Summary of paper

Formulating a programme of repairs to structural home injury hazards in New Zealand

Michael Keall, Philippa Howden-Chapman, Michael Baker, Venugopal Kamalesh, Malcolm Cunningham, Chris Cunningham, Jagadish Guria, Robert Draper, Pounamu Skelton

Full paper published in the leading international injury prevention journal:

Accident Analysis & Prevention 2013: 57(0):124-130

Approximately 38% of ACC home injury claims are potentially associated with structural features of the home environment. We identified commonly occurring injury hazards in homes that could be repaired at modest cost to reduce this burden of injuries. This research was facilitated by New Zealand's no-fault ACC scheme.

Background

Home injuries are a substantial health burden worldwide, with the home setting being at least as important as the road for injury. New Zealand survey data on medically treated injuries showed that nearly a third occurred at home. Recent research has shown that the New Zealand social costs (the total cost to the nation) of injury in the home were around $13 billion a year, considerably higher than the road injury costs of $3.84 billion.[1] Less serious (medically treated, but neither fatal nor hospitalised) injuries contributed approximately 50% of the total home injury social cost.

Our study

The aim of our study was to formulate an effective intervention to prevent home injury that could be widely adopted. The primary objective was to investigate the prevalence of structural injury hazards in the home and their association with home injury occurrence. A secondary objective was to estimate whether the benefits of a programme to remediate home injury hazards would exceed the costs of repairing the house.

Participants were Taranaki homeowners living in houses constructed before 1980, where at least one household member was a Community Services Cardholder. Data were collected on individuals, their injuries and the home environment, and consisted of:

- Self-reported demographic and health information: 1,612 occupants from 733 households completed questionnaires in 2008 and 2009
- Descriptions of their medically treated home injuries as recorded by ACC: 1,328 home injuries over the 2006-09 period were identified among the 1,612 participants

[1] Keall MD, Guria J, Howden-Chapman P, Baker MG (2011) Estimation of the social costs of home injury: a comparison with estimates for road injury, *Accident Analysis & Prevention* 43:p.998

- Information about the circumstances of these injuries derived from telephone interviews: of 464 people identified with unintentional home injuries within the scope of study, 281 (61%) were able to provide further data via telephone
- An inspection of 961 homes by trained inspectors to identify numbers and types of injury hazards and the costs of potential repairs
- Attitudes to repairs of particular injury hazards from interviews of a random subsample of 30 householders.

The home inspection used procedures developed during the Healthy Housing Index pilot study[2], and involved a walk-through of house and outdoor areas while recording a checklist of hazards and taking measurements (e.g. steepness of steps). This was peer-reviewed by an experienced environmental health officer with extensive building knowledge.

We also looked at how householders perceived structural home injury hazards, and the acceptability of repairs to these hazards, if there was no cost to the householder, i.e. attempting to identify barriers to hazard remediation unrelated to cost, such as aesthetic objections. These are potential factors that might compromise the effectiveness of an intervention involving home injury hazard remediation.

Results

Common themes in home injury were found to be: slips, trips and falls; gardening injuries; insect bites and stings; injuries due to lifting or carrying; home maintenance injuries; as well as other home injuries associated with the house or section. Injuries outside the scope of study (not at home, likely to be intentional) were excluded. Injuries that could potentially be reduced by modifying the environment were identified.

Approximately 38% (506/1,328) of home injury claims were potentially associated with structural features of the home environment. For children under 5 and adults over 80, this proportion was considerably higher.

Commonly occurring injury hazards that could be repaired at modest cost were identified based on their prevalence (estimated by the housing inspection) and their location with respect to the area of the home where the injuries occurred (identified during the telephone interviews). Many home hazards were very common, such as: lack of working smoke detectors (65% of the total 961 houses); inadequately fenced driveways (55%); excessively hot tap water (49%); and inadequately lighted outdoor access ways (34%).

In the subsample of 30 houses, a builder's estimate of cost to fix the specified injury hazards (materials and hours, excluding travel time) came to an average cost per house of $400. When householders were asked their views on having the work done, if it was at no cost to them, there was a high level of acceptance for most of the repairs (80-100%), with the exception of bathroom grab rails where acceptability was 64%.

Discussion and conclusions

This research sought to identify effective ways of increasing home safety by repairing structural injury hazards. In terms of the sorts of injury events that might be amenable to structural safety improvements in the home, falls are an obvious candidate. They made up 71% of home injuries that were potentially related to the home environment.

[2] Keall MD, Baker M, Howden-Chapman P, Cunningham M, Cunningham C (2007) Healthy Housing Index Pilot Study Final Report, Housing and Health Research Programme, Wellington

We identified relatively cheap repairs to commonly occurring outdoor injury hazards including: installing handrails for steps; repairing broken or uneven steps; installing slip-resistant high-visibility edgings for steps; providing adequate outside lighting; and resurfacing decks with slip-resistant paint or tiles. Indoor remedies include: placing grab bars in bathrooms and toilets; installing handrails on stairs; and fixing trip hazards due to loose or worn carpeting. Our research suggests that this remediation programme, with its focus on one-off environmental modification as opposed to interventions that require behaviour change or repeated implementation, is a worthwhile candidate to test with a randomised controlled trial.

We found that 38% of home injury claims were potentially associated with structural features of the home environment. However, in telephone interviews, only 8% of respondents considered that a structural aspect of their home had contributed to the injury that occurred. Their most commonly cited cause was carelessness of the person injured, not the environment. It is difficult to motivate people to undertake remediation of an environmental hazard if it is not perceived as a potential cause of injury. There may be value in a trained outsider's observations that are not clouded by familiarity with the home, as provided by the housing inspectors in this study.

Focusing on common injury hazards presented by the home environment, we sought to examine the justification for significant expenditure on safety-related repairs to New Zealand's housing stock. Calculations from previous studies[3] justify a programme of repairs costing around $600 per house on cost-benefit grounds.

This paper is part of a staged programme of research where each step builds on previous steps. A protocol for identifying and repairing important common home hazards has been designed. The actual safety effects of this protocol are now being examined in a randomised controlled trial currently in progress, the Home Injury Prevention Intervention where the intervention consists of an average of $600 per house in repairs to structural injury hazards. Results will be available later this year.

The full paper is available from philippa.howden-chapman@otago.ac.nz or the online journal: Keall MD, Howden-Chapman P, Baker MG, et al. Formulating a programme of repairs to structural home injury hazards in New Zealand. *Accident Analysis & Prevention* 2013:57(0):124-130.

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

[3] Keall MD, Baker M, Howden-Chapman P, Cunningham M (2008) Association between the number of home injury hazards and home injury, *Accident Analysis & Prevention* 40:p.887. Keall et al (2011)