Socioeconomic status and the incidence of child injuries in China

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ARTICLE INFO

ABSTRACT

Injuries are the major cause of morbidity among children and one of the leading causes of death for children ages 1–17 years in developing countries. Of particular importance is whether child injuries are equally distributed across all socioeconomic groups and the implications of this question for child injury prevention, but there is a lack of research on the relationship between socioeconomic status and risk of child injuries in developing countries, including China. This study used a provincially-representative, population-based sample of 98,385 Chinese children under age 18 to investigate the relationships between socioeconomic status (SES) and child injuries. Despite the lack of a SES gradient in the overall incidence of nonhospitalized injuries, evidence of SES disparity was found for the overall incidence of H/PD injuries (injuries resulting in hospitalization or permanent disability) and fatal injuries. The odds of getting injured in the poorest wealth quintile were about 1.3 and 3.5 times greater than the odds found in the richest wealth quintile for H/PD and fatal injuries respectively. Further analyses showed that the associations between SES and injuries varied by type and severity of injury, and across different life stages. The findings have important implications for identifying at-risk populations and the optimal times for interventions to reduce different types and severity levels of child injuries.

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Introduction

Injuries pose a great health risk for children in many countries. The burden of child injuries worldwide is disproportionately concentrated in low- and middle-income countries (Chandran, Hyder, & Peek-Asa, 2010; Linnan, Giersing, et al., 2007; Murray & Lopez, 1996; Peden et al., 2008; World Bank, 1993). In China, injuries are the leading cause of death for children and adults ages 1–44 years and the fifth leading cause of death overall (Ministry of Health, 2010). According to a province-wide injury survey in Jiangxi China, injuries were the leading cause of death for children 1–17 years old in 2005, accounting for 69% of deaths in children 1–17 years old (Jiangxi Center for Disease Control and Prevention et al., 2007).

As recognition of child injuries as a serious problem increases, research has identified various risk factors for child injuries, including large family size, low maternal education, family poverty, child's main caregiver not being the mother, long-term child health problems, region of residence, and caregiver depression (Bangdiwala & Anzola-Perez, 1990; Howe, Huttly, & Abramsky, 2006; Rahman, Rahman, Shafinaz, & Linnan, 2005, pp. 47–56; Reichenheim & Harpham, 1989). Of particular importance is whether child injuries are equally distributed across all socioeconomic groups and the implications of this question for child injury prevention. The socioeconomic status (SES) may be relevant for child injuries because of its correlation with educating and supervising children, the characteristics of the residence, and parental practices for injury prevention (Hong, Lee, Ha, & Park, 2010; Howe et al., 2006; Potter et al., 2005).

Previous studies of the associations between SES and child injuries in developed countries have supported a strong inverse relationship between SES and injuries (i.e., lower SES is associated

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with higher injury rates) during early childhood (Brownell et al., 2010; Chen, Matthews, & Boyce, 2002; Gofin, Lison, & Morag, 1993; Nelson, 1992; Stewart-Brown, Peters, Golding, & Bijur, 1986). For adolescents, however, previous studies have shown mixed results on the relationship between SES and injuries. Some previous studies have documented an inverse association between SES and injuries in adolescence (e.g., Chen, Martin, & Matthews, 2006; Faelker, Pickett, & Brison, 2000; Nelson, 1992), while others have found a lack of SES differences in injuries (e.g., West, 1997; Williams, Currie, Wright, Elton, & Beattie, 1996).

Little work has been done regarding the associations in developing countries, including China. It would be expected that differences in health care systems, cultural practices regarding supervision of young children, legal mandates, and differences in home, school and community settings might result in a different relationship between SES and child injuries. There is a need for research on this topic in order to create a socio-economic basis for injury prevention in developing countries.

Furthermore, previous studies have either investigated only the relationships between SES and the overall measure (any injury) of child injuries or were concerned primarily with the relation of SES to a particular type of injuries such as road traffic accidents. Data limitations have precluded these studies from examining the relationships between SES and child injuries for both the overall measure (any injury) and those specific types of injuries characterizing the full range of injuries experienced by children; however, investigating the relationships between SES and injuries for both the overall measure and specific types of injuries would provide a better understanding of the mechanisms behind SES differences in child injuries, given that the relationships between SES and injuries may vary by type of injury.

