Pharmacy Practice

Assessment of Drug-Related Problems in Geriatric Day Hospital Patients

Natalie R. Kennie and Todd D. Sorensen

INTRODUCTION

There are many factors that necessitate careful selection and monitoring of drug therapy in the elderly population. Polypharmacy, defined as "the use of more medications than are clinically indicated in a given patient" or as "the use of multiple prescription and over-the-counter medications by a single patient", is a significant concern in the ambulatory elderly.[1] The elderly have a higher incidence of both adverse reactions and noncompliance associated with a greater number of prescribed drugs, which increases their risk for drug-related problems (DRPs).[2] As well, altered pharmacokinetics, pharmacodynamics and physiology may place the elderly at an increased risk for drug related toxicity. All of these factors increase the risk of DRPs in the elderly population.

The Geriatric Day Hospital (GDH) at the Camp Hill Medical Centre Site of the Queen Elizabeth II Health Sciences Centre in Halifax provides ambulatory care services to the frail-elderly population. Interdisciplinary teamwork is emphasized in all aspects of care including assessment, treatment, rehabilitation, patient education, and linkages with community-based services. The multidisciplinary team is made up of two physicians, two registered nurses, a physiotherapist, an occupational therapist, a social worker, a program assistant, and a unit coordinator.

The pharmacists' role in managing geriatric drug therapy has expanded with increased involvement in geriatric assessment teams[3,4] but to our knowledge there are no publications describing clinical pharmacist involvement in geriatric day hospitals.

In light of this, a pilot project was initiated to identify DRPs in this patient population and measure the potential impact of pharmacist involvement on patient care in a geriatric day hospital.

METHODS

The study was conducted over a four-week period, from February 13 to March 10, 1995. During this time, the primary investigator provided clinical pharmacy services at the GDH for the identification and resolution of DRPs. This service included: medication histories, consultation with health care team, patient monitoring and follow up, medication counselling, provision of drug information, and follow up with the family physician and community pharmacist as required.

All DRPs identified by the pharmacist were recorded. A DRP was defined as an undesirable event, a patient experience that involved, or was suspected to involve, drug therapy and that actually or potentially interfered with a desired patient outcome as defined by Strand et al.[5] Drug-related problems were assigned to one of eight general categories.[5,6]

At the completion of the study period, DRPs identified by the pharmacist and deemed to require direct pharmacist intervention were assessed by an advisory panel using a method previously described by Bayliff and Einarson.[7] Interventions were defined as the provision, by the pharmacist, of an unsolicited recommendation to a nurse, physician or patient regarding an alteration in drug therapy. The advisory panel, composed of a geriatrician, two pharmacists and a geriatric ambulatory care nurse determined the potential impact of the interventions on patient outcome. Each panel member indicated whether the intervention would have had a positive, negative or no effect on patient therapy. For the intervention to be considered to have a positive impact three of the four judgements had to be ranked as positive. In the case of a positive effect, the panel member was to assess the relative significance of the intervention. In addition, each

Natalie R. Kennie, BScPharm, is a PharmD candidate at the University of Toronto's Faculty of Pharmacy. At the time of writing Natalie was a Pharmacy Resident at Camp Hill Medical Centre, Halifax, Nova Scotia

Todd D. Sorensen, PharmD, is a Clinical Pharmacy Specialist, Camp Hill Medical Centre Site, Queen Elizabeth II Health Sciences Centre, and an Assistant Professor, College of Pharmacy, Dalhousie University, Halifax, Nova Scotia

Address correspondence to: Natalie Kennie, BScPharm, 185 Foxhill Avenue, Kentville, Nova Scotia B4N 5B4.

panel member was to indicate whether the intervention would increase the quality of care, prevent adverse effects or a hospital stay, or have potential cost savings. In order to assess inter-rater reliability, the co-efficient of agreement was calculated by dividing the observed number of agreements by the total number of possible agreements.[7] A coefficient of 0.8 or greater was considered reliable agreement among evaluators.[8]

RESULTS

During the four-week study, a total of 36 patients were reviewed by the pharmacist. Thirty-two patients attended the Day Hospital Program two days each week. In this group, a medication history was conducted and patients were monitored at each visit. Only five of these patients were assessed for admission by the GDH staff and the pharmacist during the study period. The remainder of patients had entered the program prior to the study period. Two patients were seen on an outpatient basis and two patients had been assessed, but had not returned to the program during the study period. The length of stay of patients who attended the GDH during the study period ranged from four to eight weeks.

The average age of patients was 81 years with a range of 62-92 years. Seventy-five percent of patients were female. The mean number of medications used was 6.2 with a range of 0 to 11 medications. Twenty-six out of 36 patients (78%) used five or more medications. Only one patient assessed by the pharmacist did not take medication.

