

FREQUENCY OF RISK FACTORS THAT POTENTIALLY INCREASE HARM FROM MEDICATIONS IN OLDER ADULTS RECEIVING PRIMARY CARE

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ABSTRACT

Background

Many circumstances elevate patients, especially older adults, risk for drug-related morbidity and misadventures. Understanding the frequency of these situations can help with the design of initiatives to address or alter these circumstances with the aim of reducing medication therapy-related concerns and associated expenditures.

Objective

To describe the frequency of circumstances that may place older adults at higher risk for drug-related morbidity and misadventures in a large sample of elderly patients visiting family medicine clinics.

Methods

Elderly adults at 7 family medicine practices across Ontario self-completed the 10-item Medication Risk Questionnaire (MRQ).

Results

Surveys were completed by 907 patients, with a mean age of 72.4 (SD 10.7) years and a mean number of 4.8 medical conditions (SD 2.3; min-max: 0-14). Many subjects were taking multiple medications (mean 6.9 (SD 3.8; min-max: 0-21)) and over 90% of respondents reported at least one indicator that potentially increases their risk of drug-related morbidity.

Conclusion

Number of medications, number of medical conditions and number of daily medication doses were the most frequently observed risks for medication-related issues in this large sample of elderly patients visiting family medicine clinics.

Key Words: *Older adults, primary care, medication*

Many circumstances elevate patients', especially older adults, risk for drug-related morbidity and misadventures (i.e., the broad array of phenomena associated with negative drug experiences).¹ Multiple chronic medical problems, age-related changes in physiology affecting pharmacokinetics and dynamics of medications and declines in cognitive and sensory abilities all

contribute to this increased risk.²⁻⁴ Another contributor, use of multiple medications, can result in drug interactions, adverse drug reactions, inappropriate dosing, potential therapeutic failure and patient non-adherence.^{2,5-8} Difficulties with medication therapy negatively impact older adults' perception of health status and quality of life and are associated with increased risks for

emergency room visits and hospitalization.^{9,10} A recent study reported that medication therapy problems accounted for about 13% of emergency department visits to a tertiary care Veterans Affairs hospital and 35% of these visits resulted in an admission to hospital.¹¹ Adverse drug reactions and poor adherence, many of which are preventable, accounted for the majority of these visits. In a study of American Medicare recipients (age 65 and older), it was estimated that 13.8 preventable adverse drug events occurred per 1000-person years.¹²

As the population ages, spending on and use of medication therapy will continue to rise. Understanding the frequency of situations that can lead to drug therapy-related problems may help with the design of initiatives to address or alter these circumstances with the aim of reducing medication therapy-related concerns and associated expenditures.

Ten circumstances that contribute to medication therapy concerns have been compiled into the Medication Related Risk Questionnaire (MRQ),¹³ the only patient self-administered tool available that assesses risk factors for medication-related issues. In this study, we describe the frequency of circumstances that put patients, especially older adults, at higher risk for drug-related morbidity and misadventures by administering the MRQ in a large sample of elderly patients visiting family medicine clinics.

METHODS

This cross-sectional study of a consecutive sample of patients, recruited between June 2004 and March 2006, was conducted in 7 family practice sites across Ontario as part of the Integrating family Medicine and Pharmacy to Advance primary Care Therapeutics (IMPACT) demonstration project (www.impactteam.info). The study was approved by the McMaster University Research Ethics Board in June 2004.

Family practice sites were located in a mix of urban and rural areas (Toronto, Niagara, Burlington, Mount Forest, Stratford and Ottawa), with practice sizes ranging between 12,000 and 28,000 patients. In total, seven pharmacists and approximately 70 physicians covering over 150,000 patients were involved in the study. Pharmacists integrated into the family practices

did not dispense medication. They performed patient medication interviews and assessments, provided objective drug information and drug therapy education and performed office system medication management enhancements to optimize medication therapy. All patients referred by physicians for medication assessments were asked to self-complete the MRQ. Only those who could not fully complete the MRQ, despite assistance from the site pharmacist, were excluded from the study.

Each item in the 10-item MRQ was scored as "1" if the patient answers "yes" and "0" if the patient answers "no." The sum of each item score represents the total MRQ score (i.e., the number of risk indicators present). A study of forty subjects (aged ≥ 60 years taking ≥ 2 prescription medications) showed high inter-rater reliability ($r=0.847$) and agreement between investigators and participants ($\kappa>0.6$ for 6 questions).¹³ Reasonable internal consistency ($\alpha=0.69$) and test-retest reliability ($\kappa>0.6$) were also demonstrated.¹³ Patients also completed the Medical Outcomes Short Form 12 physical and mental composite scores (SF-12; Health Institute, New England Medical Centre, 1995)¹⁴ as a component of their baseline assessment to provide an indication of their quality of life in relation to population norms.

