The pharmacological treatment of schizophrenia in Chinese patients: a comparison of prescription patterns between 1996 and 1999

Gabor S Ungvari,¹ Yiu Gar Chung,² Yip Ka Chee,³ Ng Fung-Shing,⁴ Tang Wai Kwong¹ & Helen F. K. Chiu¹

¹Department of Psychiatry, The Chinese University of Hong Kong, Hong Kong, ²Department of Psychiatry, United Christian Hospital, Hong Kong,

³Department of Psychiatry, Kowloon Hospital, Hong Kong and ⁴Department of Psychiatry, Tai Po Hospital, Hong Kong, SAR, China

Aims In 1996 a Hong Kong-wide survey of pharmacological treatment for schizophrenic inpatients identified a few idiosyncratic prescription patterns that were not consistent with international standards. In the context of continuous quality assurance, the survey was repeated in 1999 to monitor trends in the pharmacotherapy of schizophrenia and to identify changes in prescribing practices. It was expected that the widespread introduction of novel antipsychotic drugs coupled with continuing medical education would favourably alter prescribing habits.

Methods A representative random sample of 1202 schizophrenic patients from all inpatient settings in Hong Kong was surveyed. Basic socio-demographic data and a list of all psychotropic medication taken on census day were collected.

Results Significant improvement was noted in several aspects of pharmacotherapy in 1999 as compared with 1996. The total daily dosage of antipsychotic drugs decreased from 716 ± 627 to 561 ± 482 mg day⁻¹ chlorpromazine equivalent (CPZeq) (Mann-Whitney *U*-test; $Z = -3.906$, $P = 0.000$; 95% confidence interval [CI] = 70.0, 240.2 mg day⁻¹ CPZeq), for acute patients and from 923 ± 809 to 675 ± 545 mg day⁻¹ CPZeq (Mann-Whitney *U*-test; $Z = -5.036$, $P = 0.000$; 95% CI = 175.57, 321.63 mg day⁻¹ CPZeq) for chronic patients. The percentage of patients coprescribed antipsychotics and an antiparkinson drug significantly decreased from 67.8% to 61.8% ($\chi^2 = 5.558$, $P = 0.018$) in the chronic schizophrenia group. The percentage of patients taking atypical antipsychotic medication increased significantly from 5.5% to 19.2% ($\chi^2 = 27.14$, $P = 0.000$) in the acute and 3.4% to 12.3% ($\chi^2 = 27.76$, $P = 0.000$) in the chronic group.

Conclusions Repeated surveys of prescribing practices proved to be a useful tool to demonstrate trends in the pharmacological treatment of schizophrenia. Our findings suggest that the widespread use of atypical antipsychotic drugs contributed to a more rational pharmacotherapy for schizophrenia.

Keywords: antipsychotic drugs, atypical antipsychotics, prescription patterns, schizophrenia

Introduction

Cross-sectional surveys of prescription patterns for psychiatric patients constitute an inexpensive, fast and efficient way of obtaining a global estimate of the appropriateness of pharmacotherapy in a given setting or community [1–5]. The advantages of this method explain why such surveys continue to appear in the literature in increasing numbers.

Repeated surveys in the same hospital or area are more useful than single surveys as 1) they may indicate important trends in pharmacotherapy over time and 2) they help judge the effectiveness of education and training of psychiatrists in psychopharmacotherapy. Results of the few repeated surveys published to date have been largely disappointing; education, training and audits seemed to have limited impact on prescribing practices [6–9].

Over the past decade prescription habits in Hong Kong have been repeatedly surveyed focusing mainly on the pharmacotherapy of schizophrenia in inpatient settings [2, 3, 10–12]. A Hong Kong-wide survey of psychotropic drug prescription for a representative sample of schizophrenic inpatients was completed in 1996 [12].

Correspondence: Dr Gabor S. Ungvari, Department of Psychiatry, Prince of Wales Hospital, Shatin, N.T., Hong Kong SAR, China. Tel: + 852-2632-3638; Fax: + 852-2637-7884; E-mail: gungvari@cuhk.edu.hk

Accepted 24 July 2002.

