1993. This was done at the Allentown State Hospital because of the uncertainty associated with their use and instead required a STAT physician’s order for any unscheduled medication given for psychiatric symptoms.

The decision to assess the psychiatric use of unscheduled medications in all nine Pennsylvania state hospitals followed the published report on the use of p.r.n. medications at the Arkansas State Hospital. This retrospective study evaluated the results of a 3 month prohibition on the use of p.r.n. orders for psychotropic medications. This research raised “the uncomfortable question of whether p.r.n. orders are for the benefit of the patient or the staff.” The authors concluded that p.r.n. medication orders expose patients to unnecessary psychotropic medications (Thapa et al. 2003).

Considering the high rate at which unscheduled medications were being administered during the first 6 months of the study the following policy was developed in August 2004:

Psychiatric Use

1. P.r.n. medication orders for psychiatric indications shall be prohibited.
2. STAT medication orders for psychiatric indications shall be permitted when a physician conducts a face-to-face assessment of the individual consumer. Telephone orders for STAT medications are also permitted with the requirement that the ordering physician see the person within one hour. In both situations, the medication ordered must be approved for use with the individual’s diagnosis/condition/indication (Allentown State Hospital, 2005).

The use of p.r.n. orders for medical indications was still permitted by this policy change.

The guiding principle for this change was the belief that a physician, based upon a clinical assessment, with input from the nurse and the patient, made the best decision regarding the need for extra psychiatric medication. An effective date of March 1, 2005 was set for this policy to take effect. However, following the August decision, all hospitals implemented changes that reduced the use of unscheduled medications. These included increased attention by treatment teams to people receiving unscheduled medications. It also involved staff training on techniques to assist patients with symptom management and performance improvement projects directed at supporting local team actions including behavior support programs for individual high-users. Most hospitals discontinued the psychiatric use of p.r.n. orders before the March 2005 target date.

Study Objective

The initial objective of this prospective study on March 1, 2004 was to assess patient exposure to the use of unscheduled psychiatric medications at Allentown, Clarks-Summit, Danville, Harrisburg, Mayview, Norristown, Torrance, Warren and Wernersville state hospitals and to unify practice guidelines in this regard. This objective was expanded in August 2004 to evaluate the effects of discontinuing the use of psychiatric p.r.n. orders on hospital safety measures.

Method

Study Setting

Pennsylvania state hospitals provide extended acute and long-term inpatient psychiatric treatment and rehabilitation. During this 15 month period the average daily civil census in all nine hospitals was 1,961 with 60,000 days-of-care provided each month. Additionally, 1,345 people were admitted and 1,420 were discharged during this span. People accepted for admission, for the most part, have been in an acute-care psychiatric setting immediately prior to admission and 1,070 (52%) have a length-of-residence in a state hospital of greater than 2 years.

The eight hospitals that permitted standing p.r.n. orders at the start of the study allowed them to stay in effect for up to 28-days at which time they could be renewed. Also, at the start of the study seven of the nine hospitals had a physician on-call on campus and the remaining two had physicians on-call off campus 24-hours per day, 7-days a week. By March 2005, all hospitals had a physician on-call on campus, 24-hours a day, 7-days a week. Throughout this study period the medication ordering and administration process was a standard, non-electronic, paper process.

Monthly statistical reports were issued throughout the study period to the hospitals that identified units and individual patients who were high-users of unscheduled psychiatric medications. Clinical alerts were also issued to any hospital that served a patient who received 30 or more unscheduled psychiatric medications in any month. The alerts were shared with the treatment team for review as part of the person's plan of care. During the initial phase of this study, March to August 2004, six people received 100 or more unscheduled medications in any 1 month. In August 2004, 1 person received a study high 137 unscheduled medications for agitation and assaultive behaviors.

Study Design

The Repeated Measures Quasi-Experimental Single Group Design was used for this study. This design was chosen

because it was the strongest design possible for an institutional change review. A secondary review of incidents was conducted through database queries and medical record reviews.

The 15 month period covered by this study began March 1, 2004 and ended May 31, 2005. The 6 month period preceding the March 1, 2004 start date, September 2003 through February 2004, was established to baseline the hospital safety measures used to assess the effects of this change. All unscheduled medications administered for psychiatric indications to people served in the civil sections of the hospitals were entered into a uniform database. Each hospital's 24-hours nursing report served as the source document for these entries. Licensed nurses, responsible for the administration of the unscheduled medication, completed this report.

