Supporting Safe Driving With Arthritis: Developing a Driving Toolkit for Clinical Practice and Consumer Use


KEY WORDS
- arthritis
- automobile driving
- health education
- risks
- safety

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We conducted a series of focus groups to explore the information needs of clinicians and consumers related to arthritis and driving. An open coding analysis identified common themes across both consumer and clinician-based focus groups that underscored the importance of addressing driving-related concerns and the challenges associated with assessing safety. The results revealed that although driving is critical for maintaining independence and community mobility, drivers with arthritis experience several problems that can affect safe operation of a motor vehicle. Findings from this study are part of a broader research initiative that will inform the development of the Arthritis and Driving toolkit. This toolkit outlines strategies to support safe mobility for people with arthritis and will be an important resource in the coming years given the aging population.


Driving an automobile has been identified as an instrumental activity of daily living (IADL) that is particularly important for people living with arthritis. Many depend on driving to maintain their mobility, independence, and social participation (Cranney et al., 2005). However, driving is a complex task that requires the interaction of visual, cognitive, and motor skills to perform even basic maneuvers, such as braking and steering. A change in any of these skills can affect driving safety.

Arthritis is a leading cause of disability that affects approximately 4 million people living in Canada (Badley & DesMeules, 2003) and approximately 46.4 million people, or 21% of adults, living in the United States (Helmick et al., 2008). Arthritis increases in prevalence with age. Consequently, the number of drivers with arthritis on the roadways is expected to grow exponentially in the coming years as a result of the aging population. Evidence has suggested that drivers with arthritis, musculoskeletal conditions, or both may have a higher risk for crashes and traffic violations than older adults without such a diagnosis, although not all studies have found an association (Marshall, 2008; McGwin, Sims, Pulley, & Roseman, 2000; Vernon et al., 2002).

Arthritis can cause pain, fatigue, reduced joint range of motion, and loss of muscular strength and reaction time, all of which can impair driving performance. Previous research has indicated that the pattern of joint involvement related to certain types of arthritis can limit the ability to perform specific driving skills (Cranney et al., 2005; Hawley & Dunne, 2002; Jones, McCann, & Lassere, 1991). For example, cervical disc disease can result in difficulty...
performing shoulder checks while changing lanes and reversing the vehicle (Jones et al., 1991). Jones et al. (1991) assessed driving in 94 people with different musculoskeletal disorders, most of whom had rheumatoid arthritis \( n = 37 \) or osteoarthritis \( n = 23 \). Study participants with rheumatoid arthritis exhibited difficulty turning corners and getting into and out of their vehicle. Problems with reversing, steering, sitting for prolonged periods, and foot pedal operation were more strongly associated with osteoarthritis. Jones et al. (1991) reported that most problems could be resolved using simple vehicle modifications. Most drivers in this study (77%) were found safe to drive after the modifications; however, the criteria by which they were evaluated were not specified. Other studies of people with rheumatoid arthritis have identified similar problems with driving but reported that few drivers had the vehicle modifications necessary to compensate for arthritis-related impairments (Hawley & Dunne, 2002) or had received advice about driving from clinicians (Cranney et al., 2005).

Clinicians involved in arthritis care do not routinely assess driving performance (Cranney et al., 2005; Dawson, Campbell, Byrne, & Lynch, 1995). Many such clinicians feel they do not have the knowledge and skills necessary to address driving concerns because of a lack of formal training (Marshall & Gilbert, 1999) and a lack of evidence-based recommendations (Korner-Bitensky, Gélinas, Man-Son-Hing, & Marshall, 2005; Molnar, Byszewski, Marshall, & Man-Son-Hing, 2005). Clinicians may not be aware of resources available to assist those with arthritis to continue driving (Cranney et al., 2005). Conversely, people with arthritis may not broach the subject of driving with clinicians for fear of losing their license. They may lack awareness of potential resources that might facilitate their driving safety (e.g., adaptive aids, vehicle modifications). However, little is known about the needs of both clinicians and those with arthritis when it comes to driving. Understanding the information needs of both groups is critical to ensure that driving-related resources address their concerns and facilitate their safety.

