Administered antipsychotic pro re nata medications in psychiatric inpatients

Pre- and post-accreditation comparison

Mohammed A. Al-Sughayir, *MBBS, MD.*

ABSTRACT

الأهداف: بحث ما إذا كان برنامج الاعتماد للجودة الإكلينيكية يحسن من طريقة استعمال الأدوية المضادة للذهان الموصوفة حسب الحاجة في المرضى النفسانيين المنومين.

الطريقة: أجريت دراسة مقطعية رجعية مقارنة تمت في الأجنحة النفسية في مستشفى الملك خالد الجامعي بالرياض، قورنت فيها كميات الأدوية وتوقيتها والأسباب التي دعت لصرفها خلال فترة 12 شهراً قبل برنامج الاعتماد للجودة الإكلينيكية خلال الفترة من يوليو 2009م إلى يونيو 2010م مع فترة 12 شهرا بعد برنامج الاعتماد للجودة الإكلينيكية (يوليو 2011م إلى يونيو 2012م).

النتائج: في فترة ما قبل الاعتماد للجودة الإكلينيكية تم صرف الأدوية المضادة للذهان حسب الحاجة لـ 87% من المرضى بمعدل 12.10±7.0 مرة لكل مريض مقارنة بـ 81% من المرضى ومعدل 7.47±3.2 مرة لكل مريض في فترة ما بعد الاعتماد بانخفاض معتبر إحصائيا مقداره 38% $p<0.001$. كان معامل الارتباط بين استعمال الدواء لأسباب غير محددة في فترة ما قبل الاعتماد rs=0.698; $p<0.001$ وقد انخفض ذلك انخفاضا معتبرا إحصائيا بعد الاعتماد إلى rs=0.465; $p<0.001$.

خاتمة: إن تطبيق الإرشادات الإكلينيكية المحددة لصرف الأدوية الذهانية الموصوفة حسب الحاجة الموصوفة للمرضى النفسيين المنومين ساهم في ترشيد صرف تلك الأدوية وتحسين سلامة المرضى.

Objectives: To investigate whether the mental health accreditation program drives improvements in the clinical practice of giving pro re nata (PRN) antipsychotic medications for psychiatric inpatients.

Methods: This study was conducted in October 2012, a record-based pre-post assessment design in psychiatric inpatient wards at King Khalid University Hospital, Riyadh, Saudi Arabia. Data collected from a 12-month pre-accreditation period (July 2009 to June 2010) was compared with those from a 12-month post-accreditation period (July 2011 to June 2012). The collected data identified demographics, diagnosis, number of PRN antipsychotic medications administered per patient, and indications for use.

Results: There were 177 patients during the pre-accreditation period, and 182 patients during the post-accreditation period. Before accreditation, 87% of patients were administered PRN antipsychotics and the average number of PRN antipsychotic administrations per patient was 12.10±7.0 compared with 81% of patients being administered 7.47±3.2 PRN antipsychotic medications per patient post-accreditation. Prior to accreditation, a high number of PRN antipsychotic medications were administered to patients with no specified indications (rs=0.698; $p<0.001$). During the post-accreditation period, the corresponding correlation coefficients significantly declined to rs=0.465; $p<0.001$.

Conclusion: Implementation of clinical practice guidelines in psychiatric inpatients significantly reduces the frequency of PRN antipsychotic medications and enhances patient safety.

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From the Psychiatry Department, College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia.

