A qualitative study to identify factors influencing COXIB prescribed by family physicians for musculoskeletal disorders

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**Introduction.** Cyclo-oxygenase-2 inhibiting (COXIB) anti-inflammatories have been the drug class prescribed for a large number of cases of musculoskeletal (MSK) disorders in Canada over the past 5 years. The Alberta Improvements for MSK Disorders (AIMS) initiative sought to better understand the COXIB prescribing situation by funding several studies. The objective of this qualitative study was to determine the factors underlying primary care physicians’ medication prescribing behaviour during an office visit for an MSK disorder, with particular emphasis on the prescribing of COXIBs.

**Methods.** The target respondents were Alberta primary care physicians chosen from a stratified random sample to meet a wide range of characteristics. Individual, semi-structured interviews were used to assess decision pathways in four real cases chosen by the physician. A total of 19 interviews were conducted and analysed using an analytic inductive approach.

**Results.** Factors judged as being important to decision pathways in relation to COXIB prescribing for MSK disease included safety, patient characteristics, affordability to patients, availability of samples, drug company marketing practices, habit formation, time constraints, previous clinical experience of doctors and/or patient with certain drugs and doctors’ perception of absolute versus relative risk.

**Interpretation.** Most physicians preferentially prescribed COXIBs subsequent to a complicated, multifactorial, but essentially patient-centred, decision-making process.

**Keywords.** Musculoskeletal disorders, cyclo-oxygenase-2 inhibiting anti-inflammatories, prescribing.

**Introduction**

Musculoskeletal (MSK) disorders have been identified as an increasingly frequent reason for consulting primary care physicians (family physicians and/or GPs). In Canada, it is estimated that by 2031 MSK disorders will afflict some 15.7% of the population, over 5 million people. An analysis of the Alberta Physicians Claims Database shows, on average, 1.7 million ambulatory visits to a primary care physician for an MSK-related problem, yearly, between 1997 and 2001; more than one visit for every two people in Alberta. Many patients with MSK disorders have traditionally received non-steroidal anti-inflammatory drugs (NSAIDS). January 1, 2000 saw a new generation of selective NSAIDS introduced, collectively referred to as cyclo-oxygenase-2 specific inhibitors (COXIBs). These drugs were advertised as a safer alternative to traditional NSAIDS for those patients with increased risk of developing gastrointestinal complications and have formed an increasingly large proportion of total MSK drug prescriptions. Sun et al. recently reported that 68.3% of Alberta seniors taking NSAIDS had been prescribed a COXIB (celecoxib or rofecoxib).

The Alberta Improvements for Musculoskeletal Disorders Study (AIMS) was initiated in June 2001 by the Alberta Ministry of Health and Wellness to develop a programme of research to improve the...
care and quality of life of patients with acute and chronic MSK disease. One of the findings of AIMS during an investigation of primary care physician billing data was that Alberta physicians prescribed COXIBs in higher than expected levels.\(^2\) One goal of AIMS was to identify factors leading to the preferential prescribing of COXIBs.

Previous research has identified a number of potential factors influencing physician prescribing behaviour. These include symptoms and signs in the patient, the effectiveness of other medication, co-morbidities, patient treatment preferences and expectations, physician and patient demographic factors and physicians’ habits.\(^3\)-\(^7\) Drug-related issues such as perceived effectiveness, safety and cost have received a great deal of research attention.\(^8,\!9\)

In relation to NSAIDs specifically, previous studies have found that while they are much more likely to be the ‘drug of choice’ than alternatives, the reasons behind those decisions have not always been clear.\(^4,\!10\) This lack of understanding is largely related to inadequate explanatory power in the methods used in many of these studies. This is problematic given ‘the high frequency of NSAID prescription and the potential severity of their adverse effects’.\(^11\) One Australian study, which focused directly on COXIBs, found that physicians’ perceptions of efficacy, safety and the failure of other treatment all contributed to the prioritization of COXIBs over alternatives.\(^12\) However, we could find no similar study undertaken in Canada or elsewhere.

Thus, while the influence of a multitude of factors on physician prescribing decisions is well known,\(^13\)-\(^15\) the precise influence of these factors in the use of NSAIDS to treat MSK disorders has not been well studied. The purpose of this study was to gain further insight into the relative influences on family physicians’ actual treatment of four types of MSK disease: osteoarthritis, fibromyalgia, muscle strain and rheumatoid arthritis. Specifically, we sought to understand their reasons for choosing certain drugs (particularly COXIBs), their ‘typical treatment’ plans and decision pathways, and their opinions on factors that influence their overall prescribing.

### Methods

The index conditions selected represent the main MSK disorders seen by primary care physicians and include diseases for which anti-inflammatory medication is clearly indicated (i.e. osteoarthritis) and others for which it is not (fibromyalgia, and some instances of muscle strain). In order to optimize the heterogeneity of the sample (in terms of physician characteristics) while minimizing sampling bias, we used a stratified quota sampling method (see Table 1 for the sample characteristics). A random sample of 182 primary care physicians was extracted from the population of Alberta non-specialist physicians as defined by the Alberta College of Physicians and Surgeons. Each physician was sent a letter inviting him or her to participate in the study. An accompanying questionnaire asked each to confirm that the majority of their work involved providing general medical services, that they usually saw more than 10 adult patients with MSK conditions per month and that they were unrestricted prescribers. Physicians who agreed to participate were allocated in consecutive order to the appropriate cell in a sampling matrix according to their demographic and geographic characteristics, until eventually all cells in the matrix were populated. This process resulted in 19 physicians being interviewed between July and December 2004.

In order to focus the interviews on real-life clinical management decisions, each physician was asked to identify their most recent patient consultation for each condition. The physician’s office was responsible for identifying the most recent cases. The research team did not have access to the charts.

Interviews were conducted in the doctor’s office (15 in person, four by telephone) by a trained interviewer, using open-ended questions to allow the subject to explore the reasons behind their management and treatment decisions. Doctors were encouraged throughout to refer to the index patients’ charts to assist recall. The whole interview, which lasted 10–20 minutes per chart, was audio-taped and transcribed verbatim.

Data from the first three interviews were independently coded by all four researchers, who then discussed, negotiated and agreed on the final coding schema. The entire dataset was then coded into key thematic areas by AM. Analysis followed the analytic inductive method suggested by Ritchie and Spender\(^16\) and consisted of the critical review of the transcripts, using the coding schema, by AM, who developed an initial explanatory model for the phenomena represented in the data. This initial explanatory model was then critically and independently reviewed in the context of the original data by the other three authors, and modifications were discussed and negotiated, producing the final explanatory model presented in Figure 1.

### Table 1 Characteristics of the sample of family physicians

<table>
<thead>
<tr>
<th></th>
<th>STUDY (N = 19)</th>
<th>ALBERTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>11 (57.9%)</td>
<td>64%</td>
</tr>
<tr>
<td>Urban</td>
<td>14 (73.7%)</td>
<td>70%</td>
</tr>
<tr>
<td>Canadian medical school</td>
<td>12 (63.2%)</td>
<td>69%</td>
</tr>
<tr>
<td>&gt;10 years experience</td>
<td>17 (89.4)</td>
<td>80%</td>
</tr>
<tr>
<td>CCFP experience</td>
<td>10 (52.6%)</td>
<td>54%</td>
</tr>
</tbody>
</table>
Results

The characteristics of the sample are presented in Table 1, in comparison with the overall population of Alberta primary care physicians.

Table 2 indicates the proportions of cases where at least one COXIB or NSAID was prescribed during the course of treatment for the specific MSK diseases.

Our analysis of the data identified three ‘sets’ of factors, all of which influence a doctor’s perception and, subsequently, his or her prescription decision: drug characteristics, patient characteristics and contextual factors. Although the factors are separated for the purposes of clarity of presentation, there is considerable interaction within and between the three sets.

Drug factors

Several drug characteristics appear influential in physician decision making. Drug safety (avoidance of NSAID-related gastrointestinal bleeding in particular) was the factor cited most frequently:

[My choice is based on] primarily safety related data, there is a lower incidence of GI bleed, renal toxicity.—Doctor 5.

The patient is not going to bleed or have as much stomach pain, right, why not give it to them? Why not help the patient and give them less side effects at the same time.—Doctor 10.

In addition, the availability of samples was very important. The use of samples as a stopgap, or in initial investigative treatment (an ‘N of 1 therapeutic trial’), was endemic among our study sample. The fact that generally only the name brand COXIBs, not the generic NSAIDS, is available in sample form is a powerful marketing tool. This contributes to the prescribing of COXIBs, both by creating treatment habits on the part of the physician and heightening the visibility and preference for these drugs among patients who are prescribed them at the outset of a disorder and prefer to continue to use them:

I would say what samples are available influences me as much as anything.—Doctor 4.

![Figure 1: Factors influencing doctors' prescribing behaviour](image-url)

**Table 2: Use of NSAIDs and COXIBs in relation to MSK disease**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Cases</th>
<th>Percent of patients prescribed COXIB (%)</th>
<th>Percent of patients prescribed ANY NSAIDS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoarthritis</td>
<td>17</td>
<td>76.47</td>
<td>94.12</td>
</tr>
<tr>
<td>Rheumatoid</td>
<td>17</td>
<td>41.18</td>
<td>64.71</td>
</tr>
<tr>
<td>Arthritis</td>
<td>18</td>
<td>38.89</td>
<td>50.00</td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>18</td>
<td>16.67</td>
<td>38.89</td>
</tr>
<tr>
<td>Muscle Strain</td>
<td>18</td>
<td>42.86</td>
<td>61.43</td>
</tr>
<tr>
<td>OVERALL</td>
<td>70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: In six interviews, no specific case was brought for discussion in relation to one of the conditions. Therefore, the total number of cases in this table is 70 (as opposed to 76). In these situations, hypothetical case material (prepared in advance as a back-up) had to be used in the place of an actual case but is not included in calculations in Table 2.
If we started them on one, I used the ones we had samples of. Mainly, because it is convenient for the patient.—Doctor 13.

The use of samples to influence treatment practice is but one of a number of pharmaceutical industry marketing strategies of which the physicians were aware and found hard to ignore because of their constant presence:

It may be drug reps! Because it is in your face all the time, maybe we are influenced without even realizing it.—Doctor 3.

The reps are bringing in these papers saying there is less GI bleeds and stuff. So the marketing is very important.—Doctor 4.

Respondents also highlighted the importance of previous clinical experience of using particular drugs with either the patient currently consulting with or in other patients:

I know this isn’t a double blind placebo clinical study, this is just people coming in saying, you get three or four people saying, ‘You know that [drug] really helped me’, well that’s pretty good testimonial.—Doctor 7.

If you get better reports from your patients on one of those drugs, you will probably tend to choose that one more often, and that is just by practically using things and doctors rely heavily on patient reports.—Doctor 2.

Patient factors
Patient factors that influenced prescribing included patient demand, overall patient health and risk factors, the financial situation of the patient and the severity of the patient’s disorder.

While perceptions of safety and efficacy were paramount in treating the more severe rheumatoid arthritis cases, the relatively low severity of the other three disorders and the similar risk profiles of the available drugs make patient demand a more potent factor:

Placebo effect and those sorts of things play a huge role. It’s been tried by their friends, and even though we shouldn’t, when they come in and say I want that [we will often defer]. If the patient is still saying, well I don’t care, I want it, then I probably would give in to their wish. I wouldn’t push it to the point of fighting.—Doctor 5.

They wanted Celebrex because it was the new drug, and people come and almost insist that you write them a prescription for the drug they want.—Doctor 11.

Closely related to perceptions of drug safety per se, physicians reported taking individual patient risk factors into significant account when deciding on appropriate treatment:

If they have stomach ulcer problems, then obviously I will try one of the COX inhibitors.—Doctor 1.

The patient’s age would probably make a big difference to(wards) using the COX2 inhibitors.—Doctor 2.

We found that doctors reported almost always considering specific drug affordability in relation to patients as individuals:

If they can’t afford it, there is no sense prescribing it.—Doctor 13.

It’s all to do with what kind of coverage do they have, what can they afford.—Doctor 5.

Affordability represented the single most frequently stated reason, prior to the withdrawal of rofecoxib, for not prescribing COXIBs. While most patients in Canada have some form of drug insurance plan that covers at least a portion of drug costs, by no means all do, and affordability of the treatment to the patient was a clear concern in making treatment decisions.