The purpose of this exploratory, qualitative study was to identify the information needs of consumers and clinicians concerning driving and arthritis. By identifying those factors that influence driving for people with arthritis, resources can be developed that support their driving safety. The specific aims of this project were (1) to describe the meaning of driving for people with arthritis, (2) to identify and examine driving-related tasks with which people with arthritis experience difficulty, and (3) to investigate strategies currently used by consumers and clinicians to facilitate driving safety. The perspectives of both clinicians and consumers with respect to barriers and facilitators to driver assessment were explored. Results from this study informed the development of a driving toolkit that can be used to optimize the safe use of automobiles by people with arthritis. We discuss the contents of this toolkit and the most effective means to translate this information to knowledge users.

**Method**

**Data Collection**

This study was approved by the Ottawa Hospital Research Ethics Board, Ottawa, Ontario, Canada. Clinicians and consumers were recruited to participate in focus groups through community-based arthritis organizations, such as the Arthritis Society, Consumer Advisory Board of Arthritis Research Centre of Canada, Patient Partners and Canadian Arthritis Patient Alliance, and outpatient clinics in the Ottawa area. We conducted two focus groups with people from each of the major stakeholder groups (i.e., purposeful criterion sampling): (1) consumers living with arthritis and (2) clinicians involved with arthritis care. To be eligible to participate in the study, consumers had to be ≥21 years old, have a physician-confirmed diagnosis of arthritis, and have a valid driver’s license. Clinicians who participated in the focus groups identified arthritis as the primary focus of their day-to-day practice.

We used a structured protocol, meaning that each focus group was moderated by the same facilitator with the help of an assistant to record participants’ comments. Each focus group consisted of 5–8 participants, which was in accordance with focus group guidelines (Morgan, 1998). We developed a series of semistructured questions for each stakeholder group with input from the multidisciplinary research team, who had expertise in the area of driver rehabilitation and occupational therapy, physiatry, geriatrics, and rheumatology. Before the focus group session, we obtained written consent from each participant. No remuneration was provided to the participants except for travel and parking. All focus group discussions were audiotaped and transcribed verbatim by the same member of the research team (Julia Worswick). Participants were reminded that their responses within the session would be kept confidential and reported anonymously.

The focus group sessions opened with general, open-ended questions, moving to a more direct assessment of particular dimensions of driving that had previously been shown to influence the safety of drivers with arthritis (Busteed, Daly, Silke, & Molloy, 2004; Cranney et al., 2005). Participants in both stakeholder groups were asked...
to describe the effects of arthritis on driving performance and their awareness of resources that support safe driving. Questions were then tailored to each stakeholder focus group.

Because clinicians play a role in the assessment and evaluation of arthritis, focus group questions for these participants elicited their experiences with identifying concerns about driving with their patients as well as their knowledge and awareness of driving-related resources, such as adaptive aids and joint-positioning strategies. Questions for consumers explored their driving experiences, including any challenges associated with using their vehicle. Similar to the clinician-based focus groups, consumers were also asked to identify strategies currently used to facilitate their driving safety, including the use of adaptive aids. Consumers were asked about driving-related information they found useful and how they located this information. Participants in both stakeholder groups were asked about the best means of distributing this information (e.g., Web-based or printed resources). After each group, the group facilitator and note taker held a debriefing to identify themes and subthemes raised during the discussion. Recruiting and running of focus group sessions were to continue until saturation of data was achieved, meaning that no new information (i.e., themes) was generated from both the clinician and the consumer-based group sessions. Recruitment efforts were discontinued after four focus groups given that saturation was reached, as confirmed on review of the transcripts. Krueger (1998) identified that saturation is typically reached after four to six focus group sessions, although this number might depend on the topic being explored.

**Analyses**

To begin analysis, we independently reviewed field notes and systematically coded transcripts using an open coding process to highlight emergent themes (Hsieh & Shannon, 2005). We then met to discuss these themes and develop a coding framework (Crabtree & Miller, 1999; Krueger, 1998). We used researcher triangulation, in which Brenda Vrkljan and Ann Cranney analyzed the transcripts individually. They reached agreement on major themes through collaborative discussion and interpretation. Also, a peer not directly involved in the study reviewed the process by which the associated themes were identified (Krueger, 1998). In this case, the peer acted as an auditor to ensure the integrity of the findings and theme identification. The last step involved a coreview of the final set of thematic codes (by Vrkljan and Cranney) to identify key driving issues raised by consumers and clinicians and establish areas of concern related to information needs and the best means of accessing driving-related resources. Once themes were identified, the final phase of the study involved member checking, in which the study findings were summarized and e-mailed to a randomly selected member of each respective focus group. This person was expected to provide in-depth feedback (Krueger, 1998). Those who were contacted in this study validated the findings in their written feedback to us.

