

Improving drug use in rheumatic disorders

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SUMMARY

A recent study concluded that approximately 50 elderly people are admitted to the major teaching hospital in Tasmania, Australia each year suffering from gastrointestinal bleeding related to the use of nonsteroidal anti-inflammatory drugs (NSAIDs). The aim of this study was to examine whether academic detailing, designed to encourage a rational approach to the prescribing of NSAIDs and performed by a pharmacist, could modify prescribing practices in the community. The intervention was conducted in Southern Tasmania, using the north of the state as a control area. The target group of all general practitioners (approximately 250) working in Southern Tasmania was sent educational material designed to assist in the appropriate prescribing of NSAIDs. A pharmacist then visited each general practitioner and discussed the rational use of NSAIDs directly with them. The outcome of the programme was measured using evaluation feedback from the general practitioners and pharmacoepidemiological data provided by (i) a state-wide pharmacoepidemiology database derived from community pharmacy records, and (ii) dispensing under the Pharmaceutical Benefits and Repatriation Pharmaceutical Benefits Schemes. The key variable examined was the defined daily dose (DDD) dispensed for the NSAIDs compared with paracetamol. The educational programme was very well received by the general practitioners. Changes in the prescribing of NSAIDs were evident in both study regions, but were more marked in the intervention area. For instance, the state-wide pharmacoepidemiological database indicated that the ratio of dispensed DDDs of

NSAIDs : paracetamol declined from 3.00 to 2.59 in the intervention region and remained steadier (3.16 to 2.92) in the north of the state. The improvement was significantly greater in the intervention region. This study has revealed that an educational programme utilizing academic detailing by pharmacists can modify prescribing practices within the community setting.

INTRODUCTION

Accounting for around 9% of all prescriptions (1), approximately 11 million prescriptions for non-steroidal anti-inflammatory drugs (NSAIDs) are written in Australia each year, a figure which is higher per capita than in any other country with similar data available (2). This level of usage is not without its risks. It is estimated that NSAIDs are responsible for 1500 hospitalizations due to severe upper gastrointestinal adverse effects each year in Australia, with a resultant mortality rate of about 10% (i.e. NSAIDs contribute to 100–200 deaths each year due to upper gastrointestinal haemorrhage and perforation) (1–7). The prevalence of peptic ulcers in patients who are taking NSAIDs is approximately 15–20%, with most ulcers occurring in the stomach (2, 4).

The risk of gastric bleeding associated with NSAIDs is sevenfold higher in the elderly than younger populations (7), and approximately 20–30% of all significant gastrointestinal bleeding episodes in patients over 60 years of age can be attributed to NSAIDs (2). While it has been well-documented that the risk of gastrointestinal and renal adverse effects of NSAIDs increases with advancing age (1–5, 8, 9), more than 20% of the population aged 65 years and over take NSAIDs (2, 4).

A recent study concluded that approximately 50 elderly people are admitted to the Royal Hobart Hospital, Tasmania each year suffering from gastrointestinal bleeding related to the use of NSAIDs (10).

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The aim of this study was to examine whether a programme of pharmacist-conducted academic detailing, designed to encourage a rational approach to the use of NSAIDs, could modify prescribing practices in the community.

METHODS

The intervention study was conducted in Southern Tasmania, using the north and north-west regions of the state as the control area. There are similar numbers of general practitioners working in each of the two study areas. The target group consisted of all general practitioners (approximately 250) working in Southern Tasmania. Firstly, educational mailings were sent to each general practitioner practising within Southern Tasmania (using the Telstra STD area code 002 Yellow Pages and the Medical Council of Tasmania's 'Register of Legally Qualified Medical Practitioners' for 1994). The material, developed in consultation with members of the Management Committee, Division of General Practice (Tasmania—Southern Region), was designed to encourage a rational approach to the prescribing of NSAIDs in elderly patients (copies of the material are available from the authors). Individual sections of the leaflet were based on the acronym NSAID (What is nasty about NSAIDs, what causes the side effects, what approach can I take, who is most at risk, and what data support this approach). Mention was made of our earlier work performed in Hobart (10), which indicated that approximately 50 elderly patients are admitted to the Royal Hobart Hospital each year with NSAID-induced gastrointestinal bleeds. The material advised that NSAIDs be used in the elderly for rheumatic conditions only when other approaches (e.g. paracetamol for pain relief, rest, heat application and physiotherapy) have proved ineffective, and that regular review of NSAID therapy is essential to ascertain whether it may be ceased (2, 3, 11, 12).