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Address correspondence and reprint request to: Dr. Mohammed A. Al-Sughayir, Psychiatry Department, College of Medicine, King Saud University, PO Box 21525, Riyadh 11485, Kingdom of Saudi Arabia. Tel. +966 (11) 4671717. Fax. +966 (11) 4672571. E-mail: malsughayir@ksu.edu.sa

Pro re nata (PRN) meaning as the occasion arises, medications are clinical interventions that are frequently used to control behavioral disturbances in psychiatric inpatients. The most frequently used PRN psychotropic medications in mental health services

are typical antipsychotics and benzodiazepines.[1] The literature shows that 63-90% of adult psychiatric inpatients receive a PRN medication as part of their clinical management.[2-4] Hales and Gudjonsson[5] found that on admission, 74% of psychiatric patients were routinely prescribed PRN medications. The study focused on antipsychotic medications because they are the most frequently used PRN medications in inpatient mental health. Moreover, they contribute to high doses, polypharmacy, dangerous drug-drug interactions,[6] and lethal complications such as neuroleptic malignant syndrome. Several countries around the world have sought to improve the quality of services and enhance patient safety through accreditation of health care organizations (HCOs).[7] Accreditation is a comprehensive and continuous quality improvement process, in which an independent agency defines, evaluates, and monitors an organization's compliance with pre-established common national performance standards. An interest in accreditation programs is growing rapidly among developing countries.[8] Saudi Arabia was one of the first countries in the Eastern Mediterranean region to implement health care accreditation standards.[9] Few studies have attempted to improve clinical practice associated with PRN antipsychotic medications. In Kingdom of Saudi Arabia (KSA), there are 2886 psychiatric beds in 20 hospitals. The bed occupancy in most psychiatric hospitals is approximately 100% throughout the year (the ideal figure is 85%).[10] Several governmental hospitals in KSA have obtained accreditation from different international accreditation bodies including the Joint Commission International (JCI), The Australian Council on Healthcare Standards (ACHS), and Accreditation Canada International (ACI).[11] King Khalid University Hospital (KKUH) in Riyadh obtained its first accreditation cycle from ACI in March 2011. The ACI is a not-for-profit, non-governmental quality organization that offers health care improvement services worldwide. The ACI is accredited by the International Society for Quality in Health Care (ISQua). The ISQua's accreditation provides an ACI accreditation program with international recognition and status. The ACI provides comprehensive and integrated international accreditation, education, and advisory services to governments, health services, and accreditation organizations for improving the quality of their services.[12] The client-centered approach of ACI toward service focuses on evidence-based standards and external peer review. With organizations, ACI works to improve the healthcare environment through a commitment to healthcare quality improvement. Based on the Medline/PubMed and Psych INFO computerized databases, prescribing PRN antipsychotic medications in psychiatric inpatients in Saudi Arabia have never been studied. Thus, this study attempted to investigate whether the clinical practice guidelines of administering PRN antipsychotic medications drive improvements for psychiatric inpatients care.

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Methods. A record-based pre-post assessment study was conducted at KKUH, which is the major teaching hospital of the College of Medicine, King Saud University (KSU) in Riyadh, Kingdom of Saudi Arabia (KSA). It is one of the largest secondary and tertiary care centers in the area with a capacity of more than 800 beds, caring for a population of more than 3 million. Patients admitted to this hospital came from various socioeconomic backgrounds in KSA.

The study site was the psychiatric inpatient adult unit at KKUH, which comprises 22 psychiatric inpatient beds (11 for each gender) in locked-door wards, and was adequately staffed with medical and nursing personnel along with psychologists and social workers. Approximately 180 patients a year are admitted to the psychiatric inpatient services, with an average length of stay of 38 days. Patient admissions are usually through the emergency department, outpatient clinics, and rarely from medical wards. Admissions include planned diagnostic assessments, brief intensive therapy, and stabilization of crisis presentations.[13] Within the unit, patients are typically prescribed PRN antipsychotic medications at the time of admission. As part of a comprehensive assessment, the need for PRN medication is determined by the admitting psychiatrist. Thereafter, PRN medications may be administered, as per the chart instructions, by nursing staff at any time during the admission period.

