

Injury status and perspectives on developing community safety promotion in China

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SUMMARY

The objective of this paper is to introduce the epidemiology of injuries in China, and then consider the development of safe communities in regard to injury prevention and safety promotion. The disease spectrum has changed in recent decades in the People's Republic of China. Both in cities and rural areas, injury has become the fifth leading cause of death. At least 800 000 people die from injury each year, and 50 million non-fatal injuries occur, of which 2.3 million lead to disability of varying degrees of severity. The average injury-related death rate in China from 1990 to 1997 was 66 per 100 000, which accounts for 11% of total deaths. The potential years of life lost (PYLL) of injury accounts for 24% of the total, and disability-adjusted life years (DALYs) account for 17%. Main injury causes of death, in descending order, are: suicide, traffic accident, drowning, falling, poisoning, homicide, burn and scald, and iatrogenic injury. Considering China's current injury status and its rapid

societal change, injury prevention and safety promotion need to be strengthened further, and there is a special need for the development of Safe Communities programmes. The prevention of injuries through safety promotion has been increasingly focussed on over recent decades. The WHO Safe Community model is recognized as representing an effective and long-term approach to the prevention of injuries at a local level, and has been beneficially applied all over the world. A programme may cover several aspects of injury prevention and safety promotion simultaneously, or only include one or two aspects. In a Safe Community programme in China, children, the elderly, cyclists and their passengers, and farmers should be among the prioritized target populations. However, multi-focussed inter-sectoral programmes have been shown to have additional effects to distinct sectoral programmes.

Key words: community safety promotion; injury epidemiology; injury prevention; Safe Communities

INTRODUCTION

Despite the fact that injuries consume a considerable quantity of health care resources, at least 5 million people worldwide die from injuries each year (Krug, 1999). The World Health Organization (WHO) predicts that, by the year 2020, injuries will be responsible for even more morbidity, mortality and disability, with developing countries bearing the brunt of the increase (Murray and Lopez, 1996).

The disease spectrum has changed in recent decades in the People's Republic of China.

Infectious diseases and diseases related to malnutrition, which were the leading causes of death in the 1950s, have been replaced by non-communicable diseases. According to National Health Statistics (Table 1), infectious disease is approximately the 10th most prevalent cause of death in rural areas, whereas in the cities infectious diseases do not feature among the leading 10 causes.

A salient note is that both in cities and rural areas, injury has become the fifth leading cause

Table 1: The leading 10 death causes by area in China in 1999

Causes	Cities mortality rates (1/100 000)	Causes	Rural area mortality rates (1/100 000)
1. Cancer	139.28	1. Respiratory system disease	142.06
2. Cerebral vascular diseases	137.72	2. Cerebral vascular diseases	113.05
3. Cardiovascular diseases	106.58	3. Cancer	105.57
4. Respiratory system disease	86.84	4. Cardiovascular diseases	80.07
5. Injury and poisoning	38.73	5. Injury and poisoning	69.22
6. Digestive system diseases	18.65	6. Digestive system diseases	24.80
7. Endocrine, nutrition metabolic, immune diseases	17.15	7. Urinary, reproduction diseases	9.20
8. Urinary, reproduction diseases	9.30	8. Tuberculosis (TB)	8.52
9. Psychosis	6.95	9. Newborn baby diseases ^a	1171.33
10. Neuropathy	5.83	10. Infectious diseases (except TB)	6.49

^aCalculated with live births as the denominator.

of death. At least 800 000 people die from injury each year. Besides fatal injuries, it is estimated that there are at least 50 million non-fatal injuries each year, of which 2.25 million lead to disability of varying degrees of severity. The direct health care cost of injury is at least 43 600 million RMB each year (Wang and Chi, 1999; Wang *et al.*, 2000). Accordingly, injuries have gained increasing attention from health care authorities in recent years, and are now regarded as one of the key public health problems in the strategy for disease prevention and control adopted by the Ministry of Health in China.