It is important to take differing levels of injury severity into account when interpreting data on SES disparity in child injuries. SES may have different associations with fatal vs. non-fatal child injuries and for non-fatal injuries, the relationships between SES and injuries may vary by severity (Williams et al., 1996). For example, the nature of injuries resulting in hospitalization may be different from those not requiring hospitalization. Studies that assess the different severity levels of injuries may produce more robust and practically useful results on the relationships between SES and child injuries. Moreover, SES at different points in a child's lifetime may have different effects on injury (Chen, 2004). Exploring the SES-injury relationships across different periods of childhood may provide insight into pathways linking SES with injury.

In this study, we use a large, household sample that was representative of the population in Jiangxi, China, to examine the relationships between SES and child injuries. We further examine whether the associations vary by type and severity of injury, and whether the associations vary across different life stages.

Methods

Sample

Data for this study came from the Jiangxi Injury Survey which used a multi-stage, stratified, random cluster sample selected from the current Jiangxi Public Security Bureau roster (Jiangxi Center for Disease Control and Prevention et al., 2007). The survey used probability-proportional-to-size sampling methods to create a representative and self-weighting sample. Jiangxi is one of China's inland provinces, a predominantly rural province with a total population of about 43 million. It is located in the southeastern part of the country, on the southern bank of the Yangtze River. The survey was conducted by the Provincial Health Bureau and Jiangxi

Center for Disease Control during September–December, 2005. Funding for the survey was provided by United Nations Children's Fund (UNICEF) and technical assistance for the survey was provided by Chinese Field Epidemiology Training Program, Centers for Disease Control and Prevention, and The Alliance for Safe Children (TASC). All protocols and survey instruments were submitted to an ethical review board for approval prior to the commencement of fieldwork (Linnan et al., 2007). Using the UNICEF/TASC standard injury survey methodology, one hundred thousand and ten households (100,010) were interviewed in 250 townships/street committees among 98 counties throughout Jiangxi province. The total number of respondents was 319, 543 including 98,335 children under 18 years of age. The survey is one of the largest community based injury surveys ever conducted in a developing country. The sample size allowed for the necessary power to investigate the age-, type- and severity-specific relationships between SES and child injuries among a single study sample with a common data source.

The survey questionnaires consisted of separate modules on demographics, socio-economics, household risk factors, and structured questions regarding mortality and morbidity events. Mortality events over the three years prior to the survey from all causes (infectious, non-communicable, maternal, and injury) were investigated. However, only mortality events from injury occurring the year preceding the survey were included in this study for data analysis to allow compatibility with non-fatal injuries (one year recall period) and to avoid the possibility of outcomes (mortality events) preceding their causes (SES). Morbidity from injury in the year before the survey was included also, while morbidity from other causes (non-injury) was not included. Details about the design and methods of the survey can be found elsewhere (Jiangxi Center for Disease Control and Prevention et al., 2007). The collected demographic, socioeconomic, and injury morbidity and mortality information of 98,385 children under age 18 (98,335 respondents plus 50 children who were reported as dying of injuries in the year before the survey) was used to investigate the relationship between SES and child injury.

Measure of SES

SES can be measured in multiple ways, such as family wealth, parent education and parent occupation (Krieger, Williams, & Moss, 1997; Winkleby, Jatulis, Frank, & Fortmann, 1992). Since more than 70% of Jiangxi population are farmers, parent occupation or education often fails to reflect household SES. The SES measure used in this study refers to family wealth. The World Bank has developed an asset-based tool to measure the SES of households in developing countries using data on durable consumer goods, housing quality, water and sanitary facilities and other amenities (Filmer & Pritchett, 1999, 2001; Gwatkin, Rutstein, Johnson, Pande, & Wagstaff, 2000). Following this method, our asset-based family wealth index is a linear combination of a variety of indicators of household living standards. Asset information was derived from questions concerning the household's ownership of consumer items ranging from a fan to a television and car; dwelling characteristics such as flooring material; and type of toilet facilities used. Each household asset or characteristic was assigned a weight or factor score generated through principal components analysis (the first component extracted). The resulting asset scores were standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one. The standardized scores were summed by household, and the total score of the household was then used as the family wealth index for the children who resided in that household. The complete list of assets used in the wealth index and their associated asset scores are available on