Prescription problems identified included higher than recommended doses for antipsychotics, polypharmacy with these drugs and a high rate of antiparkinsonian drug use.

The Quality Assurance Subcommittee of the Hospital Authority constantly monitors the trends in management of various psychiatric disorders by organizing periodic Hong Kong-wide surveys. To this end, another survey of prescription pattern for schizophrenia that included all inpatient settings in Hong Kong was conducted 3 years after the first one. Subsequent to the 1996 survey, the atypical antipsychotics clozapine and risperidone became widely available soon followed by olanzapine. The introduction of atypical antipsychotics was accompanied by intensive continuing medical education programs organized by drug companies and various professional associations. The widespread use of atypical antipsychotic drugs was the only significant change in the treatment of schizophrenia following the 1996 survey providing an opportunity to estimate the effect of the introduction of these drugs on prescribing habits. A comparison of the results of the two surveys is reported here with emphasis on four important aspects: 1) doses of antipsychotic drugs, 2) the number of antipsychotics given concurrently, 3) administration of antipsychotics in depot form and 4) the use of antiparkinson drugs. In addition, we have examined the impact of atypical antipsychotics on certain aspects of prescription patterns in 1999.

Methods

The method of our survey has been described in detail in previous papers [3, 10–12]. Briefly, on a randomly chosen census day, and without prior notice to participants, junior doctors working at all psychiatric inpatient settings in Hong Kong were requested to complete a data sheet for 20 patients with schizophrenia who were selected from their caseload according to the same computer-generated random sampling method. (Only the forensic psychiatric unit was excluded from the study due to its special patient population). Following the survey undertaken in 1996, psychiatrists were not informed that another survey would be taking place later. Doses of antipsychotic medications were converted into chlorpromazine equivalent (CPZeq) milligrams, using the same conversion table as in the earlier studies [2, 3, 10–13]. Olanzapine 1 mg was taken as equivalent to 60 mg chlorpromazine based on information obtained from its manufacturer, Eli Lilly Co. [Personal communication, 2000].

Statistical analysis

Statistical analysis was performed using Mann–Whitney *U*-test for continuous variables and chi-square test to

compare two proportions. The mean doses of antipsychotic drugs were adjusted for age, duration of illness and length of current admission employing univariate analysis. The statistical analysis was performed separately for the acute (length of current hospitalization 3 months or less) and chronic (length of current hospitalization more than 3 months) patients with schizophrenia, as they require different pharmacotherapeutic strategy. Level of significance was determined at the 0.05 level.

Results

Comparison of basic socio-demographic and clinical data

Samples drawn in 1996 and 1999 represented 35% and 41% of all patients with schizophrenia treated in Hong Kong public hospitals, respectively. All subjects were ethnic Chinese. Comparison of the two samples with respect to basic socio-demographic and clinical data is shown in Tables 1 and 2.

Comparison between the 1996 and the 1999 sample with respect to antipsychotic treatment

First, a comparison was made between the 1996 and 1999 samples without differentiating between typical and atypical antipsychotics. Mean doses of antipsychotic drugs were significantly decreased by 1999 (Tables 3 and 4). Having adjusted the mean doses of antipsychotics for age, duration of illness and length of current admission using multivariate analysis, the difference between the two cohorts of patients remained significant in both the acute ($P = 0.002$) and the chronic ($P = 0.000$) groups.

The percentage of patients on depot medication decreased between the two surveys, albeit not significantly, for both acute and chronic inpatients (Tables 5 and 6). Polypharmacy with antipsychotics decreased by 1999 for both acute and chronic patients but the difference between the two surveys reached statistical significance only for the chronic group (Tables 5 and 6).

The percentage of patients given antipsychotics and antiparkinson agents concurrently remained the same for acute patients between the two surveys while significantly decreased in the chronic group (Tables 5 and 6).

With respect to the three atypical antipsychotic drugs available in 1999 (clozapine, risperidone and olanzapine), the percentage of patients receiving them rose from 5.5% to 19.2% in the acute and 3.4% to 12.3% in the chronic group between 1996 and 1999, a significant difference ($\chi^2 = 27.14$ and $\chi^2 = 27.76$, respectively; $P = 0.000$ for both acute and chronic subjects). In 1999, all but one patient each from the acute and chronic group were given

Table 1 Demographic and clinical data for the 1996 and 1999 cohorts of acute patients (length of current admission is 3 months or less).

	1996 (n = 323)		1999 (n = 356)		Statistical values
Male sex (%)	50.5		54.5		* $\chi^2=1.103$ $P=0.294$
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>	
Age (years)	36.8 $\pm$ 11.5	36	40.0 $\pm$ 14.3	38	** $Z=-2.614$ $P=0.009$
Duration of illness (years)	10.9 $\pm$ 8.4	10	12.9 $\pm$ 10.1	10	** $Z=-2.114$ $P=0.035$
Length of current hospitalization (months)	1.3 $\pm$ 0.9	1	1.4 $\pm$ 0.9	1	** $Z=-2.772$ $P=0.006$

*chi-square test, **Mann–Whitney *U*-test.**Table 2** Demographic and clinical data for the 1996 and 1999 cohorts of chronic patients (length of current admission is more than 3 months).

	1996 (n = 634)		1999 (n = 846)		Statistical values
Male sex (%)	67.0		65.8		* $\chi^2=0.235$ $P=0.628$
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>	
Age (years)	43.7 $\pm$ 11.3	43	46.5 $\pm$ 13.2	45	** $Z=-3.109$ $P=0.002$
Duration of illness (years)	17.9 $\pm$ 9.7	17	20.0 $\pm$ 11.3	19	** $Z=-3.247$ $P=0.001$
Length of current hospitalization (months)	59.6 $\pm$ 63.2	36.5	57.2 $\pm$ 78.4	25	** $Z=-3.215$ $P=0.001$

*chi-square test, **Mann–Whitney *U*-test.**Table 3** Mean doses of antipsychotic (AP) drugs for acute patients in 1996 and 1999.

	1996 (n = 323)			1999 (n = 356)			*Statistical values	95% CI**
	<i>Mean</i>	<i>Median</i>	<i>Range</i>	<i>Mean</i>	<i>Median</i>	<i>Range</i>		
AP (CPZeq mg)	716 $\pm$ 627	600	20–3600	561 $\pm$ 482	400	40–3800	$Z=-3.906$, $P=0.000$	70.0, 240.2

*Mann–Whitney *U*-test, **confidence interval.**Table 4** Mean doses of antipsychotic (AP) drugs for chronic patients in 1996 and 1999.

	1996 (n = 634)			1999 (n = 846)			*Statistical values	95% CI**
95% CI**	<i>Mean</i>	<i>Median</i>	<i>Range</i>	<i>Mean</i>	<i>Median</i>	<i>Range</i>		
AP (CPZeq mg)	923 $\pm$ 809	700	25–4450	675 $\pm$ 545	550	10–3000	$Z=-5.036$, $P=0.000$	175.6, 321.6

*Mann–Whitney *U*-test, **confidence interval.

atypical antipsychotics within the recommended maximum dose range (600 mg day⁻¹ clozapine, 8 mg day⁻¹ risperidone and 20 mg day⁻¹ olanzapine.); in 1996 no patient received such medication beyond the recommended doses.

Comparison of the 1996 and 1999 sample with respect to typical antipsychotic drugs

Comparing the 1996 and 1999 cohorts of patients who took only typical antipsychotics, the difference between

Table 5 Percentage of acute patients on multiple antipsychotics (AP) drugs, depot AP and concurrent antiparkinsonian (APS) medication.

	1996 (n = 323)	1999 (n = 356)
*Patients given	(%)	(%)
No AP	5.2	2.0
One AP	48.9	57.6
Two APs	34.4	36.5
Three APs	11.1	3.9
Four APs	0.3	0.0
**Depot AP given	42.7	37.9
***AP given concurrently with APS	66.3	66.0

*Mann-Whitney *U*-test: $Z = -1.546$, $P = 0.122$ (95% CI = -0.21, 0.0047), **chi-square test: $\chi^2 = 1.625$, $P = 0.202$, ***chi-square test: $\chi^2 = 0.004$, $P = 0.947$.

Table 6 Percentage of chronic patients on multiple antipsychotics (AP) drugs, depot AP and concurrent antiparkinsonian (APS) medication.