A total of 67 DRPs were identified in 36 patients (Table I). Eight patients had no DRPs identified. The most often identified DRP was "the patient is experiencing an adverse drug reaction". Thirty of these DRPs, were deemed to require pharmacist intervention. The most frequently identified DRP which required the pharmacists intervention was "the patient is taking/receiving a drug for which there is no valid indication". The remaining 37 DRPs were characterised as having been a potential problem that required pharmacist monitoring, or were observed by the pharmacist and were addressed cooperatively with GDH staff. With respect to DRPs requiring pharmacist intervention, recommendations were made to the GDH physicians (20), family physicians (2), patients (7) and nurses (1). Twenty-four recommendations were accepted. Of the six recommendations not accepted, two were pending assessment at the end of the study and one recommendation was modified. Acceptance of the remaining three interventions could not be determined. Two of these recommendations were written to family physicians and one was documented but not acted upon because the patient had not returned to the program due to illness.

The results of the panel assessments of the effect on patient outcome, are presented in Table II. The co-efficient of agreement among the panel members with respect to the interventions having a positive effect, no effect or a negative effect on patient outcome was 0.87,

Table I: Types of Drug-Related Problems Identified

Drug-Related Problem	Total DRP's (n=67)	DRP's Requiring Pharmacist Intervention (n=30)
1. The patient is taking/receiving a drug for which there is no valid indication	11 (16.5%)	9 (30%)
2. The patient requires drug therapy for an indication and is not taking/receiving this therapy.	13 (20%)	6 (20%)
3. The patient is taking/receiving the wrong drug or drug product.	10 (15%0	3 (10%)
4. The patient is taking/receiving too little drug.	4 (6%)	1 (3%)
5. The patient is taking/receiving too much drug.	6 (9%)	2 (7%)
6. The patient is not taking/receiving the prescribed drug appropriately.	7 (10%)	3 (10%)
7. The patient is experiencing an adverse drug reaction.	15 (22%)	5 (17%)
8. The patient is experiencing a drug-drug, drug-food, or drug-laboratory interaction.	1 (1.5%)	1 (3%)

Table II: Advisory Panel Assessment of the Potential Impact of Pharmacist Interventions on Patient Outcome: Effect on Patient Therapy

Potential Outcome	Physician	Pharmacist #1	Pharmacist #2	Nurse*
Effect on Patient Therapy: (coefficient of agreement=0.87)				
Positive Effect	24/30 (80%)	30/30 (100%)	30/30 (100%)	28/29 (97%)
No Effect	2/30 (7%)	0/30 (0%)	0/30 (0%)	0/29 (0%)
Negative Effect	4/30 (13%)	0/30 (0%)	0/30 (0%)	1/29 (4%)

* unable to evaluate one intervention

indicating good agreement among evaluators.

Four of 30 pharmacist interventions were felt to have a negative effect by the physician. The nurse felt that one of the interventions would result in a negative effect while both pharmacists estimated that none of the 30 interventions would result in a negative effect. Using the criteria that three out of four panel members must agree on the effect of the intervention, all 30 interventions were considered to have a positive effect on patient outcome. There was a low co-efficient of agreement (0.26) among the panel members with respect to the significance of the interventions considered to have a positive effect. The majority of these interventions were considered to have either a significant or somewhat significant effect on patient therapy. Although cost-avoidance due to pharmacists' interventions was not calculated, each panel member reported that over one-half of the interventions assessed had potential cost savings indicating the pharmacist's ability to contribute to cost-avoidance.

DISCUSSION

During the four-week study, a total of 67 DRPs were identified, however, it is possible that the number of DRPs identified in this study could be an underestimate. The majority of these patients had been admitted and assessed in the program before the study period and many drug-related issues had already been addressed by GDH staff prior to the pharmacist's involvement.

The most common DRP identified was "the patient is experiencing an adverse drug reaction". One investigation in elderly outpatients showed that 97 of 463 patients (21%) had documented adverse drug reactions and 12 patients were hospitalized as a direct result of the adverse drug reaction.[9] The study also concluded that patients with frailty arising from multiple pathologies were more likely to have adverse drug reactions than robust elderly, even when their therapeutic regimens were simplified as much as possible.[9] Other reports cite that adverse drug reactions have been reported to be responsible for 2.8 to 16.8% of hospital admissions.[10-13] In this study, 22% of GDH patients were identified as experiencing or having the potential to experience an adverse drug reaction and in one-third of the cases it was deemed that pharmacist intervention was required. For the remaining issues previous medical assessment of the potential intervention had already occurred.