**Results**

**Consumer Focus Groups**

Consumers \((N = 11)\) ranged in age from 30 to 75 (median age = 58) and included those recently diagnosed and those for whom arthritis has been a longstanding issue (years since diagnosis = 1–25, median = 14). Arthritic conditions included ankylosing spondylitis \((n = 2)\), psoriatic arthritis \((n = 1)\), and osteoarthritis \((n = 1)\), with most participants having rheumatoid arthritis \((n = 7)\). All consumers were licensed drivers. They were either retired or on disability pensions at the time the focus groups were held.

**Clinician Focus Groups**

Of the 37 clinicians contacted, 12 involved in arthritis care agreed to participate in the focus groups (6 occupational therapists, 5 physiotherapists, and 1 social worker; median years in practice = 25, median age = 51). They all practiced in outpatient clinics or community settings (i.e., home care) in the same geographic region in eastern Ontario, Canada.

**Facilitating Driving Safety and Arthritis**

Under the overarching theme of facilitating driving safety, emergent themes from the focus group data highlighted the meaning of driving for people with arthritis. However, consumers and clinicians identified several concerns about driving safety. Key strategies used to address these concerns were described by both participant groups, which highlighted problems experienced by drivers with arthritis and challenges associated with assessing their safety. We present these themes using illustrative quotes. Problems with driving that were identified by clinicians and consumers were similar across focus groups.

**Meaning of Driving to People With Arthritis**

Many consumers identified that driving provided them with the means to participate in out-of-home activities that were critical to maintaining their health, well-being, and quality of life (e.g., participating in leisure activities such as deep water swimming, Pilates, yoga, weight training at the gym; shopping for groceries; attending health
appointed the importance of driving in the context of the fears associated with losing their license. One participant with arthritis stated, “There’s a fear that if you lose your license, you lose your freedom.” Others discussed the fear of raising driving-related problems with clinicians. They worried that instead of getting help, they would be reported to the “licensing bureau.” Another participant with arthritis spoke about hiding her concerns about driving from others:

If anything, I didn’t want them to know that I was having such a hard time driving because what would I have done? You know, I didn’t have help to drive me, I had to drive, and I didn’t want my license taken away.

Clinicians also raised concerns about whether fear was the reason consumers did not identify driving-related issues. One clinician surmised, “That’s why they don’t tell us about their reflexes because they think we might say ‘I don’t think you can drive anymore.’” For some clinicians, the fact that driving might be an issue for consumers came as a revelation, even for the clinician who identified driver assessment as her practice area: “I have never had anybody [consumer] sent to me for a driving assessment where the primary diagnosis has been arthritis.” Most stated that they did not address driving in their day-to-day practice unless the consumer, his or her family, or both raised the issue. Consumers equated losing their license with losing their independence. They depended on their automobile to function in their daily lives.

**Concerns About Driving Safety**

**Performing Driving Maneuvers.** Consumers shared many examples of difficulties they experienced while driving. Loss of muscular strength, range of motion, joint stiffness, pain, and fatigue were identified as key factors that influenced their ability to perform critical driving maneuvers. These maneuvers included checking blind spots (shoulder checks), turning, steering, reversing, and responding to sudden changes in the driving environment. One participant described how neck stiffness compromised his driving safety:

I’m terrified because I can’t turn around. My neck is all seized up. I just can’t turn around, and it scares the hell out of me . . . every once in a while a guy just appears that was in the blind spot.

Joint inflammation, or “flare-ups,” severely impaired driving performance, specifically reaction time, as one consumer stated,

Because when you’re in a flare-up, your reaction time takes longer, you’re tired, you’re weak, your muscles are all weak, your joints are aching, like you can’t do it as quickly because the brain can’t send the message and the body can’t react as quickly.

