CHAPTER 5

Safety Promotion: Education and Legislation

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CONTENTS

ABSTRACT

Road safety efforts around the world focus a great deal of attention on public education and information campaigns. However, scientific studies done over the past few decades show that very often these programmes are not very successful in altering human behaviour. At times some educational programmes also have an effect that is opposite to what was intended. There is no evidence that public education and information campaigns when used alone have a significant effect in reducing road traffic injuries. This is especially true for programmes aimed at young children. In this chapter we discuss the reasons why public education programmes have not been very successful and a summary of the studies done over the pat fifty years that give us convincing evidence regarding this. The chapter includes guidelines for effective information and education programmes.

Key Words: Road safety; education; campaigns; safety information

5.1 INTRODUCTION

Whenever a community is faced with a rising incidence of injury in any activity it launches an 'educational' programme to control the problem. Such programmes can be very expensive and time consuming. However, scientific studies done over the past few decades show that very often these programmes are not very successful in altering human behaviour (Robertson 1980b, a; Roberts et al 1994; O'Neill 2001; Duperrex, Roberts, and Bunn 2003; Lund and Aaro 2004; Robertson et al 1974; Robertson 1983; Williams 2007; Sandels 1975). At times some educational programmes also have an effect that is opposite to what was intended. However, the promoters of all educational campaigns erroneously believe that:

- Useful information regarding safety in the environment can be transferred easily to the brain of all human beings.
- Knowledge regarding safety will always result in safer behaviour and greater use of safety devices.
- Skills to operate something safely can be taught to all; improving people's skills results in safer outcomes.

Experience with educational and propaganda campaigns shows that these assumptions are not necessarily true (Robertson 2007; O'Neill 2001; Sandels 1975; Duperrex, Roberts, and Bunn 2003; Roberts, Kwan, and Cochrane Injuries Group Driver Education 2003). In many cases people either do not receive the information at all, receive only part of it, or even, receive the opposite of what is intended. Studies show that it is not necessary that people act according to what they know is correct (Smith et al 1997; Kraus, Riggins, and Franti 1975). Some groups, like teenagers, even end up doing the opposite of what they are told is correct (Kraus, Riggins, and Franti 1975). Many 'skilled' persons, like experts in car driving or skiing, are known to sustain more injuries than 'ordinary' persons (Williams and O'Neill 1974)!

In this chapter some of these findings have been summarised and guidelines outlined for conducting effective educational programmes. The following sections illustrate how some of the above assumptions are not always valid and how to impart effective education for injury control.

5.2 INFLUENCE OF SYSTEMS AND THE ENVIRONMENT ON 'HUMAN ERROR'

Policy makers and traffic safety professionals in every country find it very difficult to institute changes that actually result in a dramatic decrease in traffic fatalities and injuries in a short time. Public education campaigns are based on the assumption that most crashes are the result of 'human error' and road users can be 'educated' to avoid making such mistakes. William Haddon wrote seminal pieces on the folly of focussing on 'human error' as the main cause in the occurrence of accidents (Haddon and Baker 1981; Haddon 1968, 1980a, b; Baker and Haddon 1974). He did not like the use of the word 'accident' as he thought that this leads a feeling of inevitability in the occurrence of these incidents. Experience has also shown that not all individuals follow all the instructions given to them to promote road safety. Perrow also provides a similar reason that individuals cannot always be held responsible for 'human error' under the system they operate in, because the environment and the system itself influence their behaviour, "I wish to point away from the basic and pervasive sin identified by those who casually examine organizational failures, that of operator error; this is given as the cause of about 80% of the accidents in risky systems. I would put it at under 40%. I will suggest that what is attributed to operator error stems primarily from the structure they operate in, and thus, stems from the actions of elites. Elite errors and elite interests stem from their class and historical power positions in society, and changes in these positions are glacial" (Perrow 1994, 1999).

This is why attempts to 'educate' people regarding safety are also not always very effective and wide variations are found between people's knowledge and their actual behaviour. This is partly because we cannot select who is going to use the road and who is not. While some control can be exercised in licensing drivers of motor vehicles, almost no control is possible in the selection of pedestrians and bicyclists. Almost everyone in a population can be a road user and this has implications on how we deal with the issue of traffic injuries as a public health problem.

Systems that ensure a life safe from injury cannot be put in place without a societal and political understanding of the ethical responsibilities of the state and civil society to ensure all individuals a right to life, according to currently available knowledge and technology. This right is implicit in the public health approach followed in controlling communicable and non-communicable diseases. As in the case of all diseases, we should be able to assume that most human beings would try to prevent the occurrence of an episode of ill health if they were able to. This involves an understanding of the phenomenon to a certain extent, and at the same time the provision of means to individuals and societies to be able to do something about it.

