

Injury modules in national surveys as a source of injury data in low and middle income countries

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BACKGROUND

The importance of reliable data for planning, monitoring and evaluating injury prevention interventions is unquestionable; lack of reliable injury estimates undoubtedly affects governments' ability to recognise the seriousness of the issue and to effectively address it. This is now becoming more urgent as more than one of the recently adopted post-2015 sustainable development goals call for a safer environment.¹ Initiatives such as the Global Burden of Disease and WHO's Global Health Estimates have attempted to fill this information gap at global, regional and national levels.^{2,3} They apply statistical methods to available reported data from countries to generate mortality and morbidity estimates for external causes of injuries. Remarkably, those estimates have consistently pointed to the public health threat posed by injuries in low and middle income countries (LMIC). For example, the most recent estimates revealed disability-adjusted life year rates that were much higher in sub-Saharan Africa, Latin America and Southeast Asia than in the high income countries (HIC) of North America, Western Europe and Asia-Pacific.⁴ However, these attempts are limited in their ability to provide disaggregated data that are often needed for local-level planning, monitoring and evaluation of intervention. At the same time, they brought to light the glaring gaps in quantity and quality of input data available from LMIC that make the derived estimates for those countries less accurate.⁴

Since the release of the World Report on Violence and Health in 2002,⁵ all major WHO injury prevention reports and global monitoring reports have also been highlighting the large gaps in nationally reported data. Calls on countries to strengthen national routine data collection, conduct research and establish monitoring and evaluation mechanisms were coupled with the development of various proposals for mechanisms to achieve that with a range of potential data sources.^{6,7}

Yet, progress in developing sustainable and functional systems has been very slow.

Experience from global collaborative efforts on injury estimation and global review of available health data sources has shown the value of national health surveys as one promising source for population-level injury data in LMIC.⁸ This commentary elaborates on that by briefly discussing the state of injury data in LMIC, the potential of injury modules in national health surveys in those countries and some challenges to wider implementation, and concludes with some recommendations for further action.

INJURY DATA IN LMIC

While many LMIC have health information systems that routinely collect patient data from health facilities, these systems may not on their own be sufficient for painting a complete picture of the injury problem even under conditions of satisfactory data quality and complete reporting from health facilities. This is because, as evidence from some LMIC suggests, a considerable proportion of injured people do not seek formal medical care,⁹⁻¹¹ some of whom may have significant injuries; a study in Bangladesh revealed that while severe injuries were ultimately seen in hospital, a considerable proportion of people with injuries of moderate severity resort to traditional healers instead of formal medical care.⁹ This could bias health facility data towards certain groups such as urban residents with better physical or financial access to health facilities. The situation is even less promising for injury mortality data, as many LMIC, mostly in Africa and Southeast Asia, lack an acceptably complete death registration system,¹² the gold standard for reliable population-based data on mortality. The risk of bias in non-fatal injury data from health facilities equally applies to mortuary data on fatal cases. Furthermore, it is well known that injury data from outside the health sector, mainly police reports, are not in any way superior when it comes to completeness of reporting. While a balanced investment in strengthening routine administrative data and national vital registration in LMIC can improve statistics

on injury incidence and mortality and is indeed warranted, a less biased picture of injury epidemiology requires triangulating data from more than one source.

INJURY MODULES IN NATIONAL SURVEYS

Surveys can be an instrumental source of injury data. Despite their relatively sophisticated health information systems, many HIC collect injury data using population-based national health surveys. The National Health Interview Survey (NHIS) in the USA, the Canadian Community Health Survey, the European Health Interview Survey, the work-related injury module of the Labour Force Survey in Britain and the Korean National Health Survey¹³⁻¹⁷ are some examples where representative injury data are periodically collected using injury-specific modules in surveys. Such data may not necessarily be considered superior to hospital-based surveillance data in those countries.¹⁸ Nevertheless, those surveys also supply valuable data on demographic, social and behavioural variables, which are vital for understanding the context of injuries.¹⁸⁻²¹

Using surveys as a source of injury data has therefore even greater potential in LMIC, given the limitations of their existing information systems. Surveys pick up injuries from across the full range of severity, including those that do not present to the formal health system because of accessibility or cost-related issues. Moreover, the data can be used to study specific injuries in defined geographical areas or population segments, including people in remote rural areas who may be under-represented in routine health data sources. Survey data can fill other gaps such as work-related injuries among informal workers that are not normally captured in routine formal labour statistics—a common situation in LMIC where the informal economy predominates.²² Furthermore, there is potential for secondary analysis of survey injury data, which offers affordable research opportunities for researchers in those countries and helps to further enhance local evidence.