As a result, performing simple driving maneuvers, such as turning onto a street, required more vigilance:

Turning a corner or turning onto a street was extremely bad. I couldn’t do it like I used to. I would do it, but I had to wait until the whole road was clear so that I could; it would take me a long time.

Clinicians also noted several arthritis-related concerns that could have implications for driving performance (e.g., grip strength, shoulder and neck range, joint count). Generally, most information on driving was based on self-report and information shared by family members as opposed to objective measures of driving. Clinicians used the term flag when referring to areas of major concern that might have implications on driving, as one therapist observed:

If I do have concerns about someone’s posture, reaction time, and how they are moving and various things going on with them, I may ask the family member, are you comfortable driving in the car with them? And then you know you hear the story, no, no, no, we never go in the car with them and that’s sort of my flag.

Some linked performance on standardized assessment tools or physical examination (e.g., Trail Making Test [Reitan, 1986], brake reaction time, neck range of motion, foot tap test) with the potential for on-road concerns. One therapist noted problems when observing clients during an in-clinic evaluation: “If they’re really, really slow with completing the Trail Making Test, it’s going to flag you that wait a minute here, should this person be driving?”

An issue identified by clinicians that was not raised in the consumer groups was the potential influence of arthritis-related medications on driving. Although it was unclear whether the side effects of the medication or the disease process was the concern, clinicians noted problems with concentration, focusing, or what one clinician coined “lapses in mental awareness” that could affect driving performance: “It could be medication or it could be other parts of the condition, it’s just their speed of response is affected . . . which is needed for the brake or getting into lanes.” A clinician remarked that a client once reported driving “from a to b, and didn’t know how they got to b.”

**Operating Their Vehicle.** Consumers and clinicians identified several problems in using their vehicle, which they attributed to poor vehicle design. These problems included turning the key in the ignition; operating secondary controls (e.g., turning knobs, flipping switches, using the gear shift); getting into and out of the car (i.e., height of vehicle, weight of the door); fastening,
unfastening, and reaching for the seat belt; gripping the steering wheel; and locating gas and brake pedals. One participant described how getting into and out of the car was difficult: “Well, especially low seats. For me I found that, I have a van so I was thankful that it was high because if I had had my other car and having to sit low I would have been stuck.” Being able to use a seat belt was an issue raised by many participants: “The shoulder belt can be painful... when the shoulder belt comes across here [pointing at chest] and it’s leaning across the chest and if you have an inflammatory arthritis, that can be painful.” Buttons, switches, and knobs, such as the button to release the seat belt or trunk, were difficult to operate because of their location and the force required. For example, accessing a mobility aid or other items stored in the trunk was a challenge:

First of all getting the trunk door open... you know because ours is a hatchback, you need to make sure it doesn’t hit you on the head and depending how high the trunk is, you know with my wrists I have problems with bags of milk, stuff like that.

Secondary tasks, meaning those required to keep one’s vehicle operational (e.g., filling up the gas tank, adding fluid, air in tires), were difficult to perform. One driver commented that arthritis makes you more aware of what it takes to operate a car: “You forget about all of the little things about driving.”

**Strategies to Facilitate Driving Safety**

Given the pain, stiffness, and other limitations caused by arthritis, people with this condition had to make various accommodations to drive. The accommodations included changing their driving routine, adapting their vehicle, or both.

**Changing Driving Routines.** Consumers reported avoiding rush hour and driving during certain times, particularly if they were having a bad day. They also avoided driving on highways and other routes because of their condition. Some driving situations, however, were unavoidable. For one participant, visiting her daughter was a long but necessary road trip. To do so, she modified her driving routine by taking breaks periodically:

With the long-distance driving, one of the other things with rheumatoid arthritis is sometimes the fatigue factor can come on very quickly and you might be fine but 5 minutes later you might just say “I can’t go any further” so you have to plan your rest stops.