The specific medication administered, its dose, route, date, time, effectiveness, person requesting the medication and the reason for its use were the data elements collected on each medication administered. Multiple medications given at the same time were treated as separate record entries. These data were appended into a central database each month for analysis.

Data on the administration of unscheduled medications were shared monthly with the hospital system. Additionally, throughout this 15 month span, including the baseline period, a monthly risk management summary report was issued to all hospitals that provided incident detail on adverse events occurring to people served by the hospital system. The data contained in these reports were used to assess the effects of this change on hospital safety measures.

In researching this study, there were no conflicts of interest by any of the authors.

Analysis

The number of unscheduled medications given for psychiatric reasons was totaled each month for each facility and served as the numerator. The denominator was the number of days-of-care provided by each hospital for each month multiplied by 1,000 to establish individual rates of administration. This approach was used to control for the month-to-month changes in each hospital's inpatient census. This information was compared with the rate of adverse events adjusted per 1,000 days-of-care. The aggregate use of mechanical restraint and seclusion was used due to their low rate of use.

The Student's *t* test for continuous variables and Chi Square test for categorical variables were used to assess the statistical differences reported. All analyses were completed using the Statistical Program for Social Scientists and all *P*-values are two-tailed. Statistical significance was determined at the $P < 0.05$ levels.

Results

Patient exposure to unscheduled medications administered for psychiatric indications significantly declined following the decision to discontinue the use of p.r.n. orders. The hospital safety measures used to monitor this reduction either significantly improved or were unaffected by this change.

People served in the eight hospitals that permitted the use of p.r.n. orders were exposed to more than twice the amount of unscheduled medication compared to the hospital that did not permit their use ($P < .005$). Requiring a clinical assessment before administering an unscheduled medication was an essential part of this change. At the start of the study Allentown was the only hospital that did not permit p.r.n. orders for psychiatric indications. However, their STAT order process provided for medications to be given by telephone order with no obligation for a physician's face-to-face assessment. Requiring a face-to-face assessment significantly reduced the number of unscheduled psychiatric medications administered at Allentown in the 9 months after the policy change was announced ($P < .001$).

During the 15 month study period, 46,912 unscheduled medications were administered to people civilly served in the hospital system. Of this number, 35,353 (75%) were administered by p.r.n. order and 11,560 (25%) were administered by STAT physician's order. During the baseline period, March through August, the mean number of unscheduled medications administered monthly was 5,053. In May, 2005, the last month of the study 1,037

unscheduled medications were administered ($P < .001$). Table 1 illustrates each hospital's psychiatric use of unscheduled medications adjusted per 1,000 days of care.

At the start of this study, in March 2004, a total of 5,505 medications were administered on an unscheduled basis for psychiatric reasons within the nine hospitals with a mean rate of 87.7 per 1,000 days-of-care for the hospital system (± 51). In May 2005, the last month of this study, the total number administered had been significantly reduced to 1,037 or a rate of 17.2 per 1,000 days-of-care (± 7.1) ($P < .001$). From March 2004 to May 2005 the system decreased its use of unscheduled psychiatric medication by 80%.

Unique Patient Exposure Rate

During the first month of this study a total of 771 people (38%) of those served in the hospitals received an unscheduled medication for psychiatric reasons. In the last month of the study there was a significant reduction in the number of people (356 people or 18%) who had received an unscheduled medication for psychiatric reasons ($P < .001$).

Medications Used on an Unscheduled Basis

Benzodiazepines were the leading group of medications used on an unscheduled basis during this span accounting for 23,225 doses (50%) of all medications administered. Within this class, lorazepam was given 20,762 times and accounted for 44% of all medications given.

