Injury events: utility of self report in retrospective identification in the USA

Barbara L Braun, Susan Goodwin Gerberich, Stephen Sidney

Self report is often used to determine the correlates and predictors of injury events and to determine injury events influencing the clinical presentation of injured patients. Self reported injury data are, however, potentially limited by inaccurate reporting and biased recall of injury events.¹⁻³ The Injury Ancillary Study of the Coronary Artery Risk Development in Young Adults (CARDIA) study was undertaken to evaluate the factors related to validation of self reported injury, to assess injury reporting rates over a three year period, and to determine the sensitivity, specificity, and positive predictive value of self reported injury.

Methods: Cross sectional, self reported injury data were collected at the 1990 examination of the CARDIA study, a multi-centre, longitudinal investigation of physiological, psychological, and lifestyle characteristics that may influence the evolution of risk factors for cardiovascular diseases in young adults.⁴ Minneapolis, MN participants (n = 1245) had been randomly recruited for CARDIA from selected census tracts in the community; Oakland, CA participants (n = 1027) were recruited from the Kaiser-Permanente Health Plan membership.

The positive predictive value of self reported injuries in those with diverse access to medical care and participant characteristics related to validation were determined in Minneapolis participants. The sample totalled 139: all 44 who reported hospitalisations, 94 randomly selected participants from the 368 who reported injuries that required medical attention, and one who reported both. Exclusion criteria included non-consent to examine medical records, non-contactable providers, and clinic error in data collection or injury coding. The final Minneapolis validation sample included 113 participants who reported a total of 137 injury events. Medical records were collected from the facilities providing care.

The injury reporting rate, the positive predictive value of self reported injury among members of a health maintenance organisation, and the sensitivity and specificity of self reported injury over a three year period were determined among Oakland participants. A random sample of 75 who reported no medically attended injury and 75 who reported at least one injury was selected. This was sufficient to detect an under-reporting rate of 30% with 0.3% error. Subjects were excluded because of missing Kaiser-Permanente records or errors in clinic data collection. The final sample included 141 participants. The discharge summary and initial note pertaining to any injury related admission to hospital or outpatient visit were collected.

Self reported injuries were considered valid if the physician diagnosis in the medical record was consistent with both the anatomical site (for example, finger) and the type of injury (for example, fracture) reported by the participant. The date of the injury was recorded from the medical record.

Results: Validation rates for self reported injury events were 86.8% for Minneapolis subjects and 75.3% for Oakland subjects. All unvalidated events were the result of an inability to locate records, not of inaccurate reporting of the anatomical site or the type of injury. In the Minneapolis sample, validation rates were higher in whites than blacks and in those with ≤ 12 years of education compared with those with >12 years: in the Oakland sample, more educated subjects had higher validation rates than less educated subjects. Factors unrelated to validation included age, sex, duration of restricted activity, self reported drug or alcohol use within four hours of the event, number of anatomical sites affected, type of the injury, and external cause of the injury.

The reporting rate for medically attended injury events was 49.8% (85/174 documented injuries) over the three year period. The reporting rate declined from 77.0% in the six months before the examination date to an average of 37.0% for the other six month intervals. Motor vehicle crashes and falls had reporting rates of 71.4% (15/21) and 70.0% (20/29) respectively. Injuries caused by striking an object, overexertion and assault had reporting rates of 38.1% (8/21), 33.3% (16/48), and 22.2% (2/9) respectively. Cuts and burns showed rates of 8.3% (1/12) and 0 (0/7).

Sensitivity of the questionnaire in classifying a person as injured over three years was 78.3% (54/69 subjects). Specificity of the questionnaire was 65.3% (47/72 subjects) over the three year period. Specificity was highest within the six months before the examination date (93.1%). It declined steadily over the rest of the examination period.

Sensitivity of the questionnaire in enumerating injury events over the three year period was 41.8% (64/153 medically documented injury events). Sensitivity declined from 73.0% within the first six months to an average of 34.0% over each of the other six month intervals.

Discussion: If an injury severe enough to require medical attention is reported during an interview, it is likely the injury can be validated. The date of the injury event, the anatomical site, and the type of injury will be accurately reported, a finding consistent with the self reported hip fracture validation study by Colditz.¹

Division of
Epidemiology and
Division of
Environmental and
Occupational Health,
School of Public
Health, University of
Minnesota,
Minneapolis,
Minnesota, USA
B L Braun
S G Gerberich

Kaiser-Permanente
Health Plan
S Sidney

Correspondence to:
B Braun, University of
Minnesota 1300 South
Second St, Suite 300,
Minneapolis, MN 55455,
USA.

Accepted for publication
May 1994

Injury event reporting and consent to review medical records is likely to be limited for potentially litigious events or events of high emotional impact, limiting injury enumeration and compromising access to medical information. Demographic factors such as race and educational status may influence the collection of medical information³ and effect the likelihood of validation. Despite similar interviewer training protocols and medical record collection protocols, differences between centres may affect the collection of injury event data or the collection of medical records. Inability to retrieve records may be a result of loss of medical records or inaccurate recall of the injury event by the participant.

Under-reporting is a significant limitation of self reported injury data. Reporting rates vary by external cause of injury, possibly reflecting severity of the injury or inhibited reporting of emotionally traumatic events. The sensitivity and specificity of self reported injury was highest within six months of the examination date and declined to a stable rate over the rest of the three year examination period. This suggests self report is adequate for injury event enumeration and determination of injury status for a maximum of six months.

Studies using self report may yield inaccurate

results if the injury occurred more than six months before the examination, if the injury is intentional or emotionally threatening, or if data are collected by different survey centres. Clinical self reports of injury experiences may likewise be limited and may inhibit determination of preventive measures in patients presenting with injuries.

Support for this paper was provided in part by NHLBI/NIH-NO1-HV-48048 and NHLBI/NIH-NO1-HC-48050, National Heart, Lung and Blood Institute, NIH and in part by BRSG-2S07-RR-05448 and BRSG-2S07-RR05521-28, awarded by the Biomedical Research Support Grant Program, Division of Research Resources, NIH. This paper was presented in part to the 120th Annual Meeting of the American Public Health Association, Washington, DC, in November 1992. The authors thank Ms Mary Clement and Ms Beverly Peters for assistance in data collection.

- 1 Carlsson GS. Validity of injury data collected by interview: A study of men born in 1913 and 1923. *Journal of Neurology, Neurosurgery, and Psychiatry*. 1983;46:818-23.
- 2 National Center for Health Statistics. *Health interview responses compared with medical records*. Rockville, MD: National Center for Health Statistics, 1965. Vital and Health Statistics. Series 2, no 7; US PHS publication no 1000-Series 2, no 7.
- 3 Colditz GA, Martin P, Stampfer MJ, *et al*. Validation of questionnaire information on risk factors and disease outcomes in a postoperative cohort study of women. *Am J Epidemiol* 1986;123:894-900.
- 4 Friedman GD, Cutter GR, Donahue RP, *et al*. CARDIA: Study design, recruitment, and some characteristics of the examined subjects. *J Clin Epidemiol* 1988;41:1105-16.
- 5 The National Committee for Injury Prevention and Control. *Injury prevention and control: meeting the challenge*. New York: Oxford University Press, American Journal of Preventive Medicine; 1989.