

# Resource consumption in psychiatric intensive care: the cost of aggression

Clive E. Hyde and Collina Harrower-Wilson

The costs of operating a psychiatric intensive care unit (PICU) were recorded for a six-month period. There were 110 admissions and 99 discharges. Mean length of stay was 12.3 days. Total costs were £346,516 over the study period, £283.56 per patient-day. Fixed costs comprised 93% of the total, including nursing staff (£169,447), overheads (£77,017), medical staff (£48,819), hotel costs (£24,160) and miscellaneous (£1,750). Variable costs included special nursing, (£19,405), treatment of major self-harm (£3,024), drugs (£1,707) and staff time to manage aggressive incidents (£1,188). Reduction of the incidence of aggression could result in valuable cost savings.

Previous reports have suggested that the level of serious violence in psychiatric patients is low (Pearson *et al*, 1986). However, there is now concern that the level of violence is increasing (James *et al*, 1990; Omérov *et al*, 1990). Violence has obvious undesirable effects (eg. increased staff and patient stress and a generally poor atmosphere on the ward), and may also be associated with altered staff attitudes towards, and poorer outcomes for, violent patients (Karson *et al*, 1991). Psychiatric intensive care units (PICUs) have been set up to provide better care for this small group of highly disturbed patients (Hyde & Harrower-Wilson, 1994).

It has been estimated that aggression increases the cost of care, with violent schizophrenics costing 43% more to treat than non-violent schizophrenics (Karson *et al*, 1991). O'Dwyer & Mann (1989) described a 15-bed psychiatric intensive care ward (PICU) with an annual budget of £202,386, but there is little information published on the breakdown of costs. The prospective study presented here measured the total costs of such a unit for six months, differentiating between fixed and variable costs and estimating the additional cost incurred by violent patients.

## The study

The study consisted of a prospective analysis of all patients admitted to the PICU of the Department of Psychiatry at the Withington Hospital, Manchester, between 17 May and 17 November 1993. The Psychiatric studies in Aggression Database (PSAD), previously described (Hyde *et al*, 1994), was used to record information for each patient, including demographic details, diagnosis, nursing and medical staff involvement, drug treatment and details of violent incidents (using the Staff Observation Aggression Scale (SOAS) questionnaire (Palmstierna & Wistedt, 1985)).

Since this was a study of the cost of operating a PICU for six months, only costs relevant to the unit were included. No attempt was made to measure the non-NHS costs of psychiatric violence.

Fixed costs were defined as those costs which were independent of short-term variations in patient care or numbers (e.g. hotel costs, overheads, basic staff costs). Variable costs were those dependent on patient numbers and behaviour (drugs, additional staff costs, treating the consequences of aggression).

Hotel costs (domestic cleaning, catering, portering and linen), miscellaneous costs (equipment, travel, uniforms etc), medical staff costs, and general hospital overheads (management, capital costs of land, buildings and equipment, maintenance, energy, water etc.) were supplied by the Management Accounts Department of Withington Hospital, for the financial year 1993/4.

Nursing staff employment costs (including basic salary, overtime and enhancement payments, pension contributions, super-annuation fees, employers' National Insurance costs, annual holiday, sickness absenteeism and study leave) were taken as a weighted mean across all staff grades, and totalled £9.29 per working hour for the financial year 1993/4.

Table 1. Summary of total costs

Cost component	Cost in study period, £	% total cost
<i>Fixed costs</i>		
Basic nursing staff complement (employment costs)	169,477	49
Medical staff	48,819	14
Miscellaneous costs	1,750	1
General hospital overhead	77,017	22
Hotel costs	24,160	7
<b>Total fixed costs</b>	<b>321,193</b>	<b>93</b>
<i>Variable costs</i>		
Psychiatric drugs	1,707	0.5
Staff time to handle violent incidents	1,188	0.3
Consequences of violent incident (patient injury)	3,024	1
Special nursing	19,405	6
<b>Total variable costs</b>	<b>25,323</b>	<b>7</b>
<b>Total costs</b>	<b>346,516</b>	<b>100</b>
*Total cost per patient-day	283.56	
**Total cost per bed-day	156.94	

\*1,222 patient-days in the study period

\*\*12 beds and 84 days=2,208 bed-days in the study period

Drug prices were taken from the British National Formulary, September 1992 edition. The cost of treating one patient who incurred major injuries as a result of an aggressive incident was estimated as the charge which would have been made to an external health authority for an orthopaedic case of similar severity.

