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# Screening Seniors for Risk of Functional Decline: Results of a Survey in Family Practice

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## ABSTRACT

*Objective:* To measure functional status, determine risk of functional decline and assess consistency between responses and standardized instruments.

*Design:* A mailed survey which measured functional impairment, recent hospitalization and bereavement. A positive response on at least one of these factors indicated that the individual was "at risk" for functional decline. A random sample (n=73) of "at risk" subjects (specifically, family practice patients aged 70 and older) were assessed by a nurse.

*Results:* The response rate was 89% (369/415), 59% of seniors were female and the mean age was 77.1 (SD=5.5) years. Self-reported risk, based on activities of daily living (ADLs), was associated with impairment in at least one basic ADL (p<0.0005) using a standardized instrument. The positive predictive value of the survey for ADL impairment was 65%.

*Conclusion:* Response to a mailed survey was high and self-reported ADL risks were consistent with findings from standardized assessment tools.

## ABRÉGÉ

*Objectif :* mesurer l'état fonctionnel, déterminer le risque de déclin fonctionnel et évaluer la cohérence entre les résultats obtenus et les instruments normalisés.

*Méthode :* enquête postale mesurant la déficience fonctionnelle, l'hospitalisation récente et le deuil. Une réponse positive dans l'une ou l'autre de ces catégories suggère que la personne est susceptible (« à risque ») de subir un déclin fonctionnel. Une infirmière a évalué un échantillon aléatoire (n = 73) de sujets « à risque ».

*Échantillon :* patients suivis par un médecin de famille et âgés de 70 ans ou plus.

*Résultats :* taux de réponse de 88,9 % (369 sur 415). L'échantillon était composé de 59,3 % de femmes et l'âge moyen des répondants était de 77,1 ans (DS = 5,5). Le risque déclaré par les répondants relativement aux activités de la vie quotidienne (AVQ) était associé à une déficience dans au moins une AVQ élémentaire (p < 0,0005) à l'aide d'un instrument normalisé. La valeur prédictive positive de l'enquête sur la déficience relative aux AVQ était de 65,2 %.

*Conclusion :* taux de réponse élevé à l'enquête postale. Le risque déclaré par les répondants relativement aux AVQ est cohérent avec les résultats des outils d'évaluation normalisés.

# Screening Seniors for Risk of Functional Decline: Results of a Survey in Family Practice

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Elderly people are a growing proportion of our population and over the next 30 years, it is anticipated that the increase will be the greatest among the 75 and older age group. Frail seniors are at increased risk of deterioration in their health and in a recent Canadian study, the annual incidence of functional decline was 12% among seniors 75 and older.[1]

Dependence in activities of daily living (ADLs) has been documented to be a predictor of hospital admission, prolonged stays in hospital, higher mortality rates, home care use and admission to institutions.[2,3] Using data from the Established Populations for Epidemiologic Studies of the Elderly (EPESE) in the US, Guralnik and colleagues demonstrated that after three years of prospective follow-up, there was an incremental increase in adverse outcomes (death, nursing home admission and hip fractures) associated with increased functional dependence at the time of the initial assessment.[3]

Several factors have been shown to predict risk of functional decline or institutionalization, including age,[1,4,5] recent discharge from hospital,[5,6] living alone[6] and current functional limitations.[5,6] Previous studies have demonstrated the importance of targeting seniors "at risk" for functional decline who would most benefit from a multidimensional assessment and intervention.[7,8]

The aim of this project was to determine whether a mailed survey was a practical method of screening community-dwelling seniors about their risk of functional decline, assessing the prevalence of functional impairments and whether self-reported functional impairment on a mailed survey predicted subsequent findings of impairment on a comprehensive home assessment.

## METHOD

### Study population

The study population included all English-speaking individuals 70 years of age and older and on the roster of two family physicians in a Health Service Organization (HSO) in Stoney Creek, Ontario. The HSO had approximately 4,400 rostered patients and 11% of patients were at least 70 years of age. Seniors were excluded from the study if they were living in a nursing home, were known to have moved from the area or left the practice, were deceased, had been visited by the HSO nurse previously in their home or had received a copy of the questionnaire as part of the pretest.