The influence of disease or symptom severity was identified almost exclusively in relation to rheumatoid arthritis. Almost all respondents, upon seeing rheumatoid arthritis symptoms, reported adopting the process of prescribing an NSAID and at the same time referring the patient to a specialist for the probable outcome of getting a disease modifying antirheumatic drug (DMARD) prescribed. The doctors viewed these drugs as harsh, expensive but necessary in almost all cases of this severe disorder:

What I do these days, if I see a fellow with RA, I am very aggressive with them and start them on DMARDs, as soon as we diagnose them these days... RA is a disabling disease, and as soon as you start them on an aggressive treatment, you save them suffering and pain in the future.—Doctor 1.

Now, if I have any signs, RA is a condition I don’t see much, so I will refer at the drop of a hat... My understanding of RA is the longer you leave that without some sort of disease modifying move, the more permanent troubles they are going to have, so we are always urged to do more than just plain painkillers or simplistic NSAID medications... the repercussions of delay with OA aren’t nearly as of concern.—Doctor 3.

Contextual factors
Contextual factors included the evaluation of risk, the pressure of time and medico-legal concerns. The distinction between absolute and relative risk is one that physicians are aware of, as seen in their reaction to the withdrawal of rofecoxib from the market on September 30, 2004, during our interview period.
Of the nine physicians, seven who were interviewed after the withdrawal of rofecoxib disagreed with its withdrawal, not on the basis that there were no risks associated with taking the drug but on the basis that the relative risk was known to the majority of physicians already and was understood to represent an acceptably small increase to the small absolute risk faced by many patients.

I have stacks of rofecoxib at home [post-withdrawal, for personal use]... don’t tell anybody. If you doubled my heart attack risk I don’t think you would still have a very big number. —Doctor 12.

If you look at each and every anti-inflammatory drug, they all have the capacity to increase or precipitate congestive heart failure... The probability is the same in each patient, it doesn’t matter which drug you use. Even if the reps will tell you “No, this is 12% risk, and ours is 8% risk, it doesn’t matter.—Doctor 13.

In family medicine, where the in-depth knowledge by the physician of the context of the individual patient is crucial to effective treatment decision-making, physicians are trained and firmly believe they can successfully navigate, with that individual patient, the decision-making process of whether the potential benefits of using a COXIB outweigh the risks. Losing the drug option was not welcomed; most doctors want the autonomy to make their educated decision on absolute versus relative risk.

Time pressure was perceived to be an important decision-making imperative:

I can see that under certain situations a physician would say, OK then, let’s give it a try and see what it does, see you next week when I have more time.—Doctor 18.

You can terminate an interview faster with a prescription... it is faster and then also there is expectations of patients that they get something.—Doctor 6.

Physicians often mentioned that COXIBs were prescribed at the beginning of a course of treatment, especially in time-constrained conditions, because they are visible, readily available and highly marketed to doctors and patients alike, satisfying both supply and demand factors.

Medico-legal concerns appeared to influence physicians towards prescribing newer, potentially safer, drugs. Physician did not want to face litigation because the patient experienced a gastrointestinal bleed and was not on the latest drug promoted to have a lesser chance of this side effect.

I guess there’s maybe a medico-legal worry that creeps in the physicians’ minds as well ‘if from not using this newest Cox-2 and a person gets a GI bleed and has complications, will I be at risk’. There is a bit of fear that evolves.—Doctor 5.

You do the best you can for the patient. Something goes wrong, which is nature, and they sue you ass off! ...If no one knew that this guy was going to have a side effect, why involve the lawyers in it? And that is the biggest reason drug companies and hospitals changed their policies, because of medico-legal action. And I think that is sad.—Doctor 13.

Discussion

We acknowledge some methodological limitations associated with this study. The stratified random quota sampling technique reduced, but did not eradicate, the likelihood that individual physicians would be selected for interview through systematic selection bias. Our sampling technique allowed us to ensure that a wide variety of geographic, demographic and professional sub-groupings were represented. This heterogeneity increases the likelihood of our findings being transferable to other populations of family physicians.

An additional concern is the physician selection of index cases. Although they were asked to select the case that they had last billed for each of the index conditions, it is possible that they selected cases they considered to be either exemplary in outcome or clinically interesting.12 It is also conceivable that in practice they chose to participate in the study because they knew their behaviour closely approximated existing prescribing best practices (thus skewing findings away from average practice towards perceived ‘norms’11).

The importance of safety among the participants of our study supports previous literature on physician prescribing.8 Several articles address this safety issue by discussing potential serious side effects of the medication being prescribed and how this influences physician prescribing.4,17

Although the potential link between sample medications and physician prescribing has been described by several authors, little research supports this contention. Most articles have examined the role of relationships, contact or gifts between physicians and industry.18–21 Strang and colleagues18 reported that among a sample of 262 Canadian physicians, 70% felt that drug detailing influenced physician prescribing. Morelli and Koenigsberg20 describe a high association of sample dispensing with simultaneous prescribing of the same brand-name drug among their study of one residency practice. Their findings support the contention that sampling influences physician-prescribing habits.
Several participants in our study described how their previous experience with a particular drug influenced their decision to prescribe a medication in other patients. This supports previous work by Denig, Witteman and Schouten, as well as work by Schumock and colleagues.

Patient demand has been described as an important factor influencing physician prescribing. Our interviews revealed greater influence from patients requesting specific drugs than previous research, where one study found that in only 1.1% of cases was patient demand for a COXIB a contributing factor in their prescription. This may be related to increased access to direct-to-consumer advertising (DTCA) on American television networks. DTCA has been shown to be associated with increased prescription of advertised products and there is substantial impact on patients’ request for specific drugs. In a recent study, patients who heard a COXIB advertisement and asked their physician about the advertised drug were significantly more likely to be prescribed a COXIB (despite evidence-based guidelines recommending a NSAID) than all other patients.

For the three less severe disorders, our study rejects the original contention of Denig et al. that drug cost was largely irrelevant in decision-making. But the influence of this factor is subtle. For example, while ‘affordability’ could be identified as a characteristic of the drug itself, it becomes effective as a factor in the decision-making process only in the context of the physician’s assessment of both the financial status and treatment preferences of the patient (e.g. ‘how much has he or she got to spend, and how much is he or she prepared to pay for the treatment?’). Our findings that drug safety and patient affordability are important for non-life-threatening MSK disorders does agree, however, with Denig et al.’s finding that the importance of safety and cost in decision-making is inversely related to the severity of a disorder.

The authors found no previous reference to the link between medico-legal concerns and physician prescribing identified by several of the respondents. As the arena of physician litigation continues to expand, this will become an important area for future research.

In considering the interactions of these imperatives on family physician prescribing for MSK, Figure 1 describes the factors we identified as influencing doctors’ decision-making in relation to treating MSK disorders as well as their general linkage or interaction in the overall process. We have not attributed relative weights or values to these factors, although certain overarching concerns that tended to guide decisions are noted below.

The influences of patient characteristics, drug factors and contextual factors are integrated rapidly as prescribing decisions are made. The physician, in order to simplify and speed up complex decisions, tends to select from a limited number of possible drugs.

OK. This is how I do my practice. I always memorize two or three medications in every field, in every class. These three are my favourites . . . —Doctor 17.

This process is clearly supported in previous literature where Kasje et al. describe an ‘evoked set’ of drugs. This simplification of the decision process can be viewed as a process of habitual prescribing as discussed by Denig et al.

Another finding from this study is the lack of reflection reported by physicians on the underlying factors driving their decisions. Several of the physicians responded to the opportunity for greater self-criticism and reflection afforded by the interview process with something akin to surprise as deeper, heretofore unthought of, issues emerged. Others stated that this type of in-depth, self-critical analysis of real cases could be an effective personal and profession-wide learning tool, a form of interactive self-auditing.

Conclusion

In terms of factors important in deciding whether to use COXIBs to combat MSK pain and mobility issues, we found safety, affordability, availability, visibility (marketing) and physician-specific and patient-specific factors were paramount. Notwithstanding the fact that drug marketing plays a key role in a doctor’s choice of drugs for MSK disorders, this study shows that doctors rely on much more complex and personalized decision-making schema in order to make decisions in an atmosphere of uncertainty.

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