Table 1 Individual hospital rates of psychiatric medications administered by p.r.n. and STAT physicians orders per 1,000 days-of-care

Month	Allentown*	Clarks Summit	Danville	Harrisburg	Mayview	Norristown	Torrance	Warren	Wernersville	Weighted mean	Std. deviation
Mar-04	43.25	99.17	63.57	54.43	50.43	81.18	96.19	180.07	149.47	87.72	51.2
Apr-04	38.26	104.53	61.20	56.10	53.92	82.12	94.12	111.37	151.39	82.27	41.0
May-04	31.91	107.80	75.26	60.85	56.86	57.89	101.53	117.06	131.13	79.88	39.1
Jun-04	35.35	97.53	82.90	57.58	79.04	62.30	85.44	132.07	98.09	79.83	34.7
Jul-04	39.78	73.74	100.26	68.18	81.97	60.25	85.55	134.76	132.53	83.89	38.6
Aug-04	37.56	58.35	124.43	67.45	61.27	55.15	93.55	111.02	105.82	75.97	36.0
Sep-04	20.55	27.37	83.17	70.31	56.58	52.75	84.12	51.74	62.28	56.57	25.6
Oct-04	8.67	28.02	67.80	71.46	54.94	50.85	82.90	51.83	34.56	51.46	25.5
Nov-04	5.14	22.35	57.37	51.61	56.47	39.17	55.39	20.40	23.62	38.50	20.4
Dec-04	9.58	29.71	41.30	28.58	46.87	40.26	19.84	15.74	18.26	29.25	13.6
Jan-05	8.52	26.05	38.30	17.33	42.72	46.72	13.45	14.80	29.96	27.76	14.2
Feb-05	7.88	23.78	13.60	19.75	15.73	50.49	16.43	13.83	17.66	21.80	12.1
Mar-05	10.18	18.85	21.41	7.48	22.71	35.13	16.76	14.21	12.35	18.59	8.3
Apr-05	7.82	18.55	10.86	8.76	25.54	29.19	13.93	23.56	23.97	18.91	8.0
May-05	7.8	14.59	4.16	17.85	19.53	25.42	16.98	25.27	12.57	17.16	7.1

* Allentown did not permit the psychiatric use of p.r.n. orders throughout the study period

Chlorpromazine was the second most frequently used medication with 5,317 (11.3%) doses given and haloperidol was the third most frequently used medication with 5,168 (11%) doses administered. Use of these medications varied within the system as illustrated in Table 2.

Indications for the Use of Unscheduled Medications

Agitation was the leading reason given for the use of unscheduled medications accounting for 28,613 (60%) of all doses administered. Anxiety was the second most frequent reason listed with 7,802 doses (16%) and insomnia was the third most frequent reason reported for the administration of an unscheduled medication with 3,455 (7%) doses. Unscheduled medication for psychosis was given 120 times (0.3%) during this span.

Multiple Medications Used on an Unscheduled Basis

Each medication administered was treated as a unique record in the dataset. However, it was common for multiple medications to be used to treat psychiatric symptoms on an unscheduled basis. In the first 6 months of the study there were 26,355 unique events in the nine hospitals involving the administration of 30,320 medications or 1.15 medications administered per event. During the last 9 months of the study, there were 15,438 events involving the administration of 16,621 medications or 1.08 medications per event ($P < .001$). The practice of using multiple medications at the same time to treat psychiatric symptoms on an unscheduled basis varied among the nine hospitals. Throughout the study period lorazepam and chlorpromazine were used in combination 3,778 times. Lorazepam and haloperidol were the next most frequently combined

medications with 1,258 administrations. Unscheduled medications were administered by mouth 37,767 times (80%) during this span and 9,933 times (21%) by intramuscular injection. Overall, individual hospital rates varied from a high of 40% to a low of 8% for medications administered by injection.

Effectiveness of Unscheduled Medications

The effectiveness of medications administered on an unscheduled basis was reported in 44,782 (98%) of the events recorded. Medications were rated as effective, non-effective or unknown by a nurse in relieving the symptoms for which the medication was given. Unscheduled medications were rated effective in relieving symptoms 40,208 times (90%).

The effectiveness of benzodiazepines administered on an unscheduled basis was also assessed. This class of medications was administered 22,674 times during the study period with 5,614 doses (25%) given by STAT order and 17,025 given by p.r.n. order (75%). Benzodiazepines were effective in relieving the symptoms for which they were given 19,725 (87%) times.