### Findings

During the six-month study period, there were 110 admissions representing 83 individuals. The mean age was 35 and 61% were male. Of the 110 admissions, 54 (49%) were first admissions to the PICU, 34 (31%) were second admissions, and 22 (20%) third or greater. Only 8% were admitted informally. The most frequent diagnosis on admission was schizophrenia (42%), followed by manic depressive (mixed/rapid cycling) disorder and personality disorder (12% each), severe depression (10%), mania (7%), substance abuse (3%), organic disease (2%), neurosis (1%) and other psychiatric disorders (9%). Most admissions (65%) were from general psychiatric wards, and this was also the most frequent destination (79% of the 99 patients discharged before the study end). Mean length

of stay was 12.3 days. Mean ward occupancy was 6.64 patients.

The costs incurred on the PICU over the study period are shown in Table 1. Hotel costs consisted of cleaning (£13,180 p.a.), portering (£1,600 p.a.), linen (£175 per week) and catering (£10 per patient per day). Within the psychiatric drug cost, depot neuroleptics cost £718 (42% of drug costs), maintenance oral neuroleptics £572 (34%), parenteral neuroleptics and tranquillisers given as-needed for agitation £366 (21%), and treatment of extrapyramidal side-effects £50 (3%).

Continuous or special observation required an extra nurse on the ward, and amounted to 87 staff-days during the study period. Of these, 63 (72%) related to patients with severe depression, even though these patients made up only 10% of the total.

A total of 170 aggressive incidents occurred, over half of which were committed by 11 patients. In 101 incidents (59%) the aggression was directed at staff, resulting in visible injury in eight cases (two requiring medical attention). In 20 incidents, the patient's aggression was self-directed. Four of these resulted in moderate harm (requiring medical treatment), and one in major harm. This latter patient absconded from the PICU and jumped off a bridge, sustaining fractures

of the femur and clavicle which incurred estimated costs of £3,024. The cases of moderate harm and staff injury were relatively minor and the cost of treating them negligible.

Sixty-five aggressive incidents were sufficiently severe to require rapid tranquillisation (RT). The mean duration of an RT incident was 48 minutes from initial alarm to resolution (range 5–205). Most (70%) required at least three trained nursing staff. The PICU can provide two nurses from its basic staff complement, and calls in additional staff from other wards if necessary. The staff time costs shown in Table 1 represent only the time of these additional staff.

The drug most commonly used for RT was Acuphase (zuclopenthixol acetate), an intermediate-acting neuroleptic which was used (alone or in combination, mainly with lorazepam) in 39 incidents (60%). Chlorpromazine, haloperidol or droperidol were used in ten incidents (16%) alone and a further ten (16%) in combination with lorazepam.

### Comments

The total cost of running the PICU during the study period was £346,516, which extrapolates to an annual cost of £693,032. The average cost per patient-day was £283.56 which, with a mean duration of stay of 12.3 days, gives an average cost per admission of £3,488.

The vast majority of the unit's costs (93%) were fixed, and the largest component was the basic nursing staff complement (49% of the total cost), reflecting the high staffing levels necessary in PICU (21.7 whole-time equivalents employed on the unit). Variable costs accounted for only 7% of the total costs, but are of particular interest to management as they are open to modification.

The largest component of variable costs (77%) was special nursing. In the study unit, special nursing was mainly used to manage severely depressed patients at risk of self-harm, rather than aggressive patients. However, anecdotal evidence from a survey of psychiatric wards in the North-West of England suggests that less specialised wards rely on special nursing to manage violent patients (Harrower-Wilson & Hyde, 1994). The high cost of special nursing, revealed by the present study, indicates that this might

substantially increase the cost of managing violent patients on general psychiatric wards.

Total drug expenditure was a small component of cost (7% of variable cost and 0.5% of total cost). As-needed neuroleptics, used for the treatment of aggression, amounted to only 1.5% of the variable costs. This might have been expected had the unit chiefly used low-priced generics, but the drug of choice was a branded product (Acuphase).

This study recorded eight assaults resulting in visible injury to others from 110 admissions, a much lower rate than the 28 injurious assaults from 58 admissions reported by Walker & Seifert (1994) in a PICU in London.