Ethical clearance for the study was provided by the Institutional Review Board, College of Medicine, KSU. Steps were taken to ensure the confidentiality and anonymity of the collected data. We sought to obtain medical records of consecutive hospital admissions for pre- and post-accreditation comparisons of PRN antipsychotic medications in 2 acute mental health wards. Data collected from the 12-month

pre-accreditation period (July 2009 to June 2010) were compared with those from the 12-month post-accreditation period (July 2011 to June 2012). The adoption of accreditation principles in clinical practice occurred over a 12-month period (July 2010 to June 2011) in the middle of the study.

Accreditation, as a continuous quality-improvement process, included applying certain clinical practice guidelines for PRN psychotropic medications (**Figure 1**). To decrease the variability in the clinical judgment of nurses, nurses at KKUH psychiatric wards were educated on the essential role of clinical practice guidelines for the administration of PRN medication. All identified charts were eligible for review; there were no exclusion criteria. Data was collected in October 2012. Patients themselves were not contacted. Compiled information included demographics, diagnosis, number of PRN antipsychotic administrations per patient, and indications for use.

The collected data was entered into a spreadsheet for the analysis. Statistical analysis was conducted using Statistical Package for the Social Science version 15 software for Windows (SPSS Inc., Chicago, IL, USA). The Mann-Whitney test was used to compare the means from 2 independent groups. The Pearson correlation coefficient was computed to investigate the correlation between continuous variables. A *p*-value of <0.05 indicated statistical significance.

Results. There were 177 patients during the pre-accreditation period and 182 patients during the post-accreditation period. The comparisons of the demographic characteristics of the patients between the 2 study periods are presented in **Table 1**. There were no statistically significant differences in the demographic characteristics of the study populations for the 2 study periods ($p>0.05$; for all comparisons).

Table 2 shows the comparisons of clinical diagnoses of the patients between the 2 study periods. There was a significant reduction in the diagnosis of "psychotic disorder," from a prevalence rate of 44.1% of pre-accreditation patients to 33.5% of post-accreditation patients ($p=0.04$). There were no reports of "substance abuse" in any patients during the post-accreditation period, but this disorder was reported in 4% of patients during the pre-accreditation period and the difference between the 2 rates (0% versus 4%) was statistically

Table 1 - Comparison between the demographic characteristics of pre- and post-accreditation patients.

Variable	Study period		*P* value*
	Pre-accreditation n=177 (%)	Post-accreditation n =182 (%)	
Gender			
Male	82 (46.3)	84 (46.2)	0.999
Female	95 (53.7)	98 (53.8)	
Age (years)			
<25	50 (28.2)	59 (32.4)	
25-50	104 (58.8)	104 (57.1)	0.590
>50	23 (13.0)	19 (10.5)	
Marital status			
Single	98 (55.4)	112 (61.5)	0.352
Divorced/separated	20 (11.3)	22 (12.1)	
Married	59 (33.3)	48 (26.4)	

*Level of statistical significance is 5%.

1. After patient admission, all current medications should be documented and reviewed by the admitting team for medication reconciliation.
2. Use of regular medications for individual patients as PRN is always recommended. Polypharmacy is discouraged.
3. When handling a patient's difficult behavior, before resorting to PRN medications, alternative interventions (e.g., counseling) should be attempted.
4. For each patient, the treating psychiatrist should complete the medication orders with the required regimen of PRN medication as soon as possible.
5. Patient accepting oral PRN medications and appropriately responding to it should not be given an injection.
6. Administered PRN medication and its response should be clearly documented .
7. After administering PRN medications, the nurse in charge should monitor the vital signs at least hourly and watch for extrapyramidal side effects.
8. If the nurse has any concern, he/she should immediately inform the treating psychiatrist and ask for a medical evaluation.

Figure 1 - The clinical practice guidelines for the administration of pro re nata (PRN) psychotropic medications applied at King Khalid University Hospital, Riyadh, Kingdom of Saudi Arabia (KSA) psychiatric inpatients. Published with permission from the Psychiatry Department, College of Medicine, King Saud University, Riyadh, KSA.