Stand-alone national injury surveys are not commonly used in LMIC as a routine source of national population-based injury data—where carried out, they are often one-off. Examples include The Alliance for Safe Children (TASC) surveys in Bangladesh, Cambodia, Indonesia, Philippines, Vietnam and Thailand.²³ Other surveys as those carried out in Africa and other parts of Asia²⁴⁻²⁹ were not nationally representative. The relatively low

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incidence of injuries and the desire to generate statistics by geographical areas or population subgroups make it necessary for national stand-alone injury surveys to have a large sample size, for example, the TASC surveys featured a sample size of 450 000 in Philippines and 820 000 in Bangladesh. Such stand-alone injury surveys may not be sustainable in the limited resource climate of many countries where the data are needed the most. On the other hand, national surveys that cover a wide range of health issues are regularly carried out in LMIC—as country-funded efforts or mostly as part of internationally funded multicountry survey series—and are normally designed to yield subnational estimates, therefore already featuring large sample sizes. These surveys can be suitable vehicles for an injury module, and therefore have the potential for generating a regular flow of essential data on few key injury indicators at a lower cost than repeated stand-alone injury-specific surveys.

Despite their potential, the integration of injury questions in national health surveys in LMIC seems relatively limited. Some multicountry national health surveys funded mainly by international donors—for example, the Demographic and Health Surveys, Multiple Indicator Cluster Surveys, the World Health Surveys (WHS) and the Global School Health Survey (GSHS)—have already included modules on fatal and non-fatal injuries (table 1). Some of the generated data had

in fact proved useful, particularly for country efforts to estimate the burden of injury.^{38 39} However, core modules in regular national health surveys in LMIC funded by international agencies have been driven mainly by internationally agreed targets in areas that have been marked as priority areas in LMIC (eg, childhood nutrition, maternal health and infectious diseases). At the same time, many of those countries do not normally have the resources to contribute substantially to those surveys. Since injury had not featured strongly among those priority areas for a long time, most of the injury modules designed in those multicountry surveys have been non-core modules and might not be implemented in all the countries included in the survey or all survey rounds in the same country. For example, of the surveys with a large collection of participating countries, only the WHS and the GSHS of school-going children 13–17 years old included injury modules as core modules.

THE WAY FORWARD

Promoting the use of injury modules in surveys is undoubtedly conditional on overcoming some key challenges. The self-report nature of injury survey data limits their quality; yet, to date, published evaluations of survey injury data from LMIC are limited to examining incomplete recall due to memory decay, which is not necessarily the only concern. For example, cognitive

testing of the injury and poisoning questions of the 2002 NHIS showed that false-negative reporting could arise from failure of the respondent to hear or consider critical parts of the injury-screening questions or from their limited definitions for the term ‘injury’ or other critical terms in the questions.⁴⁰ Also, national surveys—whether funded by a country’s government or part of internationally funded multicountry surveys—are resource-intensive, and additional questions mean additional costs. Added to the fact that injuries are not usually given as much consideration as conditions that feature more heavily in the international arena, this poses a significant challenge to the addition of injury modules to existing surveys and means that much less items if any can be included than in a stand-alone injury survey. It is therefore essential that space and resources are used in the most efficient ways by designing modules that collect only the most relevant and highest quality data. This can be achieved by scaling up systematic item development and testing efforts in individual LMIC, using appropriate methods such as cognitive testing, psychometric evaluation, field experiments and statistical modelling.⁴¹ The goal would be to find out which questions on injury perform best in self-report surveys, examine appropriate survey designs for the different types of data required and investigate ways of improving highly relevant but underperforming items where a feasible alternative

Table 1 Implementation of injury modules in major multicountry national health surveys in low and middle income countries (LMIC)*

Survey—number of participating LMIC	Main agency	Number of implementing LMIC	Main items included (in each country if differed by country)	Population group covered
Demographic and Health Survey—90	US Agency for International Development and Inner City Fund (ICF) International	3	Cambodia: injury in the past 12 months, cause, fatality, seriousness if non-fatal and intent if fatal. ³⁰ Mozambique: Injury in the past 30 days, number of injuries, time, cause, intent and place of the most recent injury, what the person was doing when injured and relationship to perpetrator if injury was intentional. ³¹ South Africa: injury in the last month that was treated by a doctor or nurse and the cause of injury. ³²	All groups
Global School Health Survey—74	WHO and CDC	74	Serious injury (that led to loss of 1 day of usual activities or was medically treated) during the past 12 months, activity during the most serious injury, cause, intent and nature of the most serious injury. ³³	School-going young people aged 13–17 years
Multiple Indicator Cluster Survey—98	United Nations Children Fund	2	Mongolia 2010: injury in the past 12 months and cause of the most recent injury. ³⁴ Sudan 2010: injury in the past 12 months, time, cause, type of healthcare sought and resulting disability related to the most recent injury. ³⁵	Sudan: all groups Mongolia: children aged 2–14 years.
World Health Survey—42	WHO	42	Injury in the past 12 months from road traffic collision and from other causes, time of injury and type of healthcare received. ³⁶	All groups
WHO Study on Global Ageing and Adult Health—5	WHO	5	Injury in the past 12 months from road traffic collision and from other causes, time of injury and type of healthcare received. ³⁷	Adults aged 50 years and older