	1996 (n = 634)	1999 (n = 846)
*Patients given	(%)	(%)
No AP	2.3	2.2
One AP	42.2	53.0
Two APs	16.2	36.5
Three APs	16.2	8.1
Four APs	1.7	0.1
**Depot AP given	48.1	43.0
***AP given concurrently with APS	67.8	61.8

*Mann-Whitney *U*-test: $Z = -4.948$, $P = 0.000$ (95% CI = 0.14, 0.3), **chi-square test: $\chi^2 = 3.378$, $P = 0.052$, ***chi-square test: $\chi^2 = 5.558$, $P = 0.018$.

the daily doses was still significant (acute group: $z = -2.252$; $P = 0.024$; chronic group: $z = -4.280$; $P = 0.000$) while for the frequency of depot medication and that of antiparkinson agents did not reach statistical significance for both acute ($\chi^2 = 0.073$; $P = 0.787$; and $\chi^2 = 0.359$; $P = 0.530$, respectively) and chronic patients ($\chi^2 = 1.203$; $P = 0.273$; and $\chi^2 = 3.098$; $P = 0.078$, respectively).

The impact of atypical antipsychotics on prescription patterns in 1999

In 1999, 26.2% of acute and 30% of chronic patients on atypical antipsychotic medication were taking concurrently typical antipsychotics. The groups of these patients

will be called the acute and chronic mixed group hereafter. Similar to our findings, concurrent administration of typical and atypical antipsychotics is as frequent as 50% in many settings [14] justifying to treat the mixed group separately. In the following paragraph we compare the mixed group with the cohort of patients taking only typical antipsychotics.

Both acute and chronic patients in the mixed group received significantly lower daily doses than their respective counterparts on typical antipsychotics (406 ± 237 vs 595 ± 514 mg CPZeq; $Z = -1.979$, $P = 0.048$ for acute patients and 545 ± 407 vs 693 ± 559 mg CPZeq; $Z = -2.101$, $P = 0.036$) for the chronic groups. Patients in the mixed group received significantly less depot medication than those taking typical antipsychotics: 20.3% vs 41.8% ($\chi^2 = 10.277$; $P = 0.001$) in the acute group and 27.2% vs 45.1% ($\chi^2 = 11.911$; $P = 0.001$) in the chronic group.

Similarly, the difference between the mixed and typical groups was significant with respect to the use of antiparkinson agent accompanying antipsychotic treatment: 53.1% vs 68.8% ($\chi^2 = 5.75$; $P = 0.016$) for acute patients and 51.5% vs 63.3% ($\chi^2 = 5.369$; $P = 0.020$) for chronic patients.

Mean antipsychotic doses for the 47 and 72 acute and chronic subjects, respectively, who were on an atypical drug, did not differ significantly from those given to patients who received only one typical antipsychotic ($n = 158$ and $n = 376$ in acute and chronic group, respectively): 370 ± 240 vs 415 ± 390 mg CPZeq/day ($Z = -0.409$, $P = 0.683$) for acute patients and 413 ± 310 vs 406 ± 428 mg CPZeq/day ($Z = -0.327$, $P = 0.744$) for chronic patients. No subject received more than one atypical agent in either the acute or the chronic atypical group.

There was no difference between the atypical and typical groups with respect to the use of concurrent antiparkinson drug: 47% vs 63% ($\chi^2 = 3.763$, $P = 0.052$, acute patients) and 46% vs 51% ($\chi^2 = 0.661$, $P = 0.416$) for chronic patients.

Prescription of other psychotropic drugs in 1996 and 1999

Significantly more patients were taking benzodiazepines in 1999 than in 1996 (106 [8.6%] vs 53 [5.5%]; $\chi^2 = 7.833$, $P = 0.005$). The percentage of patients receiving other psychotropic drugs, namely antidepressants, lithium and anticonvulsants as adjunct medication to antipsychotic drugs, was essentially the same in both years: 6.2 vs 5.8%, 2.7% vs 3.4% and 6.9% vs 5.7%, respectively. In both years only a small fraction of patients -2.9% in 1996 and 2.0% in 1999 - took hypnotics regularly.