The total medication cost of treating aggressive incidents was £366 (as-needed neuroleptic drugs). Non-medication costs were £1,188 for staff time and £3,024 for orthopaedic treatment for a single case of major self-harm. Even using our strict definition (costing only those staff who cannot be supplied from the PICU's normal complement), staff time cost outweighed the medication cost by three to one. The cost of treating the consequences of one serious aggressive act was almost double the total of the other costs of aggression.

The drug of choice for treating violent incidents in the unit under study was Acuphase (zuclopenthixol acetate), an intermediate-acting neuroleptic for the treatment of acute psychosis. Conventional neuroleptic injections have to be given every four hours, an obvious problem in highly disturbed patients lacking insight into their disease, whereas one injected dose of Acuphase remains effective for up to three days (Baastrup *et al.*, 1993). Acuphase has been associated with an incidence of aggression 53% lower than conventional neuroleptic drugs (Omérov *et al.*, 1990). Since staff time cost far outweighs drug cost in the management of patient aggression, this reduction in violence when Acuphase is used may be associated with significant cost savings, and a further study is underway to investigate this. Improved management of aggression could also reduce the cost of treating the consequences of violence. In addition to these monetary savings, a reduction in violence would have significant non-financial benefits such as better atmosphere on the ward, better patient care and a reduced level of stress for both staff and patients.

### Acknowledgements

The authors would like to thank Dr Brian Nellist for invaluable assistance in setting up the computer system, the staff of the PICU of the Department of Psychiatry at the Withington Hospital, Manchester for their help in carrying out the study, and Lundbeck Ltd. for financial support.

### References

- BAASTRUP, P. C., ALOHORS, U. G. *et al* (1993) A controlled Nordic multicentre study of zuclopenthixol acetate in oil solution, haloperidol and zuclopenthixol in the treatment of acute psychosis. *Acta Psychiatrica Scandinavica*, **87**, 48-58
- HARROWER-WILSON, C. & HYDE, C. E. (1994) Service provision for violent and aggressive patients in the North-West and Merseyside regions: a descriptive report. Abstracts: Annual Meeting, Royal College of Psychiatrists, Cork, July 1994 (copies available).
- HYDE, C. E., HARROWER-WILSON, C. & NELLIST, B. (1994) The Psychiatric Studies in Aggression Database. Computers in Psychiatry Group of the Royal College of Psychiatrists, *Newsletter*, June 1994, **8**, 2. (Proceedings of the Winter Meeting of the Royal College of Psychiatrists, Software Workshop, Cafe Royal, 4 February, 1994).
- HYDE, C. E. & HARROWER-WILSON, C. (1994) Psychiatric intensive care: principles and problems. *Hospital Update*, 287-295.
- JAMES, D. V., FINEBERG, N. A., SHAR, A. K. & PRIEST, R. G. (1990) An increase in violence on an acute psychiatric ward: a study of associated factors. *British Journal of Psychiatry*, **156**, 846-855.
- KARSON, C. N., MCCLELLAN, J. L. & KASHNER, T. M. (1991) Assault increases the cost of care among inpatient veterans with schizophrenia. *Journal of Nervous and Mental Disease*, **179**, 702-704.
- O'DWYER, J. M. & MANN, B. S. (1989) Psychiatric intensive care after two years. *Psychiatric Bulletin*, **13**, 421-422.
- OMSTROV, M., WISTEDT, B. & DURLING, U. (1990) Aggressive incidents and acute psychosis, the effect of Zuclopenthixol acetate. Regional symposium, World Psychiatric Association, Oslo, Norway, 23-26 August, 1990.
- PALMSTIERNA, T. & WISTEDT, B. (1985) SOAS-Staff Observation Aggression Scale, a new psychiatric rating scale, measuring severity and frequency of aggressive behaviour. IInd International Congress on Psychogeriatric Medicine, Umeå, Sweden. 28-30 August, 1985.
- PEARSON, M., WILMOT, E. & PADI, M. (1986) A study of violent behaviour among in-patients in psychiatric hospitals. *British Journal of Psychiatry*, **149**, 232-235.
- WALKER, Z. & SCIFERT, R. (1994) Violent incidents in a psychiatric intensive care unit. *British Journal of Psychiatry*, **164**, 826-829.

\*Clive E. Hyde, *Consultant Psychiatrist*; and Colina Harrower-Wilson, *Divisional Manager for Nursing and Quality*, Department of Psychiatry, Withington Hospital, Nell Lane, Manchester M20 8LR

\*Correspondence