*Based on World Bank definition of gross national income per capita less than \$12 736: <http://data.worldbank.org/about/country-and-lending-groups>.

data source does not exist. For example, error in reporting an injury or the extent and duration of ensuing disability if any can be magnified in cross-sectional designs where long recall periods have to be used or when time of recovery from disability cannot be ascertained. Such errors can theoretically be minimised by making more use of existing panel surveys that use a shorter recall period and follow-up population-based cohorts. Other sources may be more suited for other types of policy-relevant data on injuries; for example, detailed data on injury from specific causes that are more likely to be seen in health facilities can be obtained with health facility-based studies. Such endeavours can pave the way for an extensively validated, cost-effective and hence appealing standard injury module with better prospects for implementation.

In conclusion, tracking progress in post-2015 development agenda requires a reliable source of injury data, and to that end, much can potentially be gained from using existing national surveys in LMIC. However, more effort must first go into validation of items, and analysis and dissemination of the data. Injury prevention practitioners and researchers in LMIC should advocate for the adoption by their governments of national targets related to all injury causes where those are not already in place as a way to stimulate measurement efforts. They should also engage with national statistical agencies and international organisations and donors to investigate and improve the quality of survey injury data, compare performance of items and test ways to boost performance and facilitate cross-country comparability. Moreover, analytical capacity within countries needs to be enhanced and secondary analysis carried out to maximise the value of the data. International players concerned with the promotion of injury research and data availability can help by facilitating technical and financial support for individual LMIC to test and implement injury modules.

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REFERENCES

- 1 United Nations. Transforming our world: the 2030 agenda for sustainable development, 2015. http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (accessed Jul 2016).
- 2 WHO global health estimates. http://www.who.int/healthinfo/global_burden_disease/en/ (accessed Mar 2016).
- 3 Global burden of disease—Institute for health metrics and evaluation. <http://www.healthdata.org/gbd> (accessed Mar 2016).
- 4 Haagsma JA, Graetz N, Bolliger I, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the global burden of disease study 2013. *Inj Prev* 2016;**22**:3–18.
- 5 Krug EG, Dahlberg LL, Mercy JA, et al., eds. *World report on violence and health*. Geneva: World Health Organization, 2002.
- 6 Holder Y, Peden M, Krug E, et al., eds. *Injury surveillance guidelines*. WHO, 2001.
- 7 Bartolomeos K, Kipsaina C, Grills N., et al., eds. *Fatal injury surveillance in mortuaries and hospitals, a manual for practitioners*. Geneva: World Health, 2012.
- 8 Bhalla K, Shahraz S, Abraham J, et al., on behalf of the GBD Injury Expert Group. The global injury survey data collection of the GBD-Injury Expert Group. 2012. <http://www.globalburdenofinjuries.org>
- 9 Rahman F, Andersson R, Svanström L. Medical help seeking behaviour of injury patients in a community in Bangladesh. *Public Health* 1998;**112**:31–5.
- 10 El Tayeb S, Abdalla S, Van den Bergh G, et al. Use of healthcare services by injured people in Khartoum state, Sudan. *Int Health* 2015;**7**:183–9.
- 11 Mock CN, nii-Amon-Kotei D, and Maier RV. Low utilization of formal medical services by injured persons in a developing nation: health service data underestimate the importance of trauma. *J Trauma* 1997;**42**:504–11; discussion 511–3.
- 12 United Nations Statistical Division. Coverage of civil registration systems, 2014. http://unstats.un.org/unsd/demographic/CRV/CR_coverage.htm (accessed Jan 2016).
- 13 Centers for Disease Control. National health interview survey—injury and poisoning information. http://www.cdc.gov/nchs/nhis/injury_poisoning.htm (accessed Jan 2016).
- 14 Office for National Statistics. Labour force survey user guide: Volume 2 labour force survey questionnaire 2014. file:///C:/Users/Safa/Documents/Additional%20literature%20for%20IP%20commentary/vol2od14final_tcm77-362989.pdf (accessed Jan 2016).
- 15 Eurostat. European health interview survey wave 1 guidelines, 2010. http://ec.europa.eu/eurostat/documents/203647/203710/EHIS_wave_1_guidelines.pdf/ffbeb62c-8f64-4151-938c-9ef171d148e0 (accessed Jan 2016).
- 16 Beland Y. Canadian community health survey—method overview. *Health Rep* 2002;**3**:9–14.
- 17 Kang YW, Ko YS, Kim YJ, et al. Korea community health survey data profiles. *Osong Public Health Res Perspect* 2015;**6**:211–17.
- 18 EuroSafe. *Injuries in the European Union: report on injury statistics 2008–2010*. Amsterdam: EuroSafe, 2013.
- 19 Bonnie RJ, Fulco CE, Liverman CT, eds. *Reducing the burden of injury: advancing prevention and treatment*. Washington DC: Institute of Medicine, 1999.
- 20 Kim J. Psychological distress and occupational injury: findings from The National health interview survey