Discussion

Studies of prescription habits have two main limitations. First, adequacy of pharmacotherapy is measured against guidelines and standard textbook recommendations, rather than the characteristics of the particular patient population under review. Second, the conversion of different antipsychotics into CPZ equivalents is an approximation lacking objective, scientifically sound and widely accepted standard conversion values, particularly for atypical agents [15]. Repeated surveys of the same locality using the same conversion table mitigate these shortcomings, and may reveal favourable developments or undesirable trends in prescribing practices [6–9].

The imprecise acute-chronic dichotomy poses another methodological problem. There is no consensus in the literature on how 'acute' or 'chronic' schizophrenia should be defined. In this study the arbitrary cut-off point of 3 month continuous hospitalization for dividing patients into acute and chronic groups was chosen in keeping with our clinical practice. Obviously, there are overlaps between the acute and chronic groups of patients.

During the period between the two surveys, the structure of psychiatric services, the delivery of care and the under- and postgraduate training remained essentially unchanged and so were the prescribing psychiatrists except for a few new residents. The method for selecting subjects was the same in both years. The selection was unlikely to introduce significant bias in the sampling as new admission and long-term patients were randomly assigned to junior doctors. The introduction and widespread use of atypical antipsychotic drugs constituted the only major change during this period. It was therefore safe to assume that the differences between the prescribing practices in 1996 and 1999 were largely due to the atypical drugs. In tandem with the appearance of atypical antipsychotics, continuing professional education might also have had its impact on prescribing habits.

From the viewpoint of psychotropic drug prescription, the 1996 and 1999 cohorts of schizophrenic in-patients, although different statistically, were broadly comparable with regard to basic socio-demographic and clinical data. (e.g. there is basically no difference between a 36-year-old patient with an illness duration of 10 years and a 40-year-old patient who has been ill for 12 years.)

Overall, there was a significant drop in the daily doses of antipsychotics by 1999 in both the acute and chronic group of patients, which represents a favourable development. Recent positron emission tomography (PET) studies visualizing brain dopamine receptors have confirmed earlier clinical opinion that 300–800 mg CPZeq of antipsychotic medication constitutes the optimal daily dose for the majority of patients [16]. Exceeding this dose

range does not confer any benefit in terms of antipsychotic effect while the risk of disabling side-effects significantly increases [17].

Our results show that the decrease in doses of antipsychotics by 1999 was, in part, due to the use of atypical agents; adding an atypical to a typical antipsychotic significantly decreased the cumulative daily doses for acute and chronic patients alike. Daily doses for patients taking only one atypical or typical antipsychotic drug, however, were not different. We speculate that the acute and chronic atypical groups comprised treatment-resistant patients while the typical groups were more likely to consist of subjects with relatively benign schizophrenia who did not require higher doses or combinations of antipsychotic drugs.

Atypical antipsychotics have a more strictly defined dose range and all but two of the patients took these drugs in doses suggested by recent guidelines. Lacking longer personal experience with atypical agents, clinicians were probably more willing to follow the recommendations of the literature when prescribing atypical antipsychotic drugs. In the case of clozapine, even the remote possibility of agranulocytosis made the clinicians extremely cautious. Doses of typical antipsychotics also decreased significantly during the 3-year period, most likely attesting to an effective continuing medical education.

A brief comment should be made on the antipsychotic doses for Chinese patients from an ethno-psychopharmacological perspective. There is a considerable amount of data suggesting that Asian patients have a lower threshold for the therapeutic and side-effects of these drugs than do Caucasians [18–20] although opposing views have also been published [21, 22]. A host of genetic, pharmacokinetic, pharmacodynamic, socio-cultural and environmental factors and variations in prescribing practices have been proposed to account for the interethnic differences in antipsychotic pharmacotherapy [20, 23, 24]. Similar to earlier results of prescription pattern studies in Chinese patients [2, 3, 10–12, 25], even the reduced doses of antipsychotics for our subjects found in 1999 are in the dose range prescribed for Caucasian patients with schizophrenia [1, 7, 9]. However, this finding does not necessarily cast doubts on the need for lower antipsychotic doses for Asian patients. In view of the high rate of antipsychotic-antiparkinson combination in our sample, particularly for chronic patients [62%], the possibility of administering higher than necessary antipsychotic doses cannot be excluded.

The utilization of depot medication in Hong Kong is in keeping with international figures; for instance the corresponding figures for patients with schizophrenia in public hospitals in New York State ranged between 12 and 39% [26]. The decreased utilization of depot medi-

cation for acute and particularly for chronic patients between 1996 and 1999 probably reflects the introduction of atypical antipsychotics that are not yet available in depot form. For chronic patients administration of depot medication ensures treatment adherence, provides a steady plasma level of the drug and saves time for patients, staff and caregivers [27]. Perhaps the disadvantages of depot medication, which include lack of flexibility in dosing and the inconvenience of regular injections, outweigh its usefulness for some patients and clinicians.

A statistically significant decrease in antipsychotic polypharmacy for chronic patients and a trend in the same direction for acute patients were detected during the study period. Yet, more than 40% of acute and chronic schizophrenic inpatients were still on two or more antipsychotics in 1999, a high figure compared with other studies [25]. The advantages of avoiding antipsychotic polypharmacy are manifold: 1 combining two drugs rarely increases effectiveness but 2 it definitely increases the risk of adverse effects and 3 polypharmacy makes it impossible to gauge which drug really works [28]. However, antipsychotic polypharmacy is justified in certain situations: 1 when gradually switching from one drug to another ('cross-tapering'), 2 when depot medication is temporarily augmented by an oral drug, 3 when patients and/or their relatives are unwilling to give up the old medication, 4 when patients fail to respond to several trials of monotherapy including atypical antipsychotics and 5 when patients do respond to a combination of antipsychotics having failed monotherapy [28, 29].

While polypharmacy with typical agents is difficult to justify, combining typical with atypical drugs could make sense in some cases of severe, treatment-resistant schizophrenia [14], although the benefit of reduced frequency of extrapyramidal side-effects (EPS) with atypical drugs is likely to be lost. Controlled studies in this area are still lacking [30]. In prescription surveys up to 50% of patients with treatment-resistant schizophrenia were receiving typical-atypical combination [31, 32]. The relatively high percentage of patients on both atypical and typical drugs found in our survey can be explained by the cross-tapering from a typical to an atypical antipsychotic and the accumulation of treatment-resistant patients in hospitals warranting unorthodox pharmacotherapy. In our study patients on typical-atypical combinations received significantly less daily doses than those on typical antipsychotics only.

In 1999 significantly more patients received benzodiazepines than in 1996. Together with the lower antipsychotic doses, this may suggest that benzodiazepines were used appropriately for sedation in psychotic agitation rather than giving antipsychotics in higher doses

and/or more frequently. However, a cross-sectional survey cannot determine how long benzodiazepines were administered.

While the percentage of acute patients coprescribed antipsychotics and antiparkinson drugs decreased only marginally between the two surveys, for chronic patients the decrease was statistically significant. While administering an antiparkinson drug in the beginning of acute treatment of schizophrenic psychosis is acceptable [33], the proportion of patients on antiparkinson medication was very high [62%] in the chronic group despite the statistically significant drop in their percentage. The fact that nearly the same percent of acute and chronic patients took an antiparkinson agent suggests that either chronic patients received higher than necessary antipsychotic doses, and antiparkinson medication was needed to counterbalance EPS, or treating psychiatrists kept prescribing antiparkinson drugs without a thorough review of the patients' condition and their medication.

Atypical antipsychotics, particularly clozapine and olanzapine, induce significantly less EPS and therefore the declining use of antiparkinson medication was expected. Although considerably fewer patients on atypical antipsychotics received an antiparkinson drug than those taking only typical antipsychotic medication, the percentage of acute and chronic patients taking an antiparkinson drug with atypical antipsychotics, – 46.8% and 45.8%, respectively, – was surprisingly high. This can be explained, at least in part, by the fact that most patients had received typical antipsychotics for a long period before switching to atypical drugs and they still had Parkinsonian symptoms at the time of the survey. Also, in higher dose range, risperidone is known to induce EPS.

In a recent double-blind, placebo-controlled study of antiparkinson drug withdrawal [34], less than 20% of Chinese schizophrenic patients needed long-term antiparkinson medication. In addition to their disturbing anticholinergic effects and potential for abuse [35], antiparkinson drugs may aggravate schizophrenic patients' cognitive dysfunction [33]. Therefore, the use of antiparkinson drugs should be restricted to patients with manifest Parkinsonian symptoms [33].

The percentage of patients receiving other psychotropic drugs, namely antidepressants, lithium and anticonvulsants as adjunct medication to antipsychotic drugs, was essentially the same in both samples. These small figures are reassuring as in the era of atypical antipsychotics there is limited justification of using these drugs for augmentation [14]. In both years only a small fraction of patients took hypnotics regularly, indicating the judicious use of these drugs and, possibly, the effective use of sleep hygienic measures in psychiatric inpatient settings in Hong Kong.

In conclusion, although not an exact, scientific method, monitoring prescription patterns has proved to be a useful tool of quality assurance in psychiatric pharmacotherapy. Our repeated surveys of prescription patterns for a representative sample of schizophrenic inpatients in Hong Kong revealed significant improvement in some important aspects of antipsychotic treatment. It seems that the favourable changes were partly due to the increasing use of atypical antipsychotics. The surveys have also identified areas where further improvement will be necessary to narrow the gap between guidelines depicting the optimal situation and the reality of routine clinical practice. In connection with the introduction of these new drugs, raising the psychiatric community's awareness of appropriate prescribing habits through education might have also contributed to a more adequate pharmacotherapy for schizophrenia.

The authors are thankful to the members of the Quality Assurance Subcommittee in Psychiatry and all senior and junior psychiatrists who helped in conducting this survey.