A questionnaire and a personalized letter from the family physician were mailed to all eligible seniors and a unique identification number was used to ensure confidentiality and to allow follow-up of non-respondents. Two weeks later, non-respondents were telephoned by the office secretary, and a second survey was mailed approximately two weeks later.

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**Survey instrument**

The survey instrument included a total of 37 questions, of which all but 3 were taken directly from the Cardiff-Newport Questionnaire (CNQ) which was developed by Pathy et al.[7] in the UK. The survey measures chronic illnesses, level of functioning on ADLs and instrumental ADLs (IADLs), falls and medication use. Three questions on general health, hospitalization and bereavement were added to the CNQ as these factors have been shown to have an impact on the health of frail seniors.[6,9,10] The CNQ was developed and tested on general practice patients aged 65 and over in Cardiff, Wales and was shown to have a sensitivity of 89% and a specificity of 78% for change in functional ability compared with an assessment by a geriatric health visitor. The CNQ kappa coefficients, measuring test-retest reliability, ranged from 0.43 to 0.88 for individual questions.[7]

The office nurse pretested the study questionnaire on six patients considered both able and willing to give feedback on the content and structure of the instrument. Their feedback was incorporated in the development of the survey. A copy of the survey instrument is available upon request.

Ethics review and subsequent approval of the protocol was granted by the Research Committee of St. Joseph's Hospital, Hamilton.

**Assessment of risk status**

Returned surveys were scored and respondents were deemed to be "at risk" of functional decline or institutionalization if they met at least one of the following criteria. Appendix 1 details how each response on the survey was scored and how risk status was determined.

*Functional impairment*

There were 8 questions on ADLs , each was scored on a scale from 1-5 and a summary score was developed by adding the scores across all 8 items. There were 5 IADL questions scored in a similar fashion. Respondents were assessed to be "at risk" if they were "at marginal risk" on both ADLs and IADLs or if they were "at marginal risk" on one and reported that they could

**Appendix 1**
**Scoring Scheme Used to Determine Risk of Functional Decline, Mortality or Institutionalization Among Survey Respondents**

| Question | Response Options and Score Assigned |
|---|---|
| ***Section A. Activities of Daily Living (ADLs)*** | |
| Do you have difficulty getting up from a chair and/or do you have difficulty getting up from bed?* | 1 = not at all<br>2 = a little<br>3 = quite a bit |
| Have you been more unsteady when walking in the last 3 months? | 1 = not at all<br>2 = a little<br>3 = quite a bit |
| Are you able to walk.... | 1 = without help<br>2 = with some help (such as cane or walker)<br>3 = with quite a bit of help (such as help from another person)<br>4 = cannot walk at all |
| Do you have difficulty getting up and down stairs or steps? | 1 = no, not at all<br>2 = a little<br>3 = quite a bit<br>4 = cannot manage stairs or steps at all |
| Are you able to take care of your appearance, such as comb your hair, shave, put on make-up, etc. | 1 = without help<br>2 = with some help<br>3 = with quite a bit of help<br>4 = cannot take care of appearance at all |
| Are you able to dress yourself, for example choosing own clothes, buttoning and zipping them, etc. | 1 = without help<br>2 = with a little help<br>3 = with quite a bit of help<br>4 = cannot manage at all |
| Can you bath or shower... | 1 = without help<br>2 = with special devices to help you<br>3 = with someone to help you<br>4 = cannot have a bath or shower at all (must have bed bath) |
| Do you ever have an "accident" if you are unable to get to a toilet as soon as you need to, or when you are asleep, or if you cough or sneeze? | 1 = no, never<br>2 = only occasionally<br>3 = quite often<br>4 = frequently<br>5 = have catheter/colostomy |
| **Total score across all items in Section A:** | If score is: 8 = no risk<br>If score is: 9-11 = marginal risk<br>If score is: 12 or more = at risk |
| ***Section B. Instrumental Activities of Daily Living (IADLs)*** | |
| Are you able to get to places that are <u>not</u> within walking distance... | 1 = without help using bus, taxi, care, etc.<br>2 = with a little help<br>3 = with quite a bit of help<br>4 = cannot travel even with help (need ambulance) |
| Are you able to go shopping for groceries or clothes? | 1 = by yourself, without help<br>2 = with a little help<br>3 = with quite a bit of help<br>4 = cannot go shopping at all |
| Are you able to do most of the chores that need doing around the house, for example, cook, garden, house clean, etc.? | 1 = without help<br>2 = with some help<br>3 = with quite a bit of help<br>4 = cannot do chores at all |
| Are you able to handle your own money, for example, pay bills, write your own cheques, etc.? | 1 = without help<br>2 = with a little help<br>3 = with quite a lot of help<br>4 = cannot manage money at all |
| Are you able to use the telephone... | 1 = without help, including looking up numbers<br>2 = with a little help<br>3 = with quite a bit of help<br>4 = unable to use phone<br>5 = do not have access to phone |