The prevention of injury through safety promotion has been increasingly in focus over recent decades. The WHO Safe Community model (Svanström, 2001) is recognized as representing an effective and long-term approach to the prevention of injuries at a local level, and has been beneficially applied all over the world. There are, however, no officially designated Safe Community demonstration areas in China at the present time. This paper will provide a brief introduction to the epidemiology of injuries in China, and then consider the development of Safe Communities with regard to injury prevention and safety promotion.

CURRENT STATUS OF INJURIES IN CHINA

The injury-related death rate: the burden and main causes

According to national disease surveillance data from 1990 to 1997 (Yang *et al.*, 1996; Yang *et al.*,

1997; Cao *et al.*, 2000; Wang *et al.*, 2000), the average death rate due to injury is 66 per 100 000, which accounts for 11% of total deaths. Potential years of life lost (PYLL) due to injury account for 24% of total deaths, a proportion similar to that for infectious, perinatal and gynaecological diseases (26%), and much higher than that of cancer (11%), cardiogenic and cerebral vascular diseases (11%), and respiratory system diseases (5%). Disability-adjusted life years (DALYs) for injury account for 17% of the total, less than that for infectious, perinatal and gynaecological diseases (25%). DALYs for cancer, cardiogenic and cerebral vascular disease, and respiratory system diseases are 10, 14 and 9%, respectively.

The main causes of death due to injury, in descending order according to death rate, are: suicide, traffic accident, drowning, falling, poisoning, homicide, burn and scald, and iatrogenic injury. Mortality caused by suicide, traffic accident and drowning jointly account for 55% of total injury deaths, with death rates at 17, 13 and 7 per 100 000, respectively.

Location, gender and age distribution of injury-related fatalities

The injury-related death rate in urban areas is 40/100 000, whereas that in rural areas is 73/100 000. The leading three causes of death in cities are traffic accident, suicide and falling, whereas those in rural areas are suicide, traffic accident and drowning (in descending order). Among all injury-related fatalities, the death rates for suicide, drowning, and burn and scald in rural areas are significantly higher than those in cities: risk ratios are 3.8, 4.3 and 4.1, respectively.

The injury death rate for males is 80/100 000, whereas that for females is 51/100 000. Traffic accident is the primary cause of male death: the rate, at 19/100 000, is 2.7 times that for females. In contrast, suicide is the primary cause of female deaths: the rate, at 19/100 000, is 1.2 times that of males among all injury causes.

Drowning is the primary cause of death among persons less than 15 years of age (for both boys and girls), whereas suicide is the primary cause of death among persons ≥ 15 years of age. In the age group 15–34 years, the suicide death rate for females (27/100 000) is significantly higher than that for males (15/100 000), but the reverse is true for the age group ≥ 60 years (66/100 000 for males and 52/100 000 for females). Suicide, falling and traffic accidents are the major causes of death among the elderly.

THE SAFE COMMUNITY CONCEPT

Safety is a state in which hazards and conditions leading to physical injury, i.e. psychological or material harm, are controlled in order to preserve the health and well being of individuals and the community (Maurice *et al.*, 2001). Such a state is an essential resource for everyday life, required by individuals and communities to realise their aspirations.

Safety promotion can be defined as a process that aims to provide populations with the means to ensure the presence of, and maintain the conditions necessary to reach and sustain, an optimal level of safety (Welander *et al.*, 2000). Organized efforts by individuals, organizations and communities are needed to achieve the final goal. Safety promotion can be carried out at many levels: national, regional, local, organizational and individual. In practice, safety promotion at a local community level is the essence of a 'Safe Community'.

The phrase 'Safe Community' means a local district with an active injury-prevention programme covering all ages, environments and situations, where networks of public authorities, health services, voluntary organizations, enterprises and interested individuals work together (Svanström, 1992). The fundamental idea behind the Safe Community is to address all aspects of safety and prevent injuries in all areas, encompassing all ages, environments and situations, and involving both governmental and non-governmental community sectors. The Safe

Community model provides a framework for a community-based injury-prevention programme. Community intervention is distinguished by a shift in focus away from individual responsibility, concentrating instead on multi-faceted community-wide interventions designed to ensure that everyone in the community is involved (Ekman *et al.*, 1999). The basic principle is that a programme must be based on all relevant organizations in the community and be closely associated with all relevant sectors of activity. Nevertheless, the structure used to promote safety will vary from community to community and from country to country.

The concept of Safe Community was formally introduced internationally at the First World Conference on Accident and Injury Prevention in Stockholm in 1989 (Manifesto for Safe Communities, 1989). It is now a part of the WHO's Global Injury Prevention Program, and is recognized as offering an effective and long-term beneficial approach to the prevention of injuries at a local level.

EFFECTIVENESS OF INJURY PREVENTION IN SAFE COMMUNITY PROGRAMMES AND WHAT LESSONS CAN BE LEARNT

Many programmes have been evaluated around the world, but mainly in Scandinavian and English-speaking countries. Most of these evaluations are outcome-related; few are process-oriented. The effectiveness of Safe Community programmes in terms of decreasing injury rates has been demonstrated on a number of occasions (Ytterstad, 1995; Ytterstad and Soogard, 1995; Bjerre and Sandberg, 1998; Timpka *et al.*, 1999; Bjerre and Schelp, 2000; Svanström, 2000b; Lindqvist and Lindholm, 2001; Svanström, 2001).

Since the Manifesto for Safe Communities was adopted at the First World Conference on Accident and Injury Prevention in Stockholm in 1989, almost 70 communities, each covering between 1000 and 2 million inhabitants, and from all over the world, have been designated 'Safe Communities' by the WHO Collaborating Centre on Community Safety Promotion at the Karolinska Institutet (www.phs.ki.se/csp). This designation process is based on judging how the communities fulfil six indicators (Figure 1).

We learnt from that process how communities have been struggling with the initiation and

Safe Communities have:

- An infrastructure based on partnership and collaborations, governed by a cross-sectional group that is responsible for safety promotion in their community;
- Long-term, sustainable programmes covering both genders and all ages, environments and situations;
- Programmes that target high-risk groups and environments, and programmes that promote safety for vulnerable groups;
- Programmes that document the frequency and causes of injuries;
- Evaluation measures to assess their programmes, processes and the effects of change; and
- Ongoing participation in national and international Safe Communities networks.

Fig. 1: Indicators for International Safe Communities (www.phs.ki.se/csp/indicators.htm).

sustainment of their programmes. The long-term evaluation of the Falköping community safety promotion programme has, for example, highlighted the importance of setting up an inter-sectoral steering/coordination group to lead and sustain such programmes (Svanström *et al.*, 1995; Svanström *et al.*, 1996). At the very moment this committee exerts activities, the programme fades and the injury rate decrease stops. A country with community orientation of its policies and experience in working across sectoral borders will eventually have greater success with a Safe Community programme than those who do not.

We also learnt that communities can be successful in constantly decreasing injury rates by maintaining momentum over many years (Svanström *et al.*, 1996). But these processes also need support from levels higher up in the system. Some nations, especially the Scandinavian ones, have organized support structures for community safety promotion on the national level and also intermediate levels (Svanström *et al.*, 1989; Svanström, 2001).

DISCUSSION

The need for the development of Safe Communities in China

From the point of view of safety promotion, there are currently many programmes and activities in China at various levels: national, community, within work places and organizations, etc. These are concerned with the prevention of

natural disasters (floods, earthquakes, etc.), the prevention of fire-related injuries, traffic-safety legislation (which is continually being reinforced), occupational injury prevention in enterprises, and safety education in schools, universities, and so on. At the community level, there are also many programmes and studies in progress. For example, Zhang and coworkers (Zhang *et al.*, 1999) reported on an intervention study regarding the violent and suicidal behaviour of mental patients in a community in Shanghai. The results show that the incidence rates of both violent and suicidal behaviour decreased significantly following the implementation of a family and community-oriented intervention programme.

Recently, Yan and coworkers (Yan *et al.*, 2001) reported the intervention effect of a 'Residence Committee' in Shijiazhuang City. After 1 year, both knowledge and attitudes related to injury prevention were significantly improved among residents of the intervention group, with the overall injury-incidence rate falling by 37%; by contrast, in the control group, the rate of reduction was 14%. Cost-benefit analysis of the intervention showed that the ratio of cost to benefit was 1:10. However, no community-level programme has been evaluated according to WHO Safe Community criteria, and no district has yet been included in the Safe Community Network.

Injury has been adopted as one of the key public health problems in the strategy for disease prevention and control in China. It is anticipated, in the immediate years ahead, that there will be a series

of national-level programmes oriented towards injury prevention, organized and implemented in the country at large. Given China's current injury status and its rapid industrialization, there is an urgent need for further strengthening of safety promotion, and injury prevention and control.

In our recent contacts with academics, as well as authorities representing 10 large metropolitan areas including Beijing and Shanghai, we learnt that interest is sufficiently high to test and develop a Safe Community approach to the problem in China. We can assume that the potential is related to the fact that the Safe Community model has provided a definition, or a kind of 'standardization', via the series of indicators. The application process for joining the Safe Community Network focuses on a community's energy, resources and values with regard to safety promotion. This enhances local networking and increases the area-wide momentum established for any community programme. Joining the network also provides a technical and collegial support structure (Svanström, 2001).

Possible strategies and prioritized targets for community safety promotion in China

In the Manifesto for Safe Communities, four action areas were identified: (i) formulate public policy for safety; (ii) create supportive environments; (iii) strengthen community action; and (iv) broaden public services (Manifesto for Safe Communities, 1989). It is contradictory that despite our opinion that the need for community safety promotion is higher in rural areas, the interest has been more evident in larger urban cities. This is probably more an expression of the organizational and economic capacity of those regions than evidence of any higher priority. So far the labour sector and the universities are the only structures above the municipalities and cities that have shown any interest in Safe Communities development. We suggest, however, on the basis of experiences of Safe Community development in different regions that, at least initially, rural areas should be focussed upon, with the village or township as a community. In contrast, in urban areas, a residence committee or district should be regarded as a community for which to plan a Safe Community programme.

Through gathering experiences of development, Safe Communities should then be steadily extended to counties, cities, prefectures, and even provinces. Any single community may

design its own programme—the one most suitable or practical for implementation and sustainability according to its own conditions—but such a programme must at least comprise the following basic elements of any Safe Community programme: population-based information, supervision, intervention and evaluation (Svanström, 2000a).

Injury is a complex phenomenon, which includes many aspects on several dimensions. A programme may cover several aspects simultaneously, or just one or two. These might be drowning prevention and pesticide-poisoning prevention in rural areas, or indoor-injury prevention and leisure-time injury prevention in urban areas. However, experience so far has shown that a multi-focussed and more comprehensive safety promotion programme yields additional results to single-sector ones.

In designing Safe Community programmes, the following should be regarded as prioritized target populations: children, the elderly, cyclists/passengers and farmers.

Children

Drowning is the primary cause of death among children aged 0–14 years, followed by traffic accidents and poisoning. Deaths caused by drowning are mainly due to swimming accidents or accidental falls into water, especially in rural areas (Tan *et al.*, 1998).