Diagnostic Differences in Patients Receiving an Unscheduled Medication

People with an Axis I diagnosis of schizophrenia and related psychotic disorders represent 1,503 (76%) of those served in the hospital system and during the study period had the highest rate of exposure to unscheduled medications accounting for 30,549 (65%) of the medications administered. A total of 296 people (20%) diagnosed with mood disorders are the second largest group of those

Table 2 Specific medications ordered by p.r.n. and STAT physician's order

Medication	All	Cla	Dan	Har	May	Nor	Tor	War	Wer	Count	Percent (%)
Lorazepam	576	1,524	1,455	2,459	3,808	2,877	2,031	3,186	2,846	20,762	44.3
Chlorpromazine	208	868	454	458	388	721	973	287	960	5,317	11.3
Haloperidol	100	641	848	605	461	469	715	1,045	284	5,168	11.0
Hydroxyzine	458	98	306	17	163	1,413	1,005	584	826	4,870	10.4
Olanzapine	15	288	23	379	518	3	61	224	198	1,709	3.6
Zoldipem tartrate	153	18	18	651	3	401	4	34	61	1,343	2.9
Chloral hydrate	2	193	61	0	479	473	6	0	0	1214	2.6
Diphenhydramine	0	483	276	42	48	28	20	174	12	1,083	2.3
Temazepam	40	1	5	57	5	114	571	112	78	983	2.1
Clonazepam	8	382	11	22	47	22	0	172	11	675	1.4
All others	63	588	117	782	586	304	487	265	597	3,789	8.1
Totals	1,623	5,084	3,574	5,472	6,506	6,825	5,873	6,083	5,873	46,913	100.0

State Hospitals: All = Allentown; Cla = Clarks Summit; Dan = Danville; Har = Harrisburg; May = Mayview; Nor = Norristown; Tor = Torrance; War = Warren; Wer = Wernersville

served by the system throughout the study. This group received 12,013 (26%) of the unscheduled medications administered. The remaining people 176 (9%), those with all other Axis I diagnoses, received 4,351 (9%) of the medications administered.

People with a co-occurring substance use diagnosis had high rates of exposure to unscheduled medications. Throughout this study 1,208 people served in the hospital system had a co-occurring substance abuse diagnosis. Within this group 791 (65%) received 16,371 unscheduled medications and of this number 8,731 (53%) were benzodiazepines.

Person Requesting an Unscheduled Medication

The person who “requested” the unscheduled use of a medication was part of this and other studies done on the subject. Nurses were the largest group who requested the administration of an unscheduled medication accounting for 21,695 (46%) of the doses administered. Patients were the second most frequent requestors (15,308 or 32%) followed by physicians who ordered 10,408 (22%) medications. The rate of decline for all three groups significantly increased after the decision was announced to end the use of p.r.n. orders ($P < .001$).

Gender and Age Group Differences

On average, during each month of this study, 1,176 men (60%) and 785 women (40%) were served in the hospital system. However, women and men were administered unscheduled medications on an equal basis [women: 23,338 doses (50%) and men 23,414 doses (50%)]. Overall, people age 40–49 represented the largest group served in the hospital system during this span and received 14,482 (31%) of the medications.

Racial and Ethnic Group Differences

The number of people in racial or ethnic minority groups served in the hospital system averaged 412 (21%) throughout the study. There were no differences observed in the use of unscheduled medications with any racial or ethnic group throughout this study.

Time, Day-of-the-Week Differences

Variances were discovered regarding the times unscheduled medications were being administered. The 2nd shift (3:00 pm–11:00 pm) administered 47% ($n = 22,376$) of the unscheduled medications used during the study period followed by the 1st shift (7:00 am–3:00 pm) that used 36% ($n = 17,139$) and the least amount, 17% ($n = 8,236$) were administered on the 3rd shift (11:00 pm–7:00 am). There

were no significant differences among the hospitals in this regard. However, 10,886 (23.2%) doses were administered between 4:00 pm and 7:00 pm. Additionally, the fewest number of unscheduled medications were administered on weekends when compared to the rest of the week. The 3rd shift on Friday nights recorded the fewest number of unscheduled medications administered ($n = 1,068$) throughout the study period and 2nd shift on Mondays ($n = 3,296$) and Tuesdays ($n = 3,238$) were the days and shifts for the highest use of unscheduled medications.

Safety Measures

Table 3 illustrates the effect of this change on hospital safety measures.