Table 2 - Comparisons of prevalence rates for clinical psychiatric diagnoses in the pre- and post-accreditation periods.

Diagnosis	Study period		*P*-value
	Pre-accreditation n=177 (%)	Post-accreditation n=182 (%)	
Organic	6 (3.4)	11 (6.0)	0.3497
Psychotic	78 (44.1)	61 (33.5)	0.0402*
Affective	73 (41.2)	94 (51.6)	0.0614
Substance abuse	7 (4.0)	0 (0.0)	0.0067*
Others	13 (7.3)	16 (8.8)	0.7572

*Statistically significant at 5% level of significance

Table 3 - Comparison of the number of administered pro re nata (PRN) medications for specific indications before and after accreditation.

Indication	Period	N	Mean (SD)	*P-value
Aggression	Before accreditation	99	2.88 (1.44)	0.209
	After accreditation	130	2.75 (1.68)	
Agitation	Before accreditation	111	3.20 (2.05)	0.0001
	After accreditation	131	2.32 (1.35)	
Insomnia	Before accreditation	97	3.61(2.13)	0.211
	After accreditation	3	2.33 (2.31)	
Non-specified indications	Before accreditation	147	5.96 (3.45)	0.0001
	After accreditation	131	3.22 (1.55)	

*by Mann-Whitney test

significant (p=0.0067). Before accreditation, 154 of 177 patients (87%) were administered PRN antipsychotics and the average number of PRN antipsychotic administrations per patient was 12.10 ± 7.0 compared with 147 of 182 patients (81%) receiving a mean of 7.47 ± 3.2 PRN antipsychotic administrations per patient post-accreditation. There was a reduction of approximately 38% in the number of administered PRN antipsychotics. The reduction was statistically significant (p<0.001), with no significant difference between the 2 genders.

Table 3 shows the comparison of the number of administered PRN medications for specific indications before and after accreditation.

For the 2 study periods, we investigated the association between total quantities of PRN antipsychotic orders and the quantity administered for the indications "aggression," "agitation," "insomnia," and "non-specified indications," by computing Spearman Correlation Coefficients (**Table 4**). The outstanding differences in magnitudes for the correlation coefficients were those for the category of "non-specified indications." Prior to accreditation, a high number of prescriptions for PRN antipsychotic orders were administered to patients with no specified indications (rs=0.698; p<0.001). During the post-accreditation period, the corresponding correlation coefficients (rs=0.465; p<0.001) indicated a significant decline in the practice of prescribing PRN antipsychotics for non-specified indications.

Table 4 - Correlation between total pro re nata (PRN) anti-psychotics quantities administered to a patient and the drug quantities administered for a specific clinical indication.

Indication	Total PRN antipsychotics administered	
	Pre-accreditation	Post-accreditation
Aggression	rs= 0.632 p<0.001*	rs=0.750 p<0.001*
Agitation	rs=0.643 p<0.001*	rs=0.587 p<0.001*
Insomnia	rs=0.432 p<0.001*	None
Non-specified indications	rs= 0.698 p<0.001*	rs=0.465 p<0.001*

rs is Spearman correlation coefficient. *Statistically significant at 5% level of significance.

Discussion. The study should not be entirely regarded as a survey because it only represents the data for one hospital with an inherent selection bias. However, the preliminary data may serve to provide a significant perspective regarding psychiatric practice in KSA that may assist in the future planning of mental health services in the country. In developed countries, several studies have shown that accreditation programs improve clinical outcomes of a wide spectrum of clinical conditions.[14]

Through a process of strategic planning, the College of Medicine at KSU developed a system to enhance the quality of the clinical and administrative cultures. The system included continual education, training, auditing, and a multidisciplinary team (MDT) approach. In psychiatric patient rounds, a psychologist, a social worker, and a clinical pharmacist were enrolled to upgrade the biopsychosocial assessment and management of psychiatric inpatients. Evidence has shown that the MDT approach reduces the burden of medication-related morbidity when managing behaviorally disturbed patients.[15]