Descriptive statistics were calculated for baseline patient characteristics as well as the frequency of each criterion and the number of patients with 0, 1, 2, 3, 4, 5 or more criteria. All continuous variables are presented as mean or median (standard deviation (SD), minimum [min]–maximum [max]) for continuous variables or counts (percentage) for categorical variables.

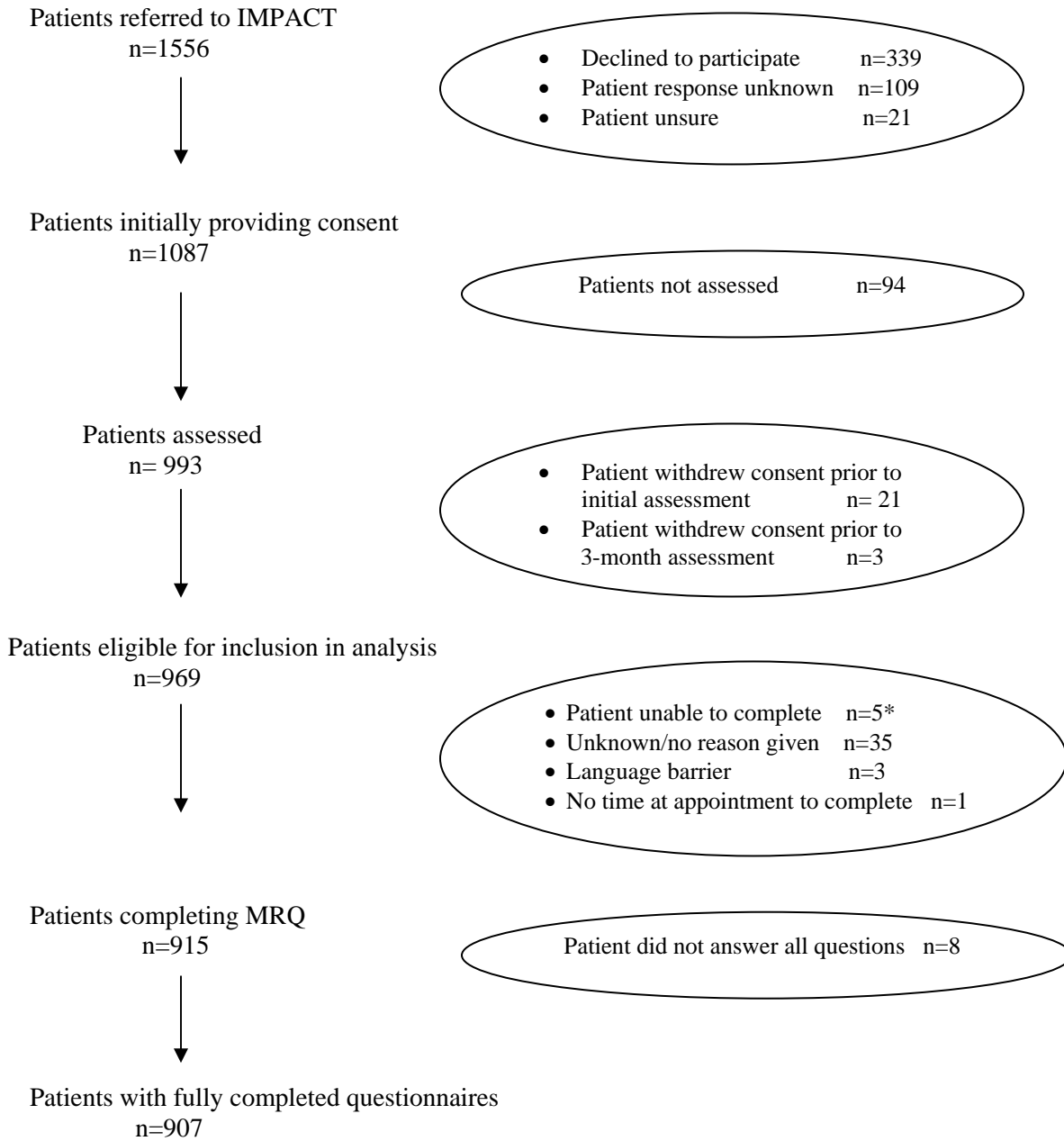
RESULTS

Nine hundred and sixty-nine patients were eligible for participation in the study; however, 62 patients did not complete the MRQ for a variety of reasons as outlined in Figure 1. The majority of the 907 participants who completed all 10 items on the MRQ were female (60.9%) with a mean (SD) age of 72.4 (10.7) years. Participants had a mean number of 4.8 medical conditions (SD 2.3; min, max: 0, 14) and were taking a mean of 6.9 (SD 3.8; min, max: 0, 21) medications. Table 1 presents SF-12¹⁴ findings for the 830 participants

who were also able to complete this questionnaire. The physical composite score (PCS) on the SF-12 was lower but the mental composite score (MCS)

was comparable to general US population. Table 2 summarizes the characteristics of the patients able to complete the MRQ and SF-12 questionnaires.

FIG. 1 Consort Diagram Showing Patient Flow



* Due to medical condition (e.g., developmental disability, dementia etc.)

TABLE 1 Quality of Life Score as per SF=12(v 1) between Study Sample and US Population

	SF-12 MCS* Study Sample (n=830)	SF-12 MCS* General Population ¹⁹ (n=2329)	SF-12 PCS† Study Sample (n=830)	SF-12 PCS† General Population ¹⁹ (n=2329)
Mean	49.8	50.0	40.6	50.1
Standard Deviation	9.8	9.6	12.2	9.5
Minimum, Maximum	9, 66	10, 70	11, 65	13, 69

* SF-12 Mental composite score

† SF-12 Physical composite score

TABLE 2 Characteristics of Participants Who Completed the MRQ and SF-12

	MRQ n=907	SF-12 n=830
Female	60.9%	61%
Age: mean (SD)	72.4 (10.7)	72.4 (10.5)
Medical conditions: mean (SD), min, max	4.8 (2.3), min=0, max=14	4.9 (2.3), min=1, max=14
Medications: mean (SD), min, max	6.9 (3.8), min=0, max=21	7 (3.9), min=1, max=21

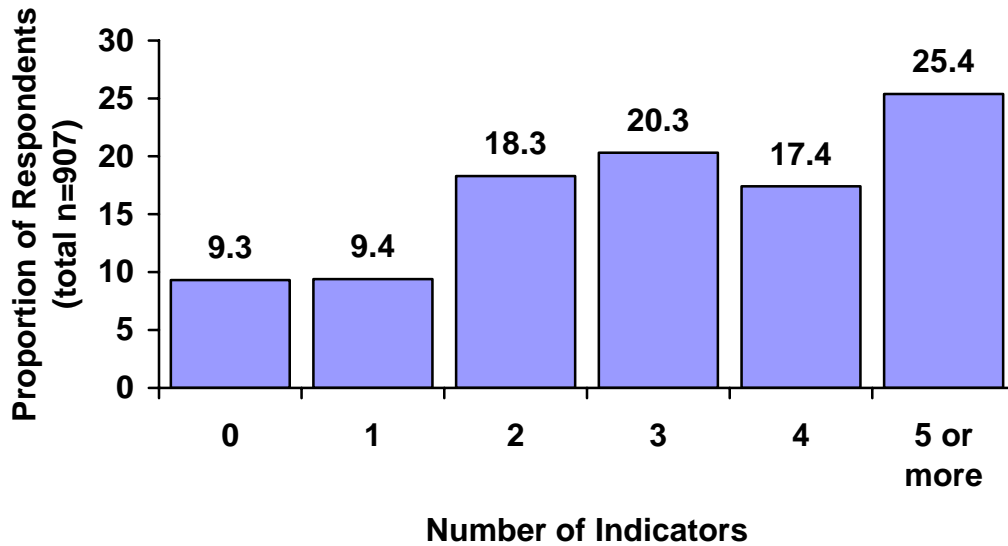
Table 3 shows the proportion of respondents who indicated that they were affected by these potential risk factors for drug-related morbidity. The majority of subjects had risks related to their number of medications (79.5%), medical conditions (76.4%) and daily medication doses (37.2%). Thirty percent had multiple doctors prescribing for them and 26.5% were unclear about the need for all of their medications. Fifteen

percent found it difficult to follow their medication regimen or sometimes chose not to, and 14.3% experienced more than 4 medication changes in the last year. Figure 2 illustrates the proportion of patients with multiple risk indicators. Over 90% of survey respondents reported that they had at least one risk factor, with 25.4% having five or more.