- 2000–2003. *J Prev Med Public Health* 2008;**41**:200–7.
- 21 Garg N, Silverberg JI. Association between eczema and increased fracture and bone or joint injury in adults: a US population-based study. *JAMA Dermatol* 2015;**151**:33–41.
- 22 Charnes J. The informal economy worldwide: trends and characteristics. *J Appl Econ Res* 2012;**6**:103–32.
- 23 The Alliance for Safe Children. <http://www.tasc-gcipf.org/index.html> (accessed Jan 2016).
- 24 El Tayeb S, Abdalla S, Mørkve O, et al. Injuries in Khartoum state, the Sudan: a household survey of incidence and risk factors. *Int J Inj Contr Saf Promot* 2014;**21**:144–53.
- 25 Mock CN, Abantanga F, Cummings P, et al. Incidence and outcome of injury in Ghana: a community-based survey. *Bull World Health Organ* 1999;**77**:955–64.
- 26 Kobusingye O, Guwatudde D, Lett R. Injury patterns in rural and urban Uganda. *Inj Prev* 2001;**7**:46–50.
- 27 Moshiri C, Heuch I, Aström AN, et al. Injury morbidity in an urban and a rural area in Tanzania: an epidemiological survey. *BMC Public Health* 2005;**5**:11.
- 28 Pant PR, Townner E, Ellis M, et al. Epidemiology of unintentional child injuries in the Makwanpur district of Nepal: a household survey. *Int J Environ Res Public Health* 2015;**12**:15118–28.
- 29 Navaratne KV, Fonseka P, Rajapakse L, et al. Population-based estimates of injuries in Sri Lanka. *Inj Prev* 2009;**15**:170–5.
- 30 National Institute of Statistics, Directorate General for Health, and ICF International. *Cambodia demographic and health survey 2014*. Phnom Penh, Cambodia and Rockville, Maryland, USA: National Institute of Statistics, Directorate General for Health, and ICF International, 2015.
- 31 National Institute of Statistics and Mozambique Ministry of Health. *Mozambique demographic and health survey 2003*. Maputo, 2005. <http://dhsprogram.com/pubs/pdf/FR161/FR161.pdf> (accessed Mar 2016).
- 32 Department of Health, Medical Research Council, OrcMacro. *South Africa demographic and health survey 2003*. Pretoria: Department of Health, 2007.
- 33 World Health Organization and Centers for Disease Control. Global school-based student health survey (GSHS) 2013 core questionnaire modules, 2013. http://www.who.int/chp/gshs/GSHS_Core_Modules_2013_English.pdf (accessed: Mar 2016).
- 34 National Statistics Office, UNICEF. Multiple Indicator Cluster Survey 2010. *Summary Report*, Ulaanbaatar, Mongolia, 2011.
- 35 FMOH. Sudan household health survey 2010. *Final report*. Sudan Federal Ministry of Health, 2013.
- 36 World Health Organization, Evidence and Information for Policy. World health survey: B- Individual Questionnaire, 2002. <http://www.who.int/healthinfo/survey/whslongindividuala.pdf> (accessed Jul 2016).
- 37 World Health Organization, Evidence and Information for Policy. Study on Global Ageing and Adult Health Wave 1—Individual Questionnaire A, 2007. <http://www.who.int/healthinfo/systems/GenericIndividualQ.pdf> (accessed Jul 2016).
- 38 Bhalla K, Navaratne KV, Shahraz S, et al. Estimating the incidence of road traffic fatalities and injuries in Sri Lanka using multiple data sources. *Int J Inj Contr Saf Promot* 2010;**17**:239–46.
- 39 Bhalla K, Naghavi M, Shahraz S, et al. Building national estimates of the burden of road traffic injuries in developing countries from all available data sources: Iran. *Inj Prev* 2009;**15**:150–6.
- 40 Miller K, Whitaker K, Beatty P, et al. *Cognitive testing of the NHIS injury and poison questions*. Questionnaire Design Research Lab, NCHS, 2002. http://www.cdc.gov/QBANK/report%5CMiller_NCHS_2002InjuryPoisonReport.pdf (accessed Jun 2016).
- 41 Presser S, Rothgeb JM, Couper MP, et al. eds. *Methods for testing and evaluating survey questionnaires*. New Jersey: John Wiley and Sons, 2004.

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