After 2 weeks, each general practitioner in the greater Hobart area of Southern Tasmania was contacted by telephone to confirm that they had received the information and to arrange an appointment to discuss the material. General practitioners from outside the greater Hobart area, but within Southern Tasmania, were sent the educational material but were not visited. The pharmacist (J.K.B.) then visited each general practitioner in the greater Hobart area and discussed the rational prescribing of NSAIDs directly

with them. Material discussed included the mechanism of action of NSAIDs, alternative drug therapies (e.g. disease modifying antirheumatic drugs and corticosteroids) and the use of physiotherapy as an adjunct treatment. The limited data on the relative safety profiles of the various NSAIDs were mentioned if the general practitioner raised the issue (9, 13, 14). Additional reference material was provided whenever requested. The length and content of each interview varied, depending upon factors such as whether the leaflet had been read, the general practitioner's interest, the demographics of the general practitioner's practice and time constraints. The majority of the visits were conducted during May to September 1994.

Two pharmacoepidemiological databases were used to measure the outcome of the educational intervention. The Tasmanian School of Pharmacy is involved in ongoing pharmacoepidemiological research (15–17). Approximately one-third of all community pharmacies throughout the state are voluntarily contributing dispensing data to the research. The contributing pharmacies generally represent the control and intervention areas of the study in approximately equal numbers. Every 6 months (April and October; selected to minimize any end-of-year bias associated with the Australian Pharmaceutical Benefits Scheme 'safety net' procedure), the participating pharmacists send computer-generated reports of complete dispensing data for the month, in a return postage paid envelope to the Tasmanian School of Pharmacy. All dispensed drugs are recorded, irrespective of supply under the Pharmaceutical Benefits Scheme (PBS), the Repatriation Pharmaceutical Benefits Scheme (RPBS), as a private prescription or as a pharmacist-initiated prescription (Poisons Schedule 3R items in Tasmania).

Dispensing data for all oral and rectal preparations of NSAIDs and oral tablet formulations of paracetamol available on the market were examined for the months of October 1993 (pre-intervention) and October 1994 (post-intervention; although 15% of the academic detailing visits were performed after October 1994). The unit quantities of each drug dispensed were converted into defined daily doses (DDDs) (18). Changes in the relative prescribing of NSAIDs and paracetamol between and within the control and intervention regions were studied. Statistical comparisons were made between the different areas of the state (i.e. south/intervention region vs. elsewhere/control region), both before and after intervention, and within each study area (before vs. after the

Table 1. Results of the anonymous evaluation of the academic detailing programme

Question	Responses	
Approximately how long was the session?	Median: 20 min Range: 5–45 min	
In your opinion was the length of the session ... ?	Too long:	0.9%
	About right:	96.3%
	Too short:	2.8%
Did you find the content of the session ... ?	Excellent:	11.2%
	Very good:	41.1%
	Good:	41.1%
	Average:	5.6%
	Poor:	0.9%
Did you find the presentation of the session ... ?	Excellent:	14.1%
	Very good:	38.3%
	Good:	39.3%
	Average:	8.4%
	Poor:	0.0%
Did you feel that the appropriate material was covered in the session?	Yes:	91.6%
	No:	2.8%
	Unsure:	5.6%
Were your questions answered to your satisfaction?	Yes:	89.7%
	No:	5.6%
	Unsure:	4.7%
Do you think the session has been useful for your clinical practice?	Yes:	84.0%
	No:	8.5%
	Unsure:	7.5%

intervention) using a normal approximation to the binomial distribution.

Secondly, for comparative purposes, PBS and RPBS data were obtained from the Drug Utilization Subcommittee (DUSC) of the Australian Pharmaceutical Benefits Advisory Committee. Specifically, PBS and RPBS dispensing data for all listed oral preparations of NSAIDs and paracetamol were requested for each of the two major regions of the state: south (postcodes 7000–7199) and north/north-east (7200–7299), for the 2 months March 1994 and September 1994. Again, a normal approximation to the binomial distribution was used to statistically evaluate differences in the relative dispensing of NSAIDs and paracetamol between the different areas of the state for each time period, and changes within each study area.

The project was also evaluated by surveying the general practitioners exposed to the academic detailing programme to assess their opinion of its clinical usefulness. An anonymous questionnaire and reply-paid envelope were left with each general practitioner at the academic detailing visit.

The research had been approved by the Ethics Committee of the University of Tasmania.

RESULTS

A total of 177 general practitioners within the greater Hobart area were visited and detailed. Fourteen general practitioners from outside the greater Hobart area, but within Southern Tasmania, were sent the educational material but were not visited. Sixty-three

Period	Region	Number of pharmacies	Dispensed DDDs		Ratio NSAIDs : paracetamol
			NSAIDs	Paracetamol	
Oct 1993	Intervention	22	69 912	23 308	3.00
	Control	17	64 227	20 300	3.16
Oct 1994	Intervention	24	78 446	30 273	2.59
	Control	28	102 833	35 170	2.92

Table 2. Dispensing of the NSAIDs and paracetamol in Tasmania during October 1993 and October 1994, derived from the state-wide pharmacoepidemiological database

general practitioners from within the greater Hobart area either did not want the academic detailer to visit (17), were overseas, on maternity leave or otherwise unavailable (31), or stated that they were 'too busy' to be seen (15).

One-hundred and seven completed evaluation questionnaires were received. The evaluations covered 135 individual general practitioners, because a single form was often completed by joint medical practices. The responses are summarized in Table 1.

The outcome of the educational intervention was assessed with data obtained from two pharmacoepidemiological sources. The first of these was the state-wide pharmacoepidemiological database (Table 2). The prescribing of NSAIDs relative to paracetamol was significantly higher in the control region during the baseline period of October 1993 ($z=4.83$, $P<0.0001$). The difference between the two regions had increased by October 1994 ($z=13.18$, $P<0.0001$). The prescribing of NSAIDs relative to paracetamol declined in both regions over the course of the study (control: $z=7.78$, $P<0.0001$ and intervention: 14.42 , $P<0.0001$), with the improvement within the intervention region being significantly greater than the change within the control region ($z=5.22$, $P<0.0001$).

Secondly, PBS and RPBS data were obtained from DUSC (Table 3). The ratios in the final column (dispensed DDDs of NSAIDs : paracetamol) are higher with the state-wide pharmacoepidemiological database (Table 2) because of the inclusion of 'safety-net' and private prescriptions of NSAIDs, which are not subsidized by the government and would not appear in the DUSC data. The PBS and RPBS data trends were very similar to those derived from the state-wide pharmacoepidemiological database. Initially, during the baseline period of March 1994, the prescribing of NSAIDs relative to paracetamol was significantly higher in the control region ($z=14.67$, $P<0.0001$). The

difference between the two regions had increased by September 1994 ($z=20.18$, $P<0.0001$). The prescribing of NSAIDs relative to paracetamol declined in both regions over the course of the study (control: $z=8.55$, $P<0.0001$ and intervention: 16.87 , $P<0.0001$), with the improvement within the intervention region being significantly greater than within the control region ($z=4.57$, $P<0.0001$).

Tasmanian Department of Community and Health Services data indicated a slight decline in the number of public hospital admissions due to gastric ulcers in Southern Tasmania over the course of the study (33 in October–December 1993 to 28 in October–December 1994), while there was little change in the remainder of the state (31 admissions in October–December 1993 and 33 in October–December 1994). However, there are no reliable ongoing statistics available on drug-related hospital admissions in the State, so it is difficult to link the educational programme with this outcome.

DISCUSSION

In this project, written material and the technique of academic detailing were employed to target the prescribing of NSAIDs by general practitioners in the Hobart area. Success of the educational programme was indicated by a statistically greater increase in the prescribing of paracetamol relative to the NSAIDs in the intervention region compared with the control region.

It was apparent that a statistically significant improvement in the prescribing of NSAIDs occurred in the control region of the state over the course of the study. This result was not unexpected. The issue of NSAID prescribing has received considerable government attention and coverage in professional journals over the past 2 years. It was pleasing that our

Table 3. Dispensing of the NSAIDs and paracetamol under the PBS and RPBS in Tasmania for March 1994 and September 1994. The intervention region was Southern Tasmania (postcodes 7000–7199), while the control region comprised the north/north-east (7200–7299) of the state

Period	Region	Dispensed DDDs		Ratio NSAIDs : paracetamol
		NSAIDs	Paracetamol	
March 1994	Intervention	177 565	76 383	2.32
	Control	121 976	47 400	2.57
September 1994	Intervention	170 663	81 333	2.10
	Control	117 108	48 583	2.41

programme was able to achieve significant changes in prescriber behaviour despite this background noise of educational activity. In addition, contamination of the two groups of prescribers via professional contact is likely to some extent in any population, particularly a relatively confined one like Tasmania. An improvement in the prescribing of antibiotics for tonsillitis within the control group of general practitioners was reported in an academic detailing study performed by the Victorian Medical Postgraduate Foundation (19), and our previous study directed at the dosage prescribing of allopurinol also showed evidence of improved prescribing practices in the control region over the course of the study (16). The results of the programme were also pleasing in light of the fact that many patients, having been on an NSAID, could then have purchased paracetamol without a prescription, thereby under-stating the real impact of the intervention in terms of the transfer of patients to paracetamol for pain relief.

One factor diluting the real effect of the programme relates to the timing of the collection of the dispensing data. The full impact of the programme was probably only becoming evident when the available post-intervention dispensing data were collected, and 15% of the academic detailing visits were performed after the data collection period. It would also be useful to examine follow-up dispensing data to determine whether the educational programme's effects are sustained, as seemed to be the case with our previous academic detailing project (16).

The academic detailing sessions were well received by the general practitioners, with over 80% of the respondents stating that the appropriate material had been covered in the session, that questions had been satisfactorily answered, and the session had been useful to their clinical practice. In part, this is attrib-

table to the project being promoted to general practitioners as an initiative of their local Division of General Practice, with fellow general practitioners involved in designing and reviewing the educational material.

We attempted to assess the outcome of the educational programme by examining Tasmanian data on public hospital admissions due to the adverse gastrointestinal effects of NSAIDs. Unfortunately, the data proved to be very limited, as drug-related admissions are rarely coded as such by the hospitals. We would have to perform a comprehensive study, as previously (10), to accurately determine the changes in NSAID-related hospital admissions.

The National Health Strategy Issues Paper Number 4, 'Issues' in Pharmaceutical Drug Use in Australia (Macklin Review), recommended that there be more evaluation of methods of providing drug education services in the community, including the use of academic detailers (20). There have now been several Australian studies that have successfully utilized the technique of academic detailing as part of programmes to modify prescriber behaviour (16, 19, 21, 22). As discussed elsewhere (16), the onus probably now rests with the Federal Government to introduce a national academic detailing programme (23), partly to counter the mass of potentially inaccurate advertising material distributed by pharmaceutical companies (24).

In conclusion, this study, like our previous project, has demonstrated that academic detailing by pharmacists is well accepted by general practitioners and can modify patterns of drug use within the community, and the ongoing collection of comprehensive prescription data from a network of community pharmacists provides a valuable means of assessing the outcome of programmes designed to promote the quality use of drugs.

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REFERENCES

1. Brooks P, Girgis L. (1994) Nonsteroidal anti-inflammatory drugs. Differential use in older patients. *Drugs and Aging*, **4**, 101–112.
2. Day RO, Henry DA, Muirden KD, et al. (1992) Non-steroidal anti-inflammatory drug induced upper gastrointestinal haemorrhage and bleeding. *Medical Journal of Australia*, **157**, 810–812.
3. Australian Gastroenterology Institute, Arthritis Foundation of Australia, Australian Rheumatology Association. *Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and the Upper Gut*. Australian Gastroenterology Institute, 1992.
4. Crotty B, Smallwood RA. (1995) Prescribing for the elderly. Upper gastrointestinal tract. *Medical Journal of Australia*, **162**, 95–97.
5. Roth SH. (1995) From peptic ulcer disease to NSAID gastropathy. An evolving nosology. *Drugs and Aging*, **6**, 358–367.
6. Brooks PM. (1993) Clinical management of rheumatoid arthritis. *Lancet*, **341**, 286–290.
7. Greene JM, Winickoff RN. (1992) Cost-conscious prescribing of nonsteroidal anti-inflammatory drugs for adults with arthritis. A review and suggestions. *Archives of Internal Medicine*, **152**, 1995–2002.
8. Smalley WE, Ray WA, Daugherty JR, Griffin MR. (1995) Nonsteroidal anti-inflammatory drugs and the incidence of hospitalizations for peptic ulcer disease in elderly persons. *American Journal of Epidemiology*, **141**, 539–545.
9. Lichtenstein DR, Syngal S, Wolfe MM. (1995) Non-steroidal anti-inflammatory drugs and the gastrointestinal tract. The double-edged sword. *Arthritis and Rheumatism*, **38**, 5–18.
10. Stanton LA, Peterson GM, Rumble RH, Cooper GM, Polack AE. (1994) Drug-related admissions to an Australian hospital. *Journal of Clinical Pharmacy and Therapeutics*, **19**, 341–348.
11. Anon. (1994) Rational use of NSAIDs for musculoskeletal disorders. *Drug and Therapeutics Bulletin*, **32**, 91–95.
12. Cohen ML, Richter MB. (1994) Can we manage our arthritic patients without NSAIDs? *Current Therapeutics*, **35**(8), 10–13.
13. Langman MJS, Weil J, Wainwright P, et al. (1994) Risks of bleeding peptic ulcer associated with individual non-steroidal anti-inflammatory drugs. *Lancet*, **343**, 1075–1078.
14. Garcia Rodriguez LA, Jick H. (1994) Risk of upper gastrointestinal bleeding and perforation associated with individual non-steroidal anti-inflammatory drugs. *Lancet*, **343**, 769–772.
15. Jacobson GA, Friesen WT, Peterson GM, Rumble RH, Polack AE. (1992) Psychoactive drug prescribing in the Tasmanian community. *Medical Journal of Australia*, **157**, 20–24.
16. Peterson GM, Sugden JE. (1995) Educational program to improve the dosage prescribing of allopurinol. *Medical Journal of Australia*, **162**, 74–77.
17. Jacobson GA, Peterson GM. (1996) Prescribing trends for anti-asthma drugs in Tasmania following the national asthma campaign. *Journal of Clinical Pharmacy and Therapeutics*, (in press).
18. WHO Collaborating Centre for Drug Statistics Methodology. *Anatomical therapeutic chemical (ATC) classification index including defined daily doses (DDDs) for plain substances*. Oslo, Norway, 1993.
19. De Santis G, Harvey KJ, Howard D, Mashford ML, Moulds RFW. (1994) Improving the quality of antibiotic prescription patterns in general practice. The role of educational intervention. *Medical Journal of Australia*, **160**, 502–505.
20. Macklin J. *National Health Strategy Issue Paper No. 4. Issues in Pharmaceutical Drug Use in Australia*. 1992.
21. Landgren FT, Harvey KJ, Mashford ML, Moulds RFW, Guthrie B, Hemming M. (1988) Changing antibiotic prescribing by educational marketing. *Medical Journal of Australia*, **149**, 595–599.
22. de Burgh S, Mant A, Mattick RP, Donnelly N, Hall W, Bridges-Webb C. (1995) A controlled trial of educational visiting to improve benzodiazepine prescribing in general practice. *Australian Journal of Public Health*, **19**, 142–148.
23. Harvey K, Howard D. (1993) How can a national academic detailing service be institutionalised? (workshop report). *Australian Prescriber*, **16**(Suppl. 1), 97–100.
24. Ziegler MG, Lew P, Singer BC. (1995) The accuracy of drug information from pharmaceutical sales representatives. *Journal of the American Medical Association*, **273**, 1296–1298.