*continued...*

*Appendix 1, continued*

| | | | |
|---|---|---|---|
| **Total score across all items in Section B:** | If score is: | 5 = | no risk |
| | If score is: | 6-10 = | marginal risk |
| | If score is: | 11 or more = | at risk |
| **Combination of Section A and Section B:** | If score is marginal in both Section A and B = at risk<br>If score is marginal in only one of Section A or B = no risk | | |
| **Combination of Section A or B and "Can you now do all the things that you could do last year?** | If score is marginal in either Section A or Section B and cannot do everything they could last year = at risk<br>If score is marginal in either Section A or B and subject can do everything they could last year = no risk | | |
| | ***Hospitalization*** | | |
| Were you hospitalized within the last 6 months? (i.e., Required to stay overnight) | 1 = | no = | no risk |
| | 2 = | yes = | at risk |
| | ***Bereavement*** | | |
| Did you lose someone who was close to you in the last six months? (e.g., Family member or friend) | 1 = | no = | no risk |
| | 2 = | yes = | at risk |

* This was asked as two separate questions on the survey instrument and the higher score, indicating the higher level of impairment, between these two questions was used.

**TABLE I**
**Self-reported Sociodemographic and Health Indicators in the 369 Survey Respondents**

| | n | (%) |
|---|---|---|
| Age in years (mean, SD) | 77.1, 5.5 | |
| Living Alone | 112/347 | (32.3) |
| Female | 219/369 | (59.3) |
| Health Status Over the Past Month | | |
| Very good/good | 240/360 | (66.7) |
| Fair | 91/360 | (25.3) |
| Poor/very poor | 29/360 | (8.1) |
| Most Common Health Conditions Reported | | |
| Arthritis | 139/368 | (37.8) |
| High blood pressure | 125/368 | (34.0) |
| Heart condition | 98/368 | (26.6) |
| Had a Fall in the Last Month | 27/363 | (7.4) |
| Number of Medications (mean, SD) | 2.5, 2.0 | |

not do all the activities that they could in the previous year. Any question left blank was assigned a score of one.

*Recent hospitalization*

If the respondent reported being hospitalized within the previous six months.

*Recent bereavement*

If the respondent reported having lost someone close to them within the previous six months.

**Validation of "at risk" status**

A randomly selected (random number table) group of seniors (n=73), representing approximately half of those who completed the survey and were "at risk", were assessed in their home by the HSO nurse. This group served as the "intervention" arm in a randomized, controlled trial that followed the survey and will be reported elsewhere (manuscript under review). The nurse was blinded to the questionnaire responses, reviewed each person's chart and conducted a comprehensive assessment of their physical, mental and emotional health, their medication use and safety of the home environment. The nurse measured functional impairment on ADLs and IADLs (the Lawton instrument) and basic ADLs (the Katz instrument) using well-validated, standard measures of functional status and independence.[11,12] We compared the self-reported questionnaire responses with these instruments to determine the positive predictive value (PPV) of the questionnaire for identifying seniors with functional impairment.

**Statistical analysis**

Data were analyzed using SPSS for Windows version 6.0. The continuity corrected $\chi^2$ test was used to examine the relationship between categorical variables, and an independent samples t-test was used for continuous variables. Pearson's correlation coefficient was used to assess the relationship between the "at risk" score based on ADLs/IADLs and the score on the Lawton instrument. Other factors thought to be indicative of risk, such as age, living alone, number of medications, general health status and falls, were compared between those considered to be "at risk" and those who were not. A type I error rate (alpha) of 0.05 (two-tailed) was used to test for statistical significance.