TABLE 3 “Yes” Responses to MRQ Individual Items

Indicator Question	Yes (n[%])
Do you get your prescriptions filled at more than one pharmacy?	61 (6.7)
Do you take any of the following medications: carbamazepine, lithium, phenytoin, quinidine, warfarin, digoxin, phenobarbital, procainamide, theophylline?	130 (14.3)
Have your medications or the instructions on how to take them been changed four or more times in the past year?	130 (14.3)
Is it difficult for you to follow your medication regimen or do you sometimes choose not to?	142 (15.7)
Does someone else bring any of your medications home to you?	194 (21.4)
Of all your medications, is there any particular medicine for which you do not know the reason for taking it?	240 (26.5)
Does more than one physician prescribe medications for you on a regular basis?	276 (30.4)
Are you currently taking 12 or more medication doses each day?	337 (37.2)
Are you currently taking medications for three or more medical problems?	693 (76.4)
Are you currently taking five or more medications?	721 (79.5)

FIG. 2 Proportion of Respondents by Number of Indicators



DISCUSSION

This study of a large sample of older ambulatory adults, found that over 60% of the participants met three or more criteria for medication related risk. Seniors are coping with numerous medical problems for which many medications are prescribed. Once the appropriateness of all medications a patient takes has been assessed, there is often little a clinician can do to minimize the number of medications or number of medical conditions for a patient. However, many of the other medication risk factors observed in this study may be amenable to change.

Medication taking is reasonably complex with many seniors in this study taking 12 or more doses each day. Initiatives to simplify medication regimens (minimize the number of dosing times daily) have been shown to enhance adherence.¹⁵ Other adherence promoting strategies involve a combination of multiple techniques delivered over time e.g., self-management plans, reinforcements and rewards.¹⁵ Specialty packaging in and of itself has not been shown to significantly affect adherence¹⁵ but, a combination of tools or strategies to assist with remembering dosing times would likely be useful for this population.

Thirty percent of study participants had multiple prescribers involved in their care and nearly 15% were coping with numerous medication changes in one year. These findings underscore the potential benefits of initiatives that promote communication between all of a patient's care providers.

Over 25% of subjects responded that they did not know the reason for taking at least one of their medications. Assuming that improving patient awareness about the importance of the medications (reasons for use) improves adherence to prescribed therapies, this suggests that patients will benefit from increased investment in education efforts.

In the original MRQ validation study, Levy found a significant correlation between drug regimen severity scores (i.e., an indicator of potential risk of medication-related issues) and the following questionnaire items: number of medications, number of medication doses, medications with narrow therapeutic index, taking medications for 3 or more medical problems and 4 or more changes in instructions about how to take

medications in past year.¹³ These were frequently occurring risk factors in this study as well. Nearly 80% of patients were taking 5 or more medications, 76.4% were coping with 3 or more medical problems and 37.2% reported taking 12 or more medication doses daily.

The correlation between "yes" responses to the MRQ and the retrospectively determined drug regimen severity score, observed in Levy's study, suggests that the questionnaire can identify patients with increased risk for potential medication-related issues or those who may benefit from a medication assessment.¹³ Langford and colleagues demonstrated that a modified version of the MRQ (5 items) is useful as a screening tool to identify patients at risk for medication-related problems in a family medicine setting in their prospective randomized controlled trial.¹⁶ In the IMPACT study, patients self-completed all 10 items of the MRQ. A future area of research is to explore the relationship between individual MRQ items, MRQ score and the number of medication-related issues identified during a pharmacist medication assessment.

Possible limitations of our study are associated with the use of a self-administered tool that requires reasonable English literacy.¹⁶ Others have observed that aging subjects' responses to this self-administered questionnaire may suffer from inaccuracies.¹³ Since the site pharmacists assisted patients who could not read English to complete the tool where needed, we are unable to comment on this issue.

Another limitation is the method used to recruit participants as our sample may be biased toward patients more likely to be at risk of medication-related issues since all were referred for pharmacist assessment. This is acknowledged, however, it was unavoidable as it was not feasible to administer the survey to all adults in each of the 7 family practice sites. As well, 77 patients who completed the MRQ did not complete the SF-12 questionnaire. Table 1 demonstrates that the characteristics of this small sample are very similar to the entire population so this limitation is not expected to impact the ability to generalize results to SF-12 norms.

The characteristics of participants in our study (age, number of medications) are similar to others that have examined medication use by elderly patients in North America;^{17,18} although

the mean SF-12 physical composite score was lower than that of the general US population indicating that patients in this study were less physically well.¹⁴ Lower physical summary measure on the SF-12 is a demonstrated predictor of future hospitalization and mortality.¹⁹

This study describes the characteristics of elderly patients seeking primary care health services. Given the similarities between our study population and many other studies in aging ambulatory North American populations, as well as our large sample size, these findings are useful for those designing health and community services and policies targeting the aging ambulatory population.

CONCLUSION

Number of medications, number of medical conditions and number of daily medication doses were the most frequently observed risks for medication-related issues in this large sample of elderly patients visiting family medicine clinics. Administration of this tool in primary care provided useful information to identify medication-related risks for patients.

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