References

- Baldessarini RJ, Kando JC, Centorrino F. Hospital use of antipsychotic agents in 1989 and 1993: Stable dosing with decreased length of stay. *Am J Psychiatry* 1984; **141**: 748–752.
- Chiu HFK, Shum PS, Lam CW. Psychotropic drug prescribing to chronic schizophrenics in a Hong Kong hospital. *Int J Soc Psychiatry* 1991; **37**: 187–191.
- Ungvari GS, Pang AHT, Chiu HFK, *et al.* Psychotropic drug prescription in rehabilitation. *Soc Psychiatry Psychiatr Epidemiol* 1996; **31**: 288–291.
- Williams C, Johnstone B, Kesterson J, *et al.* Evaluation of antipsychotic and concomitant medication use patterns in patients with schizophrenia. *Med Care* 1999; **37**: 81–86.
- Linden M, Thiels C. Epidemiology of prescriptions for neuroleptic drugs: tranquilizers rather than antipsychotics. *Pharmacopsychiatr* 2001; **34**: 150–154.
- Kass F, Charles E, Walsh T, *et al.* Quality review of outpatient psychopharmacological practice with APA Task Force criteria. *Am J Psychiatry* 1983; **140**: 221–224.
- Clark AF, Holden NL. The persistence of prescribing habits: a survey and follow-up of prescribing to chronic hospital in-patients. *Br J Psychiatry* 1987; **150**: 88–91.
- Johnson DAW, Wright NF. Drug prescribing for schizophrenic out-patients on depot injection. *Br J Psychiatry* 1990; **156**: 827–834.
- Warner JP, Slade R, Barnes TRE. Change in neuroleptic prescribing practice. *Psychiatr Bull* 1995; **19**: 237–239.
- Chiu H, Lee S, Leung CM, *et al.* Neuroleptic prescription for Chinese schizophrenics in Hong Kong. *Aust NZ J Psychiatry* 1992; **26**: 262–264.
- Chow LY, Ungvari GS, Chiu HFK, *et al.* Psychotropic drug prescription in a long-stay care facility. *HK J Psychiatry* 1999; **9**: 15–20.
- Yip KC, Ungvari GS, Cheung HK, *et al.* A survey of antipsychotic treatment for schizophrenia in Hong Kong. *Chinese Med J* 1997; **110**: 792–796.
- Kane JM. Schizophrenia. *N Engl J Med* 1995; **334**: 34–41.
- Meltzer HY, Kostakoglu AE. Combining antipsychotics: is there evidence for efficacy? *Psychiat Times* 2000; **17**: 1–10.
- Dewan MJ, Koss M. The clinical impact of reported variance in potency of antipsychotic agents. *Acta Psychiatr Scand* 1995; **91**: 229–232.
- Kapur S, Zipursky R, Roy P, *et al.* The relationship between D-2 receptor occupancy and plasma levels on low dose oral haloperidol. *Psychopharmacology* 1997; **131**: 148–152.
- McEvoy JP, Hogarty GE, Steingard S. Optimal dose of neuroleptic in acute schizophrenia. *Arch Gen Psychiatry* 1991; **48**: 739–745.
- Ruiz S, Chu P, Sramek J, Rotavu E, Herrera J. Neuroleptic dosing in Asian and Hispanic outpatients with schizophrenia. *Mt Sinai J Med* 1996; **63**: 306–309.
- Callazo Y, Tam R, Sramek J, Herrera J. Neuroleptic dosing in Hispanic and Asian inpatients with schizophrenia. *Mt Sinai J Med* 1996; **63**: 310–313.
- Frackiewicz EJ, Sramek JJ, Herrera JM, Kurtz NM, Cutler NR. Ethnicity and antipsychotic response. *Ann Pharmacother* 1997; **31**: 1360–1369.
- Sramek JJ, Sayles MA, Simpson GM. Neuroleptic dosage for Asians: a failure to replicate. *Am J Psychiatry* 1986; **143**: 535–536.
- Zhang-Wong J, Beiser M, Zipursky RB, Bean G. An investigation of ethnic and gender differences in the pharmacodynamics of haloperidol. *Psychiatry Res* 1998; **81**: 333–339.
- Lam YW, Jann MW, Chang WH, *et al.* Intra- and interethnic variability in reduced haloperidol to haloperidol ratios. *J Clin Pharmacol* 1995; **35**: 128–136.
- Aitchison KJ, Jordan BD, Sharma T. The relevance of ethnic influences on pharmacogenetics to the treatment of psychosis. *Drug Metabol Drug Interact* 2000; **16**: 15–38.
- Chong SA, Sachdev P, Mahendran R, Chua HC. Neuroleptic and anticholinergic drug use in Chinese patients with schizophrenia resident in a state psychiatric hospital in Singapore. *Aust NZ J Psychiatry* 2000; **34**: 988–991.
- Citrome L, Levine J, Allingham B. Utilization of depot neuroleptic medication in psychiatric inpatients. *Psychopharmacol Bull* 1996; **32**: 321–326.
- Davis JM, Matalon L, Watanabe MD, *et al.* Depot antipsychotic drugs. *Drugs* 1994; **47**: 741–773.
- Weiden P, Casey D. Polypharmacy. combining antipsychotic medications in the treatment of schizophrenia. *J Pract Psychiat Behav Health* 1999; **5**: 229–233.
- Preskorn S, Lacey RL. Polypharmacy: When is it rational? *J Pract Psychiat Behav Health* 1995; **1**: 92–98.
- Stahl SM. Antipsychotic polypharmacy. Part I. Therapeutic option or dirty little secret? *J Clin Psychiatry* 1999; **60**: 425–426.
- Naber D, Holzbach R, Perro C, Hippus H. Clinical management of clozapine patients in relation to efficacy and side effects. *Br J Psychiatry* 1992; **160**(Suppl 17): 54–59.
- Peacock L, Gerlach J. Clozapine treatment in Denmark: concomitant psychotropic medication and hematological monitoring in a system with liberal usage practices. *Acta Psychiatr Scand* 1994; **101**: 334–336.

- 33 WHO Consensus Statement. Prophylactic use of anticholinergics in patients on long-term neuroleptic treatment. *Br J Psychiatry* 1990; **156**: 412.
- 34 Ungvari GS, Chiu HFK, Lam LCW, *et al.* Gradual withdrawal of long-term anticholinergic antiparkinson medication in Chinese patients with chronic schizophrenia. *J Clin Psychopharmacol* 1999; **19**: 141–148.
- 35 Barnes TRE. Comment on the WHO Consensus Statement. *Br J Psychiatry* 1990; **156**: 413–414.