## RESULTS

**Sample description**

From the list of seniors who were at least 70 years of age (n=494), 79 were considered ineligible since they were either living in a nursing home (n=58), they had moved or left the practice (n=13), they had received the pretest of the survey (n=6) or they were deceased (n=2). The remaining 415 seniors were mailed a questionnaire and a total of 369 were returned for a response rate of 89% (369/415).

Survey respondents had a mean age of 77.1 years (SD=5.5), 59% were female, 32% lived alone and 7% reported having had a fall in the previous month. Twenty-nine (9%) respondents reported their health as poor or very poor (Table I).

**"At risk" responses on the survey**

Among survey respondents, 217 (59%) seniors were considered to be "at risk", on the basis of at least one of the criteria. Of these, 166 (77%) were "at risk" based on impairment in ADLs or IADLs and these responses are described in detail in Table II.

Seventy-one (19%) seniors reported having lost someone close to them and 28 (8%) reported being hospitalized in the previous six-month period.

**Comparison of self-reported functional impairment with an in-home assessment**

There was a statistically significant association between scoring positively based on

self-reported ADLs (i.e., score of 12 or more) and having an impairment on the Katz instrument (p<0.0005). Of the 46 seniors reporting an ADL impairment, 30 were assessed as having an impairment on the Katz, resulting in a positive predictive value of 65.2% (30/46) and a negative predictive value of 77.8% (21/27). Six individuals had an ADL impairment on the Katz, who were "not at risk" based on self-report. Two-thirds of these seniors (n=4) had occasional continence problems (one individual's self-report indicated never having continence difficulties), one person required assistance with dressing and one with moving in or out of a bed or chair. In the last two cases, both individuals reported being functionally independent on the mailed survey. In addition, the total score, across the ADL and IADL items on the questionnaire, correlated with the total score from the Lawton instrument (correlation coefficient=0.81; p<0.001).

**Factors associated with increased risk**

The group of seniors identified as being "at risk" were significantly older (78.0 vs. 75.8; p<0.001), taking significantly more medications (2.9 vs. 1.9; p<0.001) and significantly more likely to report their health as poor or very poor (12.9% vs. 1.3%; p<0.001) compared with those who were not considered to be "at risk". (Table III)

**TABLE II**
**Self-reported Level of Difficulty or Need for Assistance Among Seniors Indicating Some Dependence on ADLs and IADLs Among the Survey Respondents (n=369)**

| | Has Difficulty or Requires Assistance n (%) | Cannot Complete the Task n (%) | Not Answered n (%) |
|---|---|---|---|
| ***Activities of Daily Living*** | | | |
| Do you have difficulty getting up from a chair? | 155 (42.5) | n/a | 4 (1.1) |
| Have you been more unsteady when walking in the last 3 months? | 153 (42.1) | n/a | 6 (1.6) |
| Are you able to walk... | 73 (20.6) | 1 (0.3) | 14 (3.8) |
| Do you have difficulty getting up and down stairs or steps? | 165 (45.3) | 18 (4.9) | 5 (1.4) |
| Are you able to take care of your appearance, such as comb your hair, shave, put on make-up, etc. | 18 (4.9) | 4 (1.1) | 5 (1.4) |
| Are you able to dress yourself, for example, choosing own clothes, buttoning and zipping them, etc. | 25 (6.9) | 4 (1.1) | 5 (1.4) |
| Can you bath or shower... | 54 (14.8) | 4 (1.1) | 4 (1.1) |
| Do you ever have an "accident" if you are unable to get to a toilet as soon as you need to, or when you are asleep, or if you cough or sneeze? | 129 (38.2) | n/a | 5 (1.4) |
| ***Instrumental Activities of Daily Living*** | | | |
| Are you able to get to places that are not within walking distance? | 77 (22.4) | 2 (0.6) | 25 (6.8) |
| Are you able to go shopping for groceries or clothes? | 84 (23.3) | 19 (5.3) | 9 (2.4) |
| Are you able to do most of the chores that need doing around the house, for example, cook, garden, house clean, etc. | 112 (31.6) | 30 (8.5) | 15 (4.1) |
| Are you able to handle your own money, for example, pay bills, write your own cheques, etc. | 46 (12.7) | 10 (2.8) | 6 (1.6) |
| Are you able to use the telephone... | 38 (10.6) | 9 (2.5) | 9 (2.5) |

n/a The response option of "unable to complete the task" was not included on the survey for these questions
All rows total 100% when those able to complete the task without difficulty (not shown) are added.

**TABLE III**
**Relationship of Risk Status with Factors which are Predictive of Functional Decline or Mortality Among the 369 Survey Respondents**

| Risk Factors* | Result of Mailed Survey At Risk (n=217) n (%) | Not at Risk (n=152) n (%) | p-value |
|---|---|---|---|
| Age in Years (mean, SD) | 78.0, 5.7 | 75.8, 4.8 | <0.001 |
| Number of Medications (mean, SD) | 2.9, 2.1 | 1.9, 1.7 | <0.001 |
| Health Status | | | <0.001 |
| Very good or good | 109/209 (52.2) | 131/151 (86.8) | |
| Fair | 73/209 (34.9) | 18/151 (11.9) | |
| Poor or very poor | 27/209 (12.9) | 2/151 (1.3) | |
| Significant Problems with Hearing | 78/212 (36.8) | 36/150 (24.0) | 0.014 |
| Significant Problems with Eyesight | 110/210 (52.4) | 49/146 (33.6) | <0.001 |
| Living Alone | 73/216 (33.8) | 39/149 (26.2) | 0.12 |
| Falls in the Past Month | 20/215 (9.3) | 7/148 (4.7) | 0.15 |

* None of these factors were included in the determination of risk status for study participants

## DISCUSSION

Given the high response rate to this survey (89%), it appears that a mailed survey can be a feasible way to determine the level of functioning of seniors, whether or not they see their family physician regularly. This level of response was achieved by using a personalized letter from the subject's physician as well as a follow-up mailing and a phone call from the office staff and is comparable to that reported elsewhere.[4,5,7,13] A potential concern with a mailed survey is data quality since there is a greater opportunity for item omissions than in a face-to-face or telephone interview.[14] In our survey, the highest omission rate for ADL and IADL items was 7% which is considered acceptable.[15]

The proportion of seniors 70 and older in Hamilton-Wentworth has been estimated at 9%,[16] which is comparable to the proportion on the HSO roster (11%) in this study. Fewer seniors in the current study rated their health as good/very good (67%) compared with seniors 65 and older in Hamilton-Wentworth rating their health as very good/excellent (89%).[17] The fact that more study participants were 70 or older, compared with Hamilton-Wentworth as a whole, might partially explain the lower levels of perceived health among survey respondents. The level of reported dependence in shopping for groceries, walking and using stairs in our

study population is comparable to that reported in three large cross-sectional surveys of community-dwelling elderly in Canada[18,19] and the US,[20] although direct comparisons are limited by the differences in the way the results were reported (i.e., overall results versus age groups).

Early detection and prevention of health problems among seniors have been shown to decrease mortality[7] and length of hospital stay.[7,21] Among seniors reporting their health as poor or very poor, screening and intervention has been shown to improve overall self-rated health.[10] However, any screening endeavour has the potential to incorrectly identify seniors according to their actual risk status. We chose to target three specific risk factors: functional impairment, recent hospitalization and recent bereavement. However, there are other identified risk factors for health deterioration including multiple medication use,[22] chronic health conditions,[3] self-rated health,[3,18,23] cognitive,[24,25] and affective symptoms.[3,25] Therefore, we cannot be certain that our screening criteria have identified all potential seniors who might be at risk.

We were unable to determine the true sensitivity and specificity of the questionnaire, given that only a sample of "at risk" seniors were assessed. Positive predictive value (PPV) is the probability of disease (in this case, functional decline) in an individual with a positive test result (in this case, ADL impairment on the Katz).[26] The PPV of the survey was 65.2% which is lower than that reported by Barber et al.[13] who developed a nine-item postal survey to screen seniors and reported a sensitivity of 95% and a PPV of 91%. Since the PPV is influenced by the prevalence of disease in a population, we would expect to see fluctuations across settings.

Despite the study limitations, it is encouraging that the survey instrument had a high response rate, was associated with standard measures of function and also appeared to correctly classify seniors into risk groups based on factors which are thought to be predictive of functional decline and deterioration in health status. Further large-scale studies are needed in Canada to better define the parameters to be used in assessing risk and the most efficient and cost-effective models of screening our diverse population of seniors.

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