Studies of schools in Guangdong have shown that 30–40% of pupils suffer at least one kind of injury within a 1-year period. Among injured pupils, medium and serious injuries account for 8%, with a disability rate of ~120/100 000. The locations where injuries occurred were mainly at home and on campus. Results of an analysis of cognition-related injury prevention among children, their parents and teachers show that relevant knowledge is often lacking (Li, 1999; Wang and Huang, 2001). A report based on national surveillance data shows accidental mortality rates among children of <1 and 1–4 years of age of ~500/100 000 and ~830/100 000, respectively. The primary cause of death is accidental suffocation, followed by drowning and poisoning. Zhang and coworkers (Zhang *et al.*, 1998) reported that accidental suffocation accounts for 85% of total accidental deaths among infants, with the main cause being suffocation by quilt. Accordingly, in the context of a Safe Community programme, a relatively small input might save a large number of children's lives.

The elderly

The injury–mortality rate of the elderly is the highest of all age groups, with the main causes of death being suicide, falling and traffic accidents. A report from Beijing shows that the main injury causes of death of persons ≥ 60 years of age are falling, traffic accident, poisoning and suicide. Another survey in Guangdong shows that the main causes of injury include traffic accident, falling and scalding (Li *et al.*, 1997; Wang and Huang, 2001). Given the combined effects of various physiological, psychological and environmental factors, the elderly are susceptible to injury, and also impose a heavy mental and financial burden on both family and society. With the change in the disease spectrum, the development of the economy and the improvement in health services in China, life expectancy is increasing and the phenomenon of an aging population is becoming ever clearer. There are currently >100 million people ≥ 60 years of age in China. It is estimated that this number will double over the coming decade. In large cities, such as Shanghai, the percentage of persons ≥ 65 years of age will be 14.3 and 14.8% by the years 2005 and 2010, respectively (Lin *et al.*, 2001). Quite clearly, the elderly should be a priority target for injury prevention in the planning of Safe Community programmes.

Cyclists and bicycle passengers

Bicycles are widely used as a means of transportation in China. There are at least 400 million bicycles in the country, and bicycle-related traffic accidents account for $\sim 30\%$ of total traffic accident deaths (Wang and Chi, 1999; Wang and Huang, 2001). Thus, cyclists and their passengers are substantial contributors to traffic accidents in China. A study conducted in Wuhan (Li *et al.*, 1997) showed that, among injuries to bicyclists, at least 79% of fatalities and 17% of emergency room cases were the result of head injuries. The majority (71%) of these resulted from head contact with a concrete or asphalt road. It is noteworthy that bicycle-helmet wearing is non-existent, among both the injured and the cycling population in general. Most of the injured cyclists interviewed in emergency rooms knew nothing about bicycle helmets, and few agreed that a helmet should be used while cycling. In the prevention of bicycle-related traffic accidents in Safe Community programmes, as well as learning from the successful experiences of promoting

bicycle-helmet use in other countries (Cameron *et al.*, 1994; Welander *et al.*, 2000; Svanström *et al.*, 2002), bicycle passengers (largely pre-school children) should also be a priority target for intervention. However, the struggle to organize national interventions in a country where most people use a bike can be illustrated by the Swedish experience (Svanström *et al.*, 2002).

Farmers

Although injury in general is receiving increasing attention as a key public health problem in China, little has been done about the work-related injuries suffered by the country's >800 million farmers (He, 1998). Safe Communities may have an important role to play in the injury prevention and control of farmwork-related injuries in China. A survey based on 1500 farmers in Hubei Province (Xiang *et al.*, 2000) showed that 33% of Chinese farmers reported at least one work-related injury during the 24 months preceding the survey. The main external injury causes were hand tools (50%), falls (26%) and heavy falling objects (10%). The risk factors that significantly correlated with injuries were low family income and having 1–6 school years of education, and also self-reported pesticide exposure, tension in relationships with neighbours, and general life stress. A salient result was that 42% of farmers did not use personal protective equipment when working with pesticides, which was found to be strongly associated with the injury rate.

It would be fair to conclude that there are no doubts surrounding the need to develop injury prevention and safety promotion further in China. The mere sociological structure of China itself and the current changes within the country indicate the need to focus on inter-sectoral solutions on the primary level.

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