Effect of this Change on Aggression and Assaults

Aggression is defined as verbal or physical threats by a patient toward another person without physical contact. During this study incidents of aggression significantly declined from 3.02 to 2.45 per 1,000 days-of-care ($P < 0.05$). Assault is defined as an aggressive act by a patient toward another person involving physical contact that causes an injury. During baseline, patient-to-patient assaults significantly declined from 1.78 to 1.49 per 1,000 days-of-care ($P < .05$).

Effect of this Change on the Use of Mechanical Restraint and Seclusion

Prior to the start of this change the hospital system had dramatically reduced its use of seclusion and mechanical restraint. During this study the number of hours of mechanical restraint used each month significantly declined from 79 to 15 h ($P < .003$). During this same period the use of seclusion decreased from a total of 56 to 49 hours each month.

Effect of this Change on Other Measures

Data on patient falls, patient-to-staff assaults, adverse drug reactions, episodes of self-injurious behavior and medications errors were collected as part of this study. The data was analyzed using the same methods applied to the other safety measures addressed in this study and were found not to be significantly affected by the discontinuation of psychiatric p.r.n. orders. Some showed modest improvements while other measures were unaffected by this change.

Effect of this Change on Base Medications

As part of this review a retrospective study was conducted on the 100 highest recipients of unscheduled psychiatric

Table 3 Effect of discontinuing p.r.n. orders for psychiatric indications on hospital safety measures

Civil rates adjusted per 1,000 days-of-care										
Month	Psych use of unscheduled meds	Acts of aggression rate	Adverse drug reactions rate	Rate of falls with injury	Rate of staff inj from patient assault	Rate of patient inj from patient assault	Medication error rate	Actual hours of seclusion	Actual hours of mechanical restraint	Act of self-injurious behavior rate
<i>Baseline</i>										
Sep-03	×	3.70	0.42	1.58	0.83	2.00	0.67	6	101	2.01
Oct-03	×	3.41	0.26	1.53	0.76	2.03	0.53	1	104	1.71
Nov-03	×	3.07	0.22	1.53	0.62	1.43	0.52	0	92	2.52
Dec-03	×	2.07	0.10	1.66	0.40	1.62	0.43	0	53	1.83
Jan-04	×	2.87	0.38	1.20	0.64	1.89	0.37	10	78	2.15
Feb-04	×	3.01	0.44	1.42	0.58	1.73	0.41	0	45	2.14
<i>Study period</i>										
Mar-04	87.72	2.78	0.34	1.68	0.61	1.38	0.56	2	32	2.07
Apr-04	82.27	3.27	0.22	1.54	0.55	1.48	0.55	4	26	2.26
May-04	79.88	2.90	0.31	1.42	0.68	1.66	0.27	3	42	2.05
Jun-04	79.83	3.12	0.29	1.75	0.74	1.52	0.39	2	55	2.24
Jul-04	83.89	2.95	0.29	1.37	0.74	1.78	0.44	4	39	2.47
Aug-04	75.97	3.17	0.23	1.83	0.56	1.86	0.57	7	49	1.83
Sep-04	56.57	2.38	0.29	1.43	0.68	1.23	0.63	7	30	1.57
Oct-04	51.46	2.87	0.36	1.65	0.56	1.73	0.36	4	21	1.98
Nov-04	38.50	2.31	0.14	1.21	0.85	1.49	0.48	7	29	1.73
Dec-04	29.25	2.45	0.10	0.89	0.66	1.36	0.69	4	43	2.27
Jan-05	27.76	2.93	0.20	1.29	0.46	1.56	0.56	0	21	2.60
Feb-05	21.80	2.51	0.26	1.41	0.37	1.32	0.60	0	14	1.96
Mar-05	18.59	2.37	0.38	1.66	0.72	1.63	1.05	0	14	1.33
Apr-05	18.91	2.08	0.34	1.64	1.00	1.91	0.61	0	25	2.59
May-05	17.16	2.22	0.20	1.39	0.65	1.24	0.55	1	36	2.05

medications during this study period to assess the effect of this change on their standing orders for psychiatric medications. Specifically, medication order sheets from March 2004 were compared to those in March 2005. The purpose of this review was to assess each person's total exposure to psychotropic medication and the frequency at which they were administered. The results of this review showed no significant differences in either the amount or frequency of medications being administered for psychiatric indications to this group of patients.

