

The Development, Validation and Pilot Implementation of an Evaluation Tool for Printed Material Targeting Accidental Falls in the Elderly

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Abstract

As populations age both in Canada and abroad, the issue of geriatric falls is becoming of greater and greater concern. Falls in the elderly has become a major economic burden on the health care system and society at large, as well as a major contributor to decreasing quality of life, suffering, morbidity and mortality.

Despite the magnitude of the problem and the emphasis of current medical practice on patient education, the literature has not been able to show that educational interventions are successful in decreasing the incidence of geriatric falls. Before abandoning educational involvement, it is necessary to first evaluate the quality of the interventions themselves. This is especially important as the literature has long recognized crucial design considerations that must be taken into account when targeting senior populations.

This study represents an attempt to compile a comprehensive list of criteria by which to evaluate printed materials aimed at educating seniors on their risk of falling. It also makes the first attempt to validate such a list by using various measures of face validity such as contacting key informants in the field. The resulting list, along with assigned weights for each criterion, is presented.

Finally, this paper discusses the possible uses of the presented evaluation tool as well as future measures of validity that should be undertaken.

Keywords: Aged, 65 and Over; Accidental Falls; Health Education; Communication

Background – Pivotal Agency

The agency guiding this project was SMARTRISK, a national non-profit organization dedicated to preventing injuries and saving lives. Founded in 1992, SMARTRISK has become one of the leading injury prevention groups in Canada and enjoys international recognition and support. It is based on the philosophy that risk is inherent to everyday life, and that successful injury prevention lies not in traditional approaches involving negative and restrictive messages avoiding all risk, but rather through acknowledging risk and offering tools to navigate that risk. Through this method, people are empowered by being given the appropriate knowledge that allows them to choose to prevent an injury. This can be best summarized by SMARTRISK's mission statement:

SMARTRISK helps people see the risks in their everyday lives and shows them how to take those risks in the smartest way possible so that they can enjoy life to the fullest.

Thus, SMARTRISK would say that it is acceptable to take the risk of learning how to trick skateboard, but that the risk should be taken in an intelligent way by using protective gear. While not everyone in the field of injury prevention has agreed on this approach (Pless 2002), SMARTRISK is widely credited with bringing injury prevention into the national spotlight.

SMARTRISK is most associated with the prevention of paediatric injury, through its HEROES programs, which visit schools across the province, and through its “The Stupid Line” media campaign. However, SMARTRISK's mandate in truth includes adult populations as well. For example, its “Buckle Up” campaigns target drivers of all ages.

Recently, SMARTRISK has been trying to make inroads into the elderly population, especially within the area of geriatric falls.

Further information on SMARTRISK can be found at www.smartrisk.ca.

I chose to work with SMARTRISK primarily because of a strong interest in preventive measures. Having researched both immunization and screening programs, I approached the DOCH 2 course hoping to gain experience in an aspect of preventive medicine with which I was not previously familiar. SMARTRISK's emphasis on injury prevention fit this criterion. Secondly, I hoped to become familiar with SMARTRISK's approach to social marketing and communication. SMARTRISK has been lauded for innovative methods of conveying messages to the general public. Through seminars and workshops presented by various SMARTRISK personnel (some of which unfortunately had to be cancelled due to the emergence of SARS) as well as through one on one communication, I was able to accomplish these goals.

Issue and Problem Definition

The problem of falls in elderly populations has become a major focus in developed nations in general, and Canada in particular. The magnitude of the problem is becoming increasingly clear; among elderly Canadians who sustained any activity-limiting injury in 1996/97, an estimated 65,000 reported the most serious such injury had been a fall-related fracture (Wilkins 1999a). Recent studies have shown that 84% of British Columbia hospital days for unintentional injuries in those 65 and over involve falls (Scott and Gallagher 1999) and that those Canadian seniors who experience a fall

are three times as likely as those who do not to experience a decline in the ability to perform activities of daily living and to enter a care facility (Wilkins 1999b). The costs of these falls, both in terms of suffering and pain to the individual and in terms of resources to the health care system, are obvious. It is no wonder then that in a recent population based study of injury in all age groups, falls in the elderly were identified as a major priority for intervention, prevention and control (Pickett et al. 1997).

One of the main determinants of health impacting on this issue is that of education – namely the proper education and awareness on the part of elderly individuals to their own risks of falls and the consequences thereof. Several authors, after examining risk factors for falls within their communities, have concluded their studies by asserting that the proper education of at-risk populations is now possible (Resnick 1999; Baumann 1999). This conclusion rests on the assumption that the education of these individuals will in fact decrease the incidence of falls – an assumption that admittedly makes common sense. However, despite some evidence to the contrary (Tibbitts 1996), several studies and two recent Cochrane reviews have concluded that there is inadequate evidence for the effectiveness of health education interventions and packages in the prevention of falls (Stevens et al. 2001; Gillespie et al. 2001; Gillespie et al. 2000). How can this be reconciled with the widely held belief that patient education is in fact a strong determinant of their future health?

Whenever an intervention is shown to fail, there are two broad potential explanations as to why. The first is that the reasoning underlying the intervention is somehow flawed. The second however is that the implementation of the intervention was

somehow lacking. It is crucial to therefore realize that one cannot assume that the philosophy of an intervention is wrong until the quality of the intervention is ascertained.

Therefore, returning to why educational packages have not worked in preventing geriatric falls, the answer may lie in the quality and appropriateness of the educational interventions themselves. Several studies have shown that the reading level required by hospital-issued patient information pamphlets and fact sheets to be beyond the ability of a large percentage of patients (Kubba 2000; Heath-Holmes 1997; Cooley et al. 1995). Other studies have called attention to the importance of organization and clarity (Reid et al. 1995). Some studies have recognized that special consideration must be taken into account when designing print material geared towards the elderly (eg. illustrations, the size and the style of type); such consideration is often lacking in currently available material (Pettersen 1994; Ekstrom 1993).

Unfortunately, to date no studies evaluating print material educating the elderly on the risk of falls have been conducted. This is despite the fact that those seniors experiencing these falls may well be different from the general elderly population. Studies have shown that factors predisposing towards falls include the presence of significant other medical issues, impairments, diseases and an altered mental state (Fletcher and Hirdes 2002; Teasell et al. 2002; Krueger et al. 2001; Wilkins 1999a). Thus, those issues inherent to designing print materials in the elderly may well be magnified when dealing with a population at risk of falls.

Therefore, the project will design and validate a tool by which to evaluate print materials whose purpose is to educate seniors about and prevent falls.

Methodology

The process used by this study comprised three distinct phases:

1. Compilation of an initial list of criteria by which to evaluate printed materials educating geriatric populations on their risk of falls
2. Internal face validation
3. External face validation

The specific methodology for each phase is explored below.

Phase 1: Compilation of initial criteria list

It was *a priori* decided that the evaluation tool would consist of a list of criteria by which to evaluate various print materials used to educate senior populations about fall risk. These criteria would encompass general categories including but not limited to content, credibility, design and usability.

The initial list of criteria was determined through a search of the appropriate literature surrounding effective educational messaging targeted to both general and elderly populations. Senior authors of any such articles were contacted and asked about any other appropriate papers.

Phase 2: Internal face validity

After the initial criteria list was compiled, experienced SMARTRISK personnel were asked to provide the first, internal measure of validity. Using their prior experience in both geriatric falls and in the validation of evaluation tools, these personnel were asked

to review the list of criteria and make suggestions for improvement. Several members of SMARTRISK were used for guidance during this process. These individuals included but were not limited to Dr. Philip Groff, Manager of Research Development and Evaluation, Joanne Meyrick, Program Development Associate and one of the managers of SMARTRISK's Senior's Falls Strategy, Michelle Coghlan, Community Development Associate, and Vanessa Secan, Program Development Associate.

Phase 3: External face validity

Following internal face validity, the opinions of experts external to SMARTRISK were solicited. This validation took the form of a survey sent to key informants in area of falls in the elderly. For each criterion, a brief explanation was first given. The respondent was asked to rate the importance of the criteria using one of three choices. Option one – 'Do not include' – indicated that the criteria was not at all important in evaluating printed materials targeting the elderly. Option two was to weight the criteria between 1 – 5 points with 1 being slightly important and 5 being very important. The final option – 'Pass/Fail' – indicated a criterion so important that failure to meet this criterion indicated a serious flaw in the material, regardless of its performance on other criteria. An example of the survey format for one criterion can be seen in Figure 1. Space for additional comments was provided at the end of each criterion; space was also provided at the end of the survey for respondents to add new criteria. The full survey can be seen in Appendix I.

It was *a priori* decided that key informants would comprise personnel covering three broad categories in order to best represent differing perspectives:

1. Health care workers (both hospital and community based)
2. Academic and policy workers (including appropriate public health officials and program managers involved in the area of geriatric falls)
3. Members of senior advocacy groups

These key informants were mainly gathered from a list of interested parties who were already familiar to SMARTRISK.

1. Ink and paper colours

Is there always dark ink on a light background, without any reversals in colour or designed backgrounds that lower contrast?

Do Not Include

Include, Worth Points (1-5)

Include, Pass/Fail

Figure 1. Example of survey format used in phase 3 external face validation

It must be noted here that due to logistical difficulty, end users (ie. elderly patients suffering falls) were not used to aid in the tool validation. Time limitations and the scope of this study simply did not permit the identification and recruitment of this population. However, all key informants were asked to keep the viewpoints of end users in mind when validating the list of criteria; senior citizen advocacy representatives were felt to be able to significantly contribute in this regard and function as a sort of proxy. It should also be noted that future studies will likely further refine this tool using patient perspectives.

Surveys were sent to key informants with return envelopes and postage provided. A fax machine number was also provided as a second way to return the survey. Finally, a web-based version of the survey was also made available in order to provide another option to respondents and boost return rates.

The results of the collected surveys were analysed using the following methodology, based on consultations with SMARTRISK personnel: if a criterion received both P/Fs (Pass/Fail) and DNIs (Do not include), one P/F would cancel out a corresponding DNI. If half or more of the remaining responses were P/F, the criterion was designated as such. If half or more of the remaining responses were DNI, this value was assigned. If neither of these were the case, all remaining P/Fs and DNIs were converted to numerical 5 and 0 respectively. These were then compiled with the other numerical responses, the average value taken and assigned as the weight of the criterion. This somewhat complicated framework is represented schematically in Figure 2.

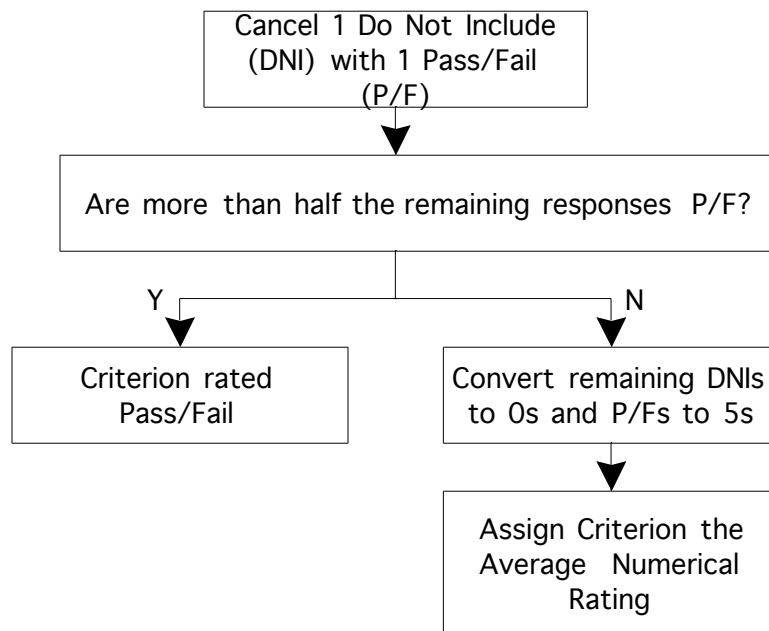


Figure 2. Schema of framework used to analyse each criterion included in the external validation survey

Results and Analysis

Phase 1: Compilation of initial criteria list

A comprehensive search of the literature using MEDLINE yielded nine articles (Ekstrom 1993; Estey et al. 1993; Petterson 1994; Petterson et al. 1994; Reid et al. 1995; Hearth-Holmes M et al. 1997; Husted et al. 1999; Bjorn et al. 1999; Kubba 2000). From these articles, 27 criteria in evaluating print materials designed for the elderly were determined. These criteria fit under four main categories (Design, Content Organisation, Readability and Content Quality) and can be seen in Appendix I – the survey sent out to key informants.

A review of the references of the above nine articles produced no new information. Senior authors of the articles were also contacted for any suggestions; those that responded could think of no new directions in which to search.

It is important to note that while several criteria were specific to elderly populations (eg. no matte/shiny paper), many were in fact applicable to more general populations. For example, clear organisation of content with easily identified key messages is a prerequisite of communication with any target audience.

Phase 2: Internal face validity

Upon presentation of the 27 criteria assembled, SMARTRISK personnel made several suggestions in terms of wording and clarity. However, no new criteria were added and no existing criteria deleted.

Phase 3: External face validity

Approximately 200 surveys were mailed to various key informants. 20 were mailed or faxed back (response rate of approximately 10%); interestingly, no informants chose to use the web-based version of the survey.

While such a low response rate may initially seem to be a strong limitation of the study, it is important to realize that the external face validity did not depend on acquiring a statistically representative sample of key informants. Rather several different perspectives were *a priori* identified (health care workers, academic and policy actors, patient advocates) and coverage of these viewpoints solicited. As can be seen in Table 1, the 20 respondents did cover these perspectives. Additionally, while not a previously identified goal, the 20 respondents covered regional perspectives as well, and were based in the following municipalities:

Toronto	Kingston	South Bruce	Peterborough
Vancouver	Durham	Belleville	Oxford
Ottawa	Perth	Sarnia	
London	Guelph	Niagra	

Table 1. Key perspectives represented by the respondents to the external face validation survey

Key Perspective	Number of Respondents
Academic/Policy Actors	5
Hospital based Health Care Workers	2
Community based Health Care Workers	7
Patient Advocates	2
Other	4

The assigned weights to each criterion, calculated using the aggregated external validation survey results according to the schema illustrated in Figure 2, can be seen in Appendix II. These results are best interpreted with Appendix I on side, which contains more detailed explanations of each criterion.

Out of the 27 criteria, 10 were assigned P/F status. Most of the other criteria were assigned values of 4 or 5, with no criteria receiving a weight of less than 3. No criteria were excluded by the aggregated responses of the key respondents. This can be taken as a reflection of the comprehensiveness of the initial criteria list. While one respondent did suggest adding a new criterion, the investigators felt that the essence behind this suggestion was adequately covered by another criterion already in the list.

It should perhaps come as no surprise that the category with the most criteria assigned P/F status was ‘Content Quality’. Design and organisational aspects to a printed material, no matter how well achieved, are pointless should the quality of the core message be inadequate.

It is interesting to note anecdotally that several criteria received both P/Fs and DNIs, depending on who the key informant was. Again anecdotally, patient advocates tended to rate design criteria higher than other key informants. This highlights the importance of covering different perspectives when soliciting expert opinions; one otherwise runs the risk of missing key pieces of information.

Limitations of Analysis

One key limitation of this study is, as mentioned above, the lack of patient/end-user perspectives. While patient advocates make an acceptable temporary proxy for patients themselves, they may not mirror each other exactly.

Another limitation is the low return rate. While, as explained previously, this study was not looking for a representative sample of key informants, a higher return rate would have allowed a better judgment of saturation, allowing the investigators to confidently conclude that all key perspectives had been adequately covered.

Conclusions and Recommendations

The above limitations notwithstanding, this study does represent not only a comprehensive list of criteria by which to evaluate materials targeting elderly populations, but the first such list to be validated by expert opinion covering both regional and occupational perspectives. It should be helpful not only to SMARTRISK but to anyone wishing to evaluate printed materials educating seniors as to their risk of falling. It can also be used as a sort of checklist for persons designing such material. Finally, while the evaluation tool in this study was created with the issue of geriatric falls specifically in mind, it should not be difficult to use this tool as a basis for other ones targeting different health issues in elderly populations.

However, in order to best explore the utility of this evaluation tool, further validation is warranted. SMARTRISK has already collected several printed materials targeting geriatric falls commonly used in the Greater Toronto Area and in Canada as a

whole. These materials could be used in the further validation of this evaluation tool in several ways:

1. Several different personnel could be asked to evaluate the same set of materials using the tool created in this study. Kappa measures and measures of inter-rater reliability could then be calculated. The higher the inter-rater reliability, the more confident one could be in the validity of the tool.
2. Using the tool to evaluate material already used by health care workers would give some idea as to what the scores assigned by the evaluation tool correspond to. It is worth noting that at the moment, the evaluation tool is capable of giving a printed material a numerical score, but that the interpretation of this score is still somewhat vague. For example, is a score of 55 good or bad? By evaluating materials which are widely agreed by health care workers to be good or bad, the scores of the evaluation tool could be placed in context.
3. The validation carried out by this study was a type of face validity. Measures of criterion validity (in which two separate measures of the same variable are employed and the results compared) are also needed. This could be where patient perspectives, lacking in this study, could be brought in. Patients could be given a set of educational materials on geriatric falls and asked to rank them in order of effectiveness. The same set of materials could be then evaluating using this study's evaluation tool and ranked according to the score assigned. Comparing the two rankings would not only provide further

validation, but also bring in end-user and patient key perspectives as a type of gold standard.

A sense of inevitability surrounds the issue of geriatric falls, both among health care workers and patients themselves. Falling is too often seen as a natural and inherent part of growing older. Somewhat ironically, the Medical SubHeading used by MEDLINE for this field is “Accidental Falls”. The term ‘accident’ itself connotes a fated, unavoidable event, implying that neither patients nor health care workers have any control over this aspect of life. The lack of any effective evidence-based methods of educating patients on minimizing their risk of falling only contributes to this overall apathy. Before throwing out the idea of educating aged patients as a viable preventive technique, it is important to first increase to quality of such interventions. This study, coupled with its future recommendations, represents the first step towards such a goal.

References

- Baumann SL. Defying gravity and fear: the prevention of falls in community-dwelling older adults. *Clinical Excellence for Nurse Practitioners*. 1999;3(5):254-61.
- Bjorn E, Rossel P, Holm S. Can the written information to research subjects be improved? – an empirical study. *J Medical Ethics*. 1999;25:263-7.
- Cooley ME, Moriarty H, Berger MS, Selm-Orr D, Coyle B, Short T. Patient literacy and the readability of written cancer educational materials. *Oncology Nursing Forum*. 1995;22(9):1345-51.
- Ekstrom I. Printed materials for an aging population: design considerations. *Journal of Biocommunication*. 1993;20(3):25-30.
- Estey A, Kemp M, Allison S, Lamb C. Evaluation of a patient information booklet. *J Nursing Staff Development*. 1993;9(6):278-82.

Fletcher PC, Hirdes JP. Risk factors for falling among community-based seniors using home care services. *Journals of Gerontology Series A-Biological Sciences & Medical Sciences*. 2002;57(8):M504-10.

Gillespie LD, Gillespie WJ, Robertson MC, Lamb SE, Cumming RG, Rowe BH. Interventions for preventing falls in elderly people. *Cochrane Database of Systematic Reviews*. 2001;(3):CD000340.

Gillespie LD, Gillespie WJ, Cumming R, Lamb SE, Rowe BH. Interventions for preventing falls in elderly people. *Cochrane Database of Systematic Reviews*. 2000;(2):CD000340.

Hearth-Holmes M, Murphy PW, Davis TC, Nandy I, Elder CG, Broadwell LH, Wolf RE. Literacy in patients with a chronic disease: systemic lupus erythematosus and the reading level of patient education materials. *Journal of Rheumatology*. 1997;24(12):2335-9.

Hustead GL, Miller C, Brown B. Test of an educational brochure on advance directives designed for well-elderly people. *J Gerontological Nursing*. 1999;January:34-40.

Krueger PD, Brazil K, Lohfeld LH. Risk factors for falls and injuries in a long-term care facility in Ontario. *Canadian Journal of Public Health*. 2001;92(2):117-20.

Kubba H. Reading skills of otolaryngology outpatients: implications for information provision. *Journal of Laryngology & Otology*. 2000;114(9):694-6.

Petterson T. How readable are the hospital information leaflets available to elderly patients?. *Age & Ageing*. 1994;23(1):14-6.

Petterson T, Dornan TL, Albert T, Lee P. Are information leaflets given to elderly people with diabetes easy to read? *Diabetic Medicine*. 1994;11:111-3.

Pickett W, Hartling L, Brison RJ. A population-based study of hospitalized injuries in Kingston, Ontario, identified via the Canadian Hospitals Injury Reporting and Prevention Program. *Chronic Diseases in Canada*. 1997;18(2):61-9.

Pless B. Taking risks with injury prevention. *CMAJ*. 2002;167(7):767.

Reid JC, Klachko DM, Kardash CA, Robinson RD, Scholes R, Howard D. Why people don't learn from diabetes literature: influence of text and reader characteristics. *Patient Education & Counseling*. 1995;25(1):31-8.

Resnick B. Falls in a community of older adults: putting research into practice. *Clinical Nursing Research*. 1999;8(3):251-66.

Scott VJ, Gallagher EM. Mortality and morbidity related to injuries from falls in British Columbia. *Can J Public Health*. 1999;90(5):343-7.

Stevens M, Holman CD, Bennett N, de Klerk N. Preventing falls in older people: outcome evaluation of a randomized controlled trial. *Journal of the American Geriatrics Society*. 2001;49(11):1448-55.

Teasell R, McRae M, Foley N, Bhardwaj A. The incidence and consequences of falls in stroke patients during inpatient rehabilitation: factors associated with high risk. *Archives of Physical Medicine & Rehabilitation*. 2002;83(3):329-33.

Tibbitts GM. Patients who fall: how to predict and prevent injuries. *Geriatrics*. 51(9):24-8, 31.

Wilkins K. Medications and fall-related fractures in the elderly. *Health Reports*. 1999a;11(1):45-53(Eng), 49-58(Fre).

Wilkins K. Health care consequences of falls for seniors. *Health Reports*. 1999b;10(4):47-55(Eng); 47-57(Fre).