To ensure that accreditation brings a high quality of care, assessment should be based on the outcome indicators of the care of patients. Standardized practice guidelines for PRN psychotropic medications are essential to guarantee effective improvement of psychiatric inpatient services. In KSA, national standard practice guidelines regarding the use of PRN medications in psychiatric inpatient services are still absent. The significant difference between diagnostic categories in pre- and post-accreditation periods may constitute a confounding factor to this study. However,

research has shown that the main factors contributing to the use of PRN medications in the mental health setting are the severity of behavioral disturbances, the availability of alternative interventions, the ward environment, and nursing staff characteristics.[16] Thus, psychiatric diagnosis appears to have a limited influence on PRN antipsychotics administration.

Of the PRN antipsychotics in this study, haloperidol and zuclopenthixol were administered most often in both study periods. Atypical antipsychotics were rarely prescribed as PRN in this study. Systemic review studies have shown that the risk-to-benefit ratio is not acceptable in using the atypical antipsychotic medications on PRN basis.[1] It is interesting to find that, in the post-accreditation period, fewer patients appear to have been administered PRN antipsychotic medications, 81% compared with 87% in the pre-accreditation period. These ranges are comparable to the most frequently cited ranges in the literature, 63-90%.[2-5,15] The average number of PRN antipsychotic administrations per patient post-accreditation was 7.47±3.2 compared to 12.10±7.0 administrations in the pre-accreditation period. There was a reassuring significant reduction of approximately 38%. In published international studies,[2,3,15] the reported means of PRN medications in psychiatric inpatients were 10-12 administrations per patient. Studies have shown that approximately 75% of PRN medications administered to psychiatric inpatients were dispensed by nurses.[17] Nurses were encouraged to utilize a positive nurse-patient relationship and non-pharmacological interventions before resorting to PRN medications. Most of the used alternative interventions at the KKUH wards were face-to-face de-escalation and supportive contacts. However, the content of such interventions is difficult to validate. Further investigation is required to explore the critical successful factors embedded in the alternative interventions.

In accordance with previous studies,[18,19] our results indicate that the most common reported reasons for administration of PRN antipsychotics were aggression, insomnia, and agitation. However, agitation may be confused with akathisia (antipsychotic-induced motor restlessness). For PRN antipsychotics, it is essential to distinguish agitation from akathisia. When akathisia is mistaken for agitation, the patient with akathisia may develop serious side effects as a result of being given repeated excessive quantities of antipsychotic medications. Patients with akathisia are usually aware of their subjective compelling feeling of inner tension and motor restlessness. Akathisia may respond to benzodiazepines or beta-blockers, but not to antipsychotic or anticholinergic medications. The significant decline in the number of administered PRN antipsychotics for "non-specified indications" can be explained by the positive effect of the clinical practice guidelines for the administration of PRN antipsychotics in enhancing the attitude and practice of nurses with regard to patient safety and quality of care. Our findings indicate that implementation of clinical practice guidelines for the administration of PRN psychotropic medications in psychiatric inpatients significantly reduces the frequency of PRN antipsychotic medications and enhances patient safety.

However, limitations of this study should be considered namely, its reliance on retrospective data collection with questions on the reliability of documentation. Another limitation relates to possible staff changes,which may affect the association between accreditation and seen improvements.

Multicenter research with a larger sample size is necessary to confirm the findings of this study. There is evidently more scope for research to explore factors, which may have an impact on improving the practice of PRN administration for psychiatric inpatients, such as alternative non-pharmacological interventions and knowledge, attitude, and practices of nurses.