Discussion

The administration of unscheduled medications has a direct impact on the duties and responsibilities of the nurse. Medications administered by p.r.n. order require an assessment of the individual to assure they meet the requirement of the order. Next, the medication is prepared and administered and then the requisite documentation

needs to be completed. Medications administered by STAT order require a more comprehensive nursing assessment and communication of the symptoms to the physician.

The elimination of p.r.n. orders for psychiatric indications resulted in a decrease in the time involved in preparing, administering and documenting the use of medications. Nursing staff now focus their efforts on the effective intervention and support of the individual experiencing emotional instability or psychiatric pain. Consultation between psychiatrists, nurses, members of psychiatric emergency response teams and the patient has been enhanced through this process. Accurate patient assessments, knowledge of the person's past and present coping and stress tolerance capabilities as well as application of therapeutic intervention strategies are key nursing responsibilities. Timely and accurate nurse-to-physician communication, sharing the nurse's assessment findings as well as the therapeutic interventions utilized, is critical. Clinical teams now readily discuss situations and prior interventions with one another and ask for

feedback from the person as to what has helped resolve the issue at hand.

P.r.n. orders, both medical and psychiatric, are convenient for healthcare organizations because they do not have the costs associated with a physician on site in order for a person to receive medication for symptom relief. They are convenient for nurses because they can provide a person with medication without the individual having to be seen by a physician. Finally, they are convenient for the person served because they do not have to wait to be assessed by a physician in order to obtain medication for their specific symptoms. However, these benefits need to be balanced against the risks associated with the over exposure to psychotropic medications. These include unintended drug interactions, dependency on medication with known addictive properties, the risk of extrapyramidal symptoms and the potential for acquiring neuroleptic malignant syndrome (Mylan Pharmaceuticals 2004 a, b, c; Upsher-Smith Laboratories 2004). Healthcare facilities that use p.r.n. orders should consider precautions to prevent their overuse. In the absence of a physician, seeking the approval of a nurse supervisor to review the alternate strategies attempted prior to the administration of a p.r.n. medication may provide an additional safeguard.

Prior to the start of this study there was no evidence of training for clinicians on the use of unscheduled medications in any of the hospitals. A potential barrier to training is the lack of an established best practice in the administration of p.r.n. medications (Craven et al. 1987; Usher et al. 2001; Geffen et al. 2002). Training on the use of unscheduled medications should be considered an annual requirement for all clinicians regardless of the type of orders permitted. The literature also indicates the potential for assault and the nurse's requirement that they provide for a safe milieu justifies the need for p.r.n. orders (Osher and Drake 1996; Thapa et al. 2003). However, during the 9 months after the decision was announced to discontinue the use of p.r.n. orders, many safety measures showed significant improvement or were unchanged by this action.

This study also suggests the need for more effective clinical protocols for the use of unscheduled medications. Stop orders for p.r.n. should not exceed 7 days. Indications for use should be as descriptive as possible and list specific behaviors that are unique to the person being served and based on an assessment. They should also include the route of administration, time between doses and a maximum daily dose (Szczeny and Miller 2003). Healthcare facilities should also employ monitoring procedures that would provide clinicians with daily reports on a patient's exposure to unscheduled medication over time. The clinical alerts used in this study are an effective and inexpensive way of monitoring patient exposure to unscheduled medications.

The rate at which benzodiazepines were used with people who have a comorbid alcohol or substance abuse diagnosis during this study was troubling considering that this class of medications is contraindicated for use with people who have these conditions (Osher and Drake 1996). Increasing the level of review for the use of unscheduled medications will prevent the unwarranted use of benzodiazepines with people who have a substance abuse condition.

The use of unscheduled medication also needs further consideration with the application of medication algorithms. Since 2001 the Pennsylvania Medication Algorithm Project for Schizophrenia (PennMAPS) has been in effect within the state hospital system for the treatment of people with schizophrenia (Allentown State Hospital 2000). The goal of this algorithm is medication mono-therapy. The algorithm does not take into account the use of neuroleptics administered on an unscheduled basis, and as a result may provide a false report. Medication algorithms need to take into account medications administered on an unscheduled basis.