Another driver found relief from gripping the steering wheel after a consult with her therapist: “Hand and wrist exercises help as far as your grip with the steering wheel and to maintain control when steering.” Drivers also used hand and wrist splints. Obtaining a disability parking permit was another modification that was particularly helpful because these spaces were not only close to drivers’ desired destination (e.g., grocery store) but also often wider: “You’re not cranking your wheel so much when you’re backing out.” If consumers reported difficulties with off-road tasks (e.g., getting into or out of car, turning the ignition key, opening or closing doors, fastening or unfastening the seat belt, transferring their mobility aid to and from the car), some clinicians had them perform the task in question and offered suggestions when possible (e.g., use of proper body mechanics). However, clinicians avoided on-road assessments. Clinicians felt they were not qualified to perform comprehensive assessments and that it was a safety risk. A clinician stated, “I don’t feel (a) qualified and (b) I don’t think I want to go there for safety reasons.”

**Adapting Their Vehicle.** Drivers with arthritis identified several vehicle adaptations that had facilitated driving safety since their diagnosis. These adaptations are listed in Figure 1. The list includes key turners, wide mirror extensions, and back supports, among others (see Figure 1). Although consumers appreciated when vehicles had these adaptations directly integrated into their design (e.g., keyless entry, seat heaters, remote starters, adjustable steering wheels), they identified that these vehicles were usually the more expensive models: “Arthritis is an expensive disease... all of the adaptations are on the higher-end cars.” Clinicians also identified the cost of vehicle adaptations as a major barrier for those with arthritis. However, they reported that in some situations, simple, cost-effective solutions could facilitate performance (e.g., using a plastic bag to swivel when transferring into and out of a vehicle). Both consumers and clinicians felt that a useful resource would be to identify arthritis-friendly vehicle features. This resource could be used when purchasing a vehicle.
Need for Resources Specific to Arthritis and Driving

Locating Driving-Related Information. Another theme that emerged from the focus groups was the challenge of locating driving-related information specific to arthritis. Both consumers and clinicians reported difficulties knowing where to find information about driving, particularly adaptive devices. They were not always aware of available tools and resources. Consumers identified that when they did find information, it was by searching online or speaking with others, namely consumers living with the disease: “I’ve learned of a lot of adaptive behavior from some of the people [who] have had rheumatoid arthritis for much longer than I have. . . . I think they’re an invaluable source of information.” Clinicians stated that they lacked a systematic way of assessing driving in their practice. Most were unaware of the role of driver assessment centers or when it was appropriate to refer people to these services. Location and cost of a formal driver assessment were another barrier identified by clinicians. Some clinicians used a checklist to assess driving. This checklist included determining whether a parking pass was required or whether the driver had problems getting into or out of the car, putting on a seat belt, adjusting mirrors, and turning the key in the ignition. Using this checklist ensured key areas of concern were assessed and recommendations were provided, when possible.

Developing Resources That Support Safe Driving With Arthritis. Although some participants were able to locate driving-related information, they stated that most resources did not address the specific needs of drivers with arthritis. They stated that resources should include arthritis-specific information on vehicle adaptations and other tips, such as the importance of planning and pacing your driving route for long-distance trips. One consumer stated, “If you’re talking about preparing a manual for someone newly diagnosed, show him the things he should look for in a car.” When consumers and clinicians in the focus groups were asked to identify strategies to help disseminate driving-related information (i.e., a toolkit) and resources to potential users (i.e., consumers, clinicians), suggestions included the Internet and pamphlets. They also suggested that information on driving should be shared during presentations at consumer support groups and other sessions organized by the Arthritis Society, particularly for patients newly diagnosed. Clinicians stated that increasing the availability of such resources would ensure driving-related concerns were addressed and raise awareness about the potential implications of arthritis on driving safety.

Discussion

Results from this focus group analysis highlighted the meaning of driving for people with arthritis and the need for resources to support their driving safety. Consumers and clinicians identified that driving a vehicle provided them the means to engage in activities identified as critical to maintaining independence and community mobility. Previous research has linked driving cessation and associated decreases in out-of-home activity levels with higher rates of depression and a decline in quality of life (Marottoli et al., 2000). This study is the first to raise this potential link in reference to arthritis and driving. Encouraging people with arthritis to be as active and mobile as possible is important. Results of this study support the critical role of driving for people living with arthritis. Driving provides the means to participate in activities that keeps them healthy and mobile in their community (e.g., attending yoga, Aquafit, volunteer work, education sessions on arthritis).