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References

1. Baker JA, Lovell K, Harris N. A best-evidence synthesis review of the administration of psychotropic pro re nata (PRN) medication in in-patient mental health settings. ***J Clin Nurs*** 2008; 17: 1122-1131.
2. Baker JA, Lovell K, Harris N. The impact of a good practice manual on professional practice associated with psychotropic PRN in acute mental health wards: An exploratory study. ***Int J Nurs Stud*** 2008; 45: 403-410.
3. Curtis J, Capp K. Administration of 'as needed' psychotropic medication: a retrospective study. ***Int J Ment Health Nurs*** 2003; 12: 229-234.
4. Thapa PB, Palmer SL, Owen RR, Huntley AL, Clardy JA, Miller LH. P.R.N. (As-needed) orders and exposure of psychiatric inpatients to unnecessary psychotropic medications. ***Psychiatr Serv*** 2003; 54: 1282-1286.
5. Hales H, Gudjonsson G. Effect of ethnic differences on the use of PRN (as required) medication on an inner London Medium secure unit. ***Journal of Forensic Psychiatry Psychology*** 2004; 15: 303-313.
6. Davies S, Lennard M, Ghahramani P, Pratt P, Robertson A, otokar J. PRN prescribing in psychiatric inpatients - potential for pharmacokinetic drug interactions. ***J Psychopharmacol*** 2007; 21: 153-160.

7. Shaw CD. The role of external assessment in improving health care. ***Int J Qual Health Care*** 2000; 12: 167.
8. Shaw CD. External quality mechanisms for health care: Summary of the ExPeRT project on visitatie, accreditation, EFQM and ISO assessment in European Union countries. External peer review techniques. European foundation for quality management. International organization for standardization. ***Int J Qual Health Care*** 2000; 12: 169-175.
9. Al-Awa B, Al Mazrooa A, Rayes O, El Hati T, Devreux I, Al-Noury K, et al. Benchmarking the post-accreditation patient safety culture at King Abdulaziz University Hospital. ***Ann Saudi Med*** 2012; 32: 143-150.
10. Al-Habeeb AA, Qureshi NA. Mental and Social Health Atlas in Saudi Arabia: 2007-2008. ***East Mediterr Health J*** 2010; 16: 570-577.
11. Alkhenizan A, Shaw C. Assessment of the accreditation standards of the Central Board for Accreditation of Healthcare Institutions in Saudi Arabia against the principles of the International Society for Quality in Health Care (ISQua). ***Ann Saudi Med*** 2010; 30: 386-389.
12. Accreditation Canada International. Accreditation. [Updated 2010 November 10; Accessed 2013 May 6]. Available from URL: http://www.internationalaccreditation.ca
13. Al-Sughayir M. Referral pattern of physical diseases in psychiatric in-patients. ***Saudi Med J*** 2000; 21: 864-868.
14. Alkhenizan A, Shaw C. Impact of accreditation on the quality of healthcare services: a systematic review of the literature. ***Ann Saudi Med*** 2011; 31: 407-416.
15. Geffen J, Sorensen L, Cameron A, Roberts MS, Geffen L. Pro re nata medication for psychoses: an audit for practice in two metropolitan hospitals. ***Aust N Z J Psychiatry*** 2002; 36: 649-656.
16. Baker JA, Lovell K, Harris N, Campbell M. Multidisciplinary consensus of best practice for pro re nata (PRN) psychotropic medications within acute mental health settings: a Delphi study. ***J PsychiatrMent Health Nurs*** 2007; 14: 478-484.
17. Haliton MF, Whitefor HA. Pro re nata medication for psychiatric inpatients: time to act. ***Aust N Z J Psychiatry*** 2008; 42: 555-564.
18. Botvinik L, Schweitzer I. Audit of antipsychotic prescribing in a private psychiatric hospital. ***Australian Psychiatry*** 2004; 12: 227-233.
19. Stein-Partbury J, Reid K, Smith N, Mouhanna D, Lamont F. Use of pro re nata medications in acute inpatient care. ***Aust N Z J Psychiatry*** 2008; 42: 283-292.