The "teaching skills with pills" as part of a strategy to reduce unscheduled medications is a challenging approach for some clinicians. Providing a person with options for managing anxiety during their inpatient hospitalization such as relaxation techniques, diet changes that limit caffeine and personal exercise routines may be more durable to a person post discharge. A balanced approach in this regard will be effective at providing a person with additional options for symptom relief and decrease dependency on medications with known addictive properties.

Prior to this change there was minimal evidence to suggest clinicians, or hospitals in general, were routinely monitoring the unscheduled use of medications their patients were receiving. Psychiatric instability is a common reason for a person to be referred for state hospital admission. A significant measure of a person's instability is their response to symptom management using psychiatric medications. One indicator of a person's positive response to medication management would be symptom control and limited use of unscheduled psychiatric medications. The specific time medications are administered can be just as important as the amount of medication being ordered and clinicians strive for a balance between the two. Frequent use of unscheduled medications creates a barrier to achieving this balance. Psychiatric stability, as evidenced by an absence of breakthrough symptoms, is an important indicator of a person's readiness for discharge. Frequent use of unscheduled medications, as a measure of instability, may extend a person's hospital stay.

By the start of this study the hospital system had significantly reduced its use of mechanical restraint and seclusion (Smith et al. 2005). Additionally, there was local

hospital performance improvement projects focused on assault and fall reduction that could have contributed to the results reported. However, other than the statewide initiatives to monitor and reduce the use of restrictive measures, there were no other system wide programs that could account for the changes reported.

Pennsylvania also supports the admission of individuals with criminal commitments through three forensic centers located at Mayview, Norristown and Warren state hospitals. This service provides competency evaluation and restoration to people charged with a serious crime. The average monthly forensic census during this 15 month study period was 196. While not part of this study, the forensic service was part of this statewide initiative. During March 2004 the forensic service used 112 meds per 1,000 days-of-care ($N = 646$) and during May 2005, the last month of the study, 19 unscheduled medications were administered per 1,000 days-of-care ($N = 108$). The effects of this change on forensic safety measures were equal to those found in the civil hospitals.

Finally, the hospital system is committed to providing safe and effective psychiatric inpatient treatment and rehabilitative services. Because of this commitment the state hospitals contract with the Joint Commission for Accreditation of Healthcare Organizations under their Comprehensive Accreditation Manual for Hospitals standards. During January 2006, at The Joint Commission entrance meeting for the Pennsylvania State Mental Hospital system, a presentation on this change was made to Leo Kirven, MD, lead surveyor for the Joint Commission. Following a lengthy discussion of the change Dr. Kirven remarked, "The use of standing orders for the psychiatric use of p.r.n. orders is problematic from a policy perspective. The psychiatric use of p.r.n. orders will go the same way as standing p.r.n. orders for seclusion and restraint. A doctor today would not think of writing such an order" (Kirven, personal communication, 2006).

Conclusion

Eliminating the use of p.r.n. medication orders for psychiatric indications has resulted in a safer hospital system. The documented paradoxical effects of lorazepam, the leading medication administered during this study period, may account for the higher rates of assaults and aggression during baseline (Brown 1978; Paton 2002; Workman and Cunningham 1975).

The use of medication within hospital settings remains an effective tool in supporting the needs of people in psychiatric or behavioral distress. STAT physician orders for medication, when properly used, represent the best practice for providing immediate symptom relief to foster a

safe milieu. Requiring a STAT physician's order relative to administering additional psychiatric medication increases the quality of the clinical decision making. All unscheduled medications, including medications administered early, need to be closely monitored by the clinician, as well as the healthcare facility, to ensure their proper use. Hospitals that permit the use of p.r.n. orders for psychiatric indications expose patients to unnecessary psychiatric medications when compared to hospitals that have discontinued their use.

Areas in Need of Further Study

Further study is needed in the area of patient one-to-one and/or visual observation orders as such interventions may be employed to address and manage problem behaviors and challenging psychiatric symptoms. During the span of this study more than 1,000 people were admitted to the hospital system and a modifier absent from this study is a quantitative measure of a person's psychiatric acuity and how it may affect the use of unscheduled medications. The economic issues associated with discontinuing the psychiatric use of p.r.n. orders are an important issue that warrants further investigation.

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