5.3 LIMITATIONS OF ROAD USERS

5.3.1 Perception of risk

Over hundreds of centuries human beings relied on intuition, instinct, and gut feeling to live a safer life. Many of these life saving attributes became embedded in our genes to save us from dangers such as the fear of heights (Dawkins 2008). However, as new risks appear in our environment, we have to learn to assess the actual risk and how to detect it. This is not easy. For example, it is impossible for us to guess that minute traces of pesticides in our food or diesel fumes in the air might lead to cancer. Slovic and Peters (2006) also suggest 'people judge a risk not only by what they think about it but also by how they feel about it. If their feelings toward an activity are favorable, they tend to judge the risks as low and the benefits as high; if their feelings toward the activity are unfavorable, they tend to make the opposite judgment—high risk and low benefit'. As most road users perceive the benefits of mobility as desirable they are likely to judge the risks on the road as low.

Human beings act to protect themselves when they perceive the risk of harm to be high. Every time you put your hand in a flame you get burned, a risk of almost one hundred per cent. We learn very early not to put our fingers in a flame. But the most educated individuals all over the world still get burned sometimes. Similarly, the risk of falling from heights. Every time you fall from more than two meters you expect to get hurt. Consequently, people don't go around jumping from the second floor as a matter of habit. We do not need any campaigns to teach people the danger of falls from heights.

On the other hand, the risk of sustaining a serous injury or fatality in road traffic crashes per trip is very low. For city of Copenhagen the risk per million trips was calculated to be 8 per 100 million trips for car occupants and 21 per 100 for bicyclists (Jorgensen 1996). Even if in some locations the risk is ten times higher, it still remains less than 1 per million trips. These risks per trip are far too low for most human beings to take a safety precaution *every time* they take a trip. If human beings started being very careful at such low risk levels, most human activity would stop. This is why people don't always act according to instructions when on the road, because they do not perceive the risk level to be very high.

5.3.2 Involvement of the whole population

It is very difficult to get everyone to behave in a safe way when we cannot specifically select the people who will be involved in certain activities, such as domestic work, use of the road, and in

most of our work environments. In addition, on any day, the population on the road includes individuals preoccupied for any of the following reasons:

- Those who cannot concentrate on the job at hand because they have suffered a recent personal loss or disappointment—such as death of a loved one, loss of a job, failure in an important examination, monetary loss, and the like.
- Those who are preoccupied with problems in personal relationships with a spouse, parent, sibling, or close friend.
- Those who are taking medications or drugs that alter behaviour and perceptual abilities, or those who are under the influence of alcohol.
- Children whose cognitive and motor skills make it difficult for them to understand or follow instructions given to them.
- Elderly people whose motor and cognitive functions are impaired.
- Psychologically disturbed persons who may not be able to function as desired but who cannot be excluded from participating in road traffic.

If we estimated the percentage of individuals who might fall into one of the above categories on any given day, the estimate would amount to a significant proportion—possibly as much as 20 to 30 per cent. These individuals cannot always be identified or prevented from participating in these activities. These are the individuals who are not likely to observe instructions and thus are likely to be involved in crashes. Each one of us has been preoccupied at times and behaved differently on that day compared to all other days.

Traffic systems must be designed safely, not only for "normal" people but also for those who might belong to any of the groups listed above. Such designs, rules, and regulations would reduce the probability of people hurting each other or themselves, even when someone makes a mistake. Perrow states this issue forcefully (7): 'Above all, I will argue, sensible living with risky systems means keeping the controversies alive, listening to the public, and the essentially political nature of risk assessment. Ultimately, the issue is not risk, but power; the power to impose risks on the many for the benefit of the few'.

5.3.3 Evidence on limits of education

Robertson (2007) and Williams (2013) have done seminal work on the limitations of education in general and driver education in particular over the past five decades. Williams concludes that 'However, the aim of most educational and training programs is to change individual behavior. When used alone, they largely fail to do so'. This section is largely based on Robertson and Williams' and many examples taken from their writings.

5.3.3.1 Example 1. Promotion of seat belt use

Television advertisements were prepared by a panel of consumers and advertising experts to promote the use of seat belts. The advertisements were shown on a special cable network received by only certain families (intervention group). Comparison families did not see the special messages on their televisions. Observations of seat belt use were made at random locations in the community before and after the television campaign. The results: There was a slight decline in seat belt use by drivers from both intervention and comparison families, showing that those provided the education did not do better than those who did not (Robertson et al 1974).

A huge amount of energy and money was spent in efforts to find ways to increase seat belt use by educating of car users in North America and Western Europe after the installation of belts was made mandatory in cars in the mid 1960s. However, belt use did not exceed 30 per cent almost anywhere and was less than 20% in most locations until belt use was made compulsory and enforced. Attempts to convince people to use belts through education, exhