ABSTRACT

Through a process of participatory action research involving a telephone hotline, the STEPS project compiled data over a nine-month period on the location and nature of 791 pedestrian slips, trips, falls and potential hazards in the Capital Regional District of British Columbia. Of the 533 people who reported a slip, trip or fall, the majority (80%) were female, and the average age was 65.27 years. Thirty-five percent (n=186) had some type of physical disability and many (n=106) reported using a mobility aide at the time of their accident. Most callers (75%) said they had suffered an injury, and of these 55% required medical attention. The most frequently reported fall locations were sidewalks and crosswalks. Major recommendations from the study include the need for municipal priority-setting for repairs with input from key user groups, including the elderly and people with disabilities.

The STEPS Project: Participatory Action Research to Reduce Falls in Public Places Among Seniors and Persons with Disabilities

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An intricate web of causality is revealed when one begins to untangle the problem of falls among older people and people with disabilities, and there still are many limits to our understanding. In particular, little attention has been paid to the contribution of unsafe public environments.

The STEPS Project was a participatory action research study aimed at identifying and rectifying factors contributing to slips, trips and falls in public places among older people and people with disabilities. STEPS refers to Seniors and Persons with Disabilities Task Force for Environments which Promote Safety. The setting was the Capital Regional District (CRD) of British Columbia, an area comprising the city of Victoria and 13 surrounding municipalities. The study was unique in its involvement of seniors, people with disabilities, health practitioners and researchers as research partners.

LITERATURE REVIEW

For the elderly, a fall is a serious unexpected incident that can cause injury, disability, death, fear and loss of confidence, decreased mobility, increased isolation and dependency. The exact incidence of falls among the elderly is difficult to determine because of under-reporting of the event. It is estimated that one of every three non-institutionalized seniors will experience at least one fall yearly, and 50% of this total will sustain a significant injury. In 1984 in Canada, falls accounted for 57% of accidental fatalities and the majority of severe accidental injuries for people 65 years or older. A total of 43,403 received hospital treatment as a result of a fall-related injury, costing $480 million, a figure that includes only the basic cost of hospital beds.

Most falls are the result of a complex interaction of intrinsic and extrinsic factors. Intrinsic factors include sway and gait changes, as well as changes attributed to pathological diseases like osteoarthritis or to blindness. Advanced age, female sex, history of a previous fall, and polypharmacy are four factors that consistently predict high risk fallers regardless of the setting. In addition, depression, living alone, being widowed or divorced, transient emotional stress, decreased contact with children and the use of assistive devices have all been linked to falls.

Environmental hazards are also implicated as precursors to falls. Previous studies, focusing primarily on in-home falls, have identified hazards such as stairs, poor illumination, slippery floors, scatter mats, telephone cords, uneven sidewalks, furniture at improper heights and poor fitting shoes.

A 1978 U.S. study of hazards experienced by elderly and handicapped pedestrians noted the limited conception of the “average” pedestrian that designers of urban environments generally use, an oversight that results in unintentional discrimination against persons who are not of average mobility. Through unstructured interviews, panel discussions and field observations, 18 problem areas were identified and prioritized. A 1991 Swedish study of 298 injury events concluded that in a one-year period, one out of three people 65 years of age and older fell at least once.
period, two thirds of all falls were due to ice and snow.\textsuperscript{19} Gallagher and Brunt found that among community-dwelling elderly fallers, 78% of falls occurred while people were walking, and 68% occurred outside the home.\textsuperscript{10} In order to build support for policy development and community planning, more research is needed on the extent of the problem and the ways that public policy decisions and practices may be influencing the problem.

**PURPOSE AND METHODS**

The overall purpose of the STEPS project was to create a safer environment for those at risk of falling by increasing awareness about causes of falls in public places, increasing the likelihood of identified hazards being eliminated and promoting the development of risk management plans to reduce hazards.

This project used participatory action research — “a systematic inquiry, with the collaboration of those affected by the issue being studied, for purposes of education and taking action or effecting social change”.\textsuperscript{20} Key stakeholders were consulted to establish project goals, develop methods and prepare for dissemination of the findings. Data were collected over nine months by means of a telephone hotline survey using a questionnaire to determine the conditions under which people fell in public places. The survey targeted seniors and people with disabilities through pamphlets, posters, public talks, radio and television features, and newspaper stories. Seniors and other volunteers manned the telephone.

The survey took approximately eight minutes to complete and asked both closed- and open-ended questions about the person’s experience. It generated 791 reports of slips (in which a slippery surface was involved) (n=115), trips (i.e., stumbling but not landing on the ground) (n=207), falls (i.e., landing on the floor or ground) (n=387) and potential hazards (n=208); more than one category could be reported in any single report. Details of each report were transmitted to the relevant municipal offices or building managers for action. Only one building owner overtly refused to inspect the hazard. The project funding ended before repairs could be completed, thus it was not possible to determine actual repair rates. Unofficial feedback from municipal engineers and building owners indicated that at least 30% of the hazards had been immediately repaired or marked as a hazard.

All the data in this study concern only the actual incidents, excluding potential hazards. The n values given exclude cases in which data were missing. It is impossible to calculate accurate or even approximate response rates, as no true incidence rates have been established for falls and near falls occurring in public places. Furthermore, much of the research on falls is limited to seniors, whereas this study also targeted people with disabilities.

### RESULTS

**Characteristics of the sample**

As shown in Figure 1, most (80%) of the sample of 533 were female; the average age was 65.3 years (SD=17.59). There were proportionately more women callers in every age group than are represented in the general population.

Thirty-five percent (n=186) of callers had some type of physical disability. Of these, 157 (84%) said they used a mobility aide; 106 were using an aide when they slipped or fell. Figure 2 shows the types of aides used. In addition, 279 callers (52%) said they wore glasses. Of these, 207 (74%) said they were wearing them at the time of the accident. About three-quarters (n=156) of the 207 said they used bifocal or multifocal glasses.
The nature of the slips, trips and falls

Most of the callers (n = 368) reported a fall, 207 had a trip and 115 people reported a slip. Many of the fallers reported injuries. Of 538 valid cases, 405 callers (75%) said they had sustained an injury from their incident, and 220 of these (55%) required medical attention.

The nature of the injuries is shown in Figure 3.

Location of the falls

Of 574 valid reports, 486 (85%) concerned outdoor locations; 87 (15%) reports concerned indoor locations. When plotted on a map, the hazards were often located on walking routes between seniors’ residences and shopping centres, recreation centres and health clinics. The outdoor sites are shown in Figure 4. Sidewalks, crosswalks, curbs and roads were named most often. As shown in Figure 5, most of the outdoor sites had uneven surfaces; fewer reports of wet, broken, poorly lit, littered or icy conditions were received. Concrete surfaces were overwhelmingly implicated when compared with all other types of surfaces (see Figure 6).

Differences by age, sex and disability

The data were examined for differences among callers that might be related to age, sex or whether or not people had a disability. Only results statistically significant at the 0.05 level of confidence or higher are reported here.

Callers were divided into four age groups: 0-49 (n = 103, 19%), 50-64 (n = 104, 20%), 65-79 (n = 217, 41%), and 80 and over (n = 109, 20%). Those in the oldest group (80+) reported having disabilities and using aids when they had their accident significantly more often than did people in all other age categories. They also fell more often at bus stops than the other three age groups. The youngest age group (0-49) reported having an accident while wearing high heels more often than the other three age groups and were least likely to be wearing glasses. Those in the 0-49 and 50-64 age groups were more likely to have been wearing runners than callers in either of the two older age groups, whereas the older two groups were more likely to be wearing walking shoes at the time of their accident.

When men (n = 107) and women (n = 445) were compared, significant differences were found on 11 variables. When compared with their male counterparts, women in the study were more likely to have reported a fall, more likely to have fallen because of an uneven surface, and were much more likely to have sustained injuries. Of 538 valid cases, 405 callers (75%) said they had sustained an injury from their incident, and 220 of these (55%) required medical attention.
an injury. Interestingly, only 10 women reported wearing high heels at the time of their fall. Women were more likely to be wearing glasses. While only 12 people reported slipping on a grate, men were more likely to have reported this than women. Men were also more likely to report having a physical disability, having a hearing loss and using aides of any sort, including wheelchairs.

Callers were divided into those who had a physical disability (n = 186) and those without (n = 334). Persons without a disability were more likely to report both slips and falls. They were also more likely to report falling on a walkway, slipping or falling on both tile and painted surfaces, and slipping on wet surfaces. Those without a disability were also more likely to have sustained an injury and, specifically, more likely to have received a sprain.

OUTCOMES AND RECOMMENDATIONS

Following the survey, the STEPS Steering Committee hosted a symposium to bring together health care professionals, engineers, city planners, politicians and others with a mandate for public safety, to discuss the study findings and to compile recommendations. A more detailed discussion of this process is published in the final report of the project.1

The main findings of the study pointed to the need for municipalities and private building owners to develop a high-priority plan for the repair of uneven and slippery surfaces on sidewalks and other walkways, focusing on routes used by seniors and persons with disabilities (e.g. routes between seniors’ residences and seniors’ centres, churches, shopping centres and health care facilities). Such plans call for removal of obstacles from pedestrian walkways, providing a minimum clear width of 36 inches and 80 inches in height.21

Clear mechanisms need to be in place for people to report hazards. In this study, many people said they either did not know whom to call to report a hazard or they had tried to call and felt that they were not being listened to. Communication channels should be established between diverse user groups, municipalities, and provincial jurisdictions to address ongoing issues of pedestrian safety.

In addition to individual action through reporting of hazards, community action can be a powerful tool for influencing policy changes or instigating large-scale repairs to improve the pedestrian safety of neighborhoods. People in neighborhoods can organize site inspections, report the findings to the appropriate authorities and lobby for repairs through groups such as local rate payers associations, municipal advisory boards for persons with disabilities and/or seniors’ organizations. These issues are further outlined in a video and a technical manual produced by the authors.22, 23

The study sample was not randomly selected and thus the generalizability of the findings is limited. However, one would argue that generalizability was not the intent here, but rather the testing of a model of inquiry that highlights issues in a given community, thereby providing tangible and credible evidence to direct local policy formulation and resource allocation.

The inquiry seemed well-suited to this participatory action research approach. It provided a transformative setting for re-evaluation of public works standards and began a continuing dialogue between engineers, health departments, researchers and citizens of one community. The process was time-consuming. It entailed a shift of power and control away from the principal investigator and into the hands of the participants; thus additional caution was needed to ensure that standardized procedures for recruiting informants and collecting data were being met. A critical definition of “validity” offered by Comstock and Fox is that the research process should bring underlying social structures and relations to light, and give power to the powerless and voices to the silent.24 The work described in this study was an important step in this direction.

REFERENCES


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