Congruent with previous research, participants identified that pain, fatigue, joint stiffness, and losses in strength and range of motion resulted in problems before and during driving (e.g., reversing, checking blind spots; Cranney et al., 2005). Many problems were attributed to poor vehicle design (e.g., turning the ignition key, opening and closing doors, putting on seat belts, getting in and out of seat). Although these problems have been noted in other studies (Cranney et al., 2005), this study is the first in which drivers with arthritis and clinicians identified that the ability to perform even routine driving maneuvers, such as turning a corner, were compromised. Such problems can have resulting implications on the safety of consumers and other road users. Conflicting information from published studies makes it unclear whether people with arthritis have higher crash rates (McGwin et al., 2000; Sagberg, 2006). Given the aging population and expected increases in arthritis and other health conditions (e.g., diabetes), the effect of comorbid medical conditions (e.g., arthritis and diabetes or heart disease) on crash risk should be investigated. Preliminary findings have suggested that having multiple medical conditions can impede driving safety, especially among older adults (Dobbs, 2005).

Clinicians in this study identified side effects of arthritis medications as a potential factor that could influence driving safety. McGwin et al. (2000) reported three classes of medications that were positively associated with crash involvement in a sample of older drivers \(N = 901\) with chronic medical conditions: (1) nonsteroidal anti-inflammatory drugs (NSAIDs), (2) angiotensin converting enzyme inhibitors, and (3) benzodiazepines and anticoagulants. After exploring interactions between medication...
subgroups, only the use of NSAIDs was associated with a 50% increased risk of crash involvement (95% confidence interval = 1.0–2.5). Although arthritis was one of the conditions evaluated, the direct link between arthritis-related medications and crash risk was not reported (McGwin et al., 2000). Another study used a double-blind, placebo-controlled crossover design to evaluate the effect of opioids (i.e., oxycodone and paracetamol) and an NSAID (bromfenac) on driving performance with young, healthy volunteers (N = 30; mean age = 24, standard deviation = 1.6). Although neither drug significantly affected performance on the driving test, participants treated with oxycodone and paracetamol reported that driving took more effort and that they experienced increased sedation and reduced alertness (Verster, Veldhuijzen, & Volkerts, 2006). The authors acknowledged that additional research is needed to evaluate the effects of analgesics among drivers with existing pain pathology, particularly with older drivers because of changes in drug metabolism and the known effects of pain on cognitive performance. People with arthritis should be informed when medications could interfere with their driving ability.

Consumers in this study used self-restrictive strategies to compensate for changes resulting from their condition to keep driving (e.g., avoiding certain roads and highways). They modified their driving routine by planning and pacing this activity, such as incorporating rest breaks when traveling longer distances, using parking permits for people with disabilities, or both. Other adaptations included using hand and wrist splints as well as exercises (e.g., rotating the wrists when stopped safely at a traffic light) to release tension from the driver’s upper extremities. Others were able to compensate for driving problems by using vehicle adaptations. These adaptations included mirror extensions, key turners, back and neck supports, and remote starters. However, as noted in previous studies (Cranney et al., 2005; Hawley & Dunne, 2002; Jones et al., 1991), compensatory strategies, although effective, appeared underused among drivers with arthritis in this study. Increasing awareness among clinicians and consumers about potential resources that facilitate driving safety is critical. A toolkit was explored as a potential means to translate key information and resources about driving and arthritis to potential users (e.g., clinicians, consumers).

**Development of a Driving and Arthritis Toolkit**

The notion of developing a toolkit on arthritis and driving emanated in part from the success of this approach with drivers with dementia (Byszewski et al., 2003). The Driving and Dementia Toolkit (Byszewski et al., 2003) was developed in response to the needs of primary care physicians. This toolkit provides information to assist with in-office assessment of driving skills and communicating results to people with dementia, their caregivers, or both, including links to appropriate community resources. An evaluation of this resource for dementia supported its effectiveness with increasing knowledge and physician confidence in responding to driving-related concerns. Although dementia presents a unique set of challenges when it comes to addressing driving-related issues, results from this study indicate that the need for information and resources is similar for drivers with arthritis and the clinicians involved with their care.