The most common DRP requiring pharmacist intervention was "the patient is taking/receiving a drug for which there in no valid indication". Kruse et al have defined polypharmacy as five or more concomitant drugs.[14] In our study, 78% of the patients met these criteria. Several studies have demonstrated that pharmacist interventions in the ambulatory care setting have been effective in reducing the number of medications and costs of drug therapy.[15-17] A controlled trial by Britton and Lurvey evaluated the effect of medication profile review by a clinical pharmacist on prescribing in a general medicine clinic.[15] Results showed that medication profile review by a clinical pharmacist reduced both the number and cost of drugs for patients receiving five or more medications. The effect of a pharmacist on drug prescribing in a hospital-based geriatric clinic was studied by Phillips and Carr-Lopez.[16] During the study period, the pharmacist reviewed each patient's medication profile and assessed whether drug dosages should be adjusted or medications should be discontinued. The pharmacist and geriatrician who coordinated care at the clinic reviewed the cases before changes were made. The addition of a pharmacist to the staff at the hospital-based geriatric clinic resulted in a 32% reduction in the total number of prescription medications prescribed. Our study also demonstrated that a reduction in the number of drugs was possible as the DRP that most often required pharmacist intervention was "the patient is taking/receiving a drug for which there is no valid indication."

In this project, an attempt was also made to assess the clinical impact of the pharmacist. Unfortunately, it was not possible to determine the clinical outcome of the interventions in a four-week study. Instead, a method similar to that employed by Bayliff and Einarson was utilized to assess the potential impact of the pharmacist's interventions on patient care.[7] Using the predetermined criteria, all 30 of the interventions had a positive effect on patient outcome with a high level of agreement. However, there was a low level of agreement among evaluators when determining the significance of a positive intervention, which is possibly due to limited patient information available to the evaluators and inter-rater variability. The fact that the physician assessed four interventions as possibly producing a negative effect on patient therapy, while the other panel members assessed the same interventions to have a positive effect, illustrates this evaluator disparity. Again, some of these negative judgements appeared to have been to inadequate information.

In conclusion, in this pilot project, 30 DRPs requiring pharmacist intervention were identified over a four-week period at the GDH. These interventions were considered to potentially have a positive impact on patient therapy, providing support for ongoing pharmacist involvement with the multidisciplinary team at this geriatric day hospital.

REFERENCES

1. Stewart RB, Cooper JW. Polypharmacy in the aged: Practical solutions. *Drugs Aging* 1994;4:449-61.

2. Shimp LA, Ascione KJ, Glazer HM, et al. Potential medication-related problems in non-institutionalised elderly. *Drug Intell Clin Pharm* 1985;19:766-72.
3. Pulliam C, Pait L. The pharmacist's contribution to a geriatric assessment team. *Hosp Pharm Times* 1995;6:1-4.
4. Wong BJ, Vogenberg R. Gilbert HD, et al. Role of the pharmacist on a geriatric assessment team. *Consult Pharm* 1994;9:1149-58.
5. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990;47:533-43.
6. Perrier DG, Winslade N, Pugsley J, et al. Designing a pharmaceutical care curriculum. *Am J Pharm Ed* 1995;59:113-25.
7. Bayliff CD, Einarson TR. Physician assessment of pharmacists' interventions- A method of estimating cost avoidance and determining quality assurance. *Can J Hosp Pharm* 1990;4:161-71, 195.
8. Nelson AA. Research design: Measurement, reliability and validity. *Am J Hosp Pharm* 1980;37:851-7.
9. Schneider JK, Mion LC, Frengley JD. Adverse drug reactions in an elderly outpatient population. *Am J Hosp Pharm* 1992;49:90-6.
10. Beard K. Adverse reactions as a cause of hospital admissions in the aged. *Drugs Ageing* 1992;2:356-67.
11. Walker J, Wynne H. The frequency and severity of adverse drug reactions in elderly people. *Age Aging* 1994;23:255-9.
12. Col N, Fanale JE, Kronholm P. The role of medication noncompliance and adverse drug reactions in hospitalizations of the elderly. *Arch Intern Med* 1990;150:841-5.
13. Colt HG, Shapiro AP. Drug-induced illness as a cause for admission to a community hospital. *J Am Geriat Soc* 1989;37:323-6.
14. Kruse W, Rampmaier J, Frauenrath-Volkers C, et al. Drug-prescribing patterns in old age. A study of the impact of hospitalization on drug prescriptions and follow-up survey in patients 75 years and older. *Eur J Clin Pharmacol* 1991;41:441-7.
15. Britton JL, Lurvey PL. Impact of medication profile review on prescribing in a general medicine clinic. *Am J Hosp Pharm* 1991;48:265-70.
16. Phillps SL, Carr-Lopez SM. Impact of a pharmacist on medication discontinuation in a hospital-based geriatric clinic. *Am J Hosp Pharm* 1990;47:1075-9.
17. Mason JD, Colley CA. Effectiveness of an ambulatory care clinical pharmacist: A controlled trial. *Ann Pharmacother* 1993;27:555-9.