Both consumers and clinicians suggested that a toolkit on arthritis and driving should include information specific to the needs of those with this diagnosis, including information on vehicle adaptations and strategies to enhance on-road performance. Figure 1 lists some of these adaptations. Given the fear associated with disclosing difficulties with driving, the provision of a toolkit could facilitate a safe and open dialogue about driving between clinicians and consumers to ensure concerns are addressed. The challenge for clinicians is to determine whether a person is safe to continue driving. The Driving and Dementia Toolkit includes a decision-based algorithm to assist physicians through this process and to determine whether a more in-depth driving assessment is necessary (Byszewski et al., 2003). A similar algorithm will be developed for arthritis and its utility evaluated, which will form the basis of a future study.

Unfortunately, the expense associated with driver assessment services and vehicle adaptations was identified as a significant barrier by participants because many consumers are on fixed incomes (i.e., disability, retirement pensions). Although determining strategies to ensure such services are covered by insurance providers, government agencies, or both is beyond the scope of this article, it is important to consider the costs to society when people no longer participate in activities that keep them healthy and mobile in their community. The association of driving cessation, out-of-home activity levels, and depression has already been noted.

**Dissemination of the Toolkit**

Facilitating the transfer of current and relevant information on vehicle adaptations and other strategies that enable people with arthritis to maintain their driving safety is critical. Research on knowledge transfer and diffusion of innovations of health care research has indicated that using media-related resources (e.g., Web sites, journals, newsletters, short informational bulletins) is an effective tool to increase knowledge and awareness (Reardon & Gibson, 2006). However, interpersonal strategies are more effective
with regard to the actual implementation of innovations (i.e., products of exchange process—e.g., arthritis and driving toolkit; Grimshaw & Eccles, 2004; Grol & Grimshaw, 2003). Additional background work on the development of the driving and arthritis toolkit will result from a systematic review of the literature on arthritis and driving performance outcomes and a physician survey on driving and arthritis that we conducted. On the basis of results from this study, this toolkit should target both consumers and clinicians. Information on adaptive equipment (see Figure 1) and other suggested strategies will be provided. The toolkit will also include a clinical decision-making algorithm that can be used to determine when an in-depth driving assessment may be necessary (e.g., red flags; see Figure 2).

Study Limitations and Suggestions for Future Research

It is important to consider the findings in light of a few limitations. Focus groups in this study included consumers with different types of arthritis. Some consumers had been diagnosed more recently than others. The intent of the study was not to generalize the results to all people with arthritis or across diagnoses; rather, it was to understand their driving experiences and the challenges faced by clinicians when addressing driving in their practice. Our objective was to generate driving-related resources for both user groups that targeted their respective issues. Moreover, when conducting qualitative research, the introduction of bias with regard to the interpretation of the themes is possible. We attempted to minimize this bias by using methods such as peer debriefing and member checking to confirm the analysis. The study’s focus was to address strategies that would facilitate the safety of drivers with arthritis. This study is the first to explore the information needs of both consumers and clinicians. Future research will involve an evaluation of the driving and arthritis toolkit that is currently under development. Strategies to disseminate the toolkit, including a comparison between online and hard-copy resources, will be examined to determine their effectiveness in addressing driving-related concerns among potential end users (e.g., knowledge and confidence gained by clinicians in addressing driving issues; consumers’ satisfaction with information and resources).

Conclusion

Arthritis has the potential to affect performance of many activities of daily living, including driving. Results from this study indicated that drivers with arthritis experience problems that affect safety. Clinicians find addressing the driving-related concerns of patients challenging given the lack of knowledge and resources specific to arthritis. This study’s results underscored the need to develop information that optimizes the safe use of automobiles in people with arthritis.

Loss of mobility as a result of arthritis is a common experience for those living with this disease, and being...
able to drive allows them to maintain their independence in their community. With the expected increase in the number of older drivers and given that arthritis is the most prevalent disease of people ≥65 years old, it is critical that clinicians have the knowledge, skills, and access to resources that can address driving-related concerns and determine whether a more in-depth driving assessment is required. Developing resources that support safe driving will facilitate the safety of those with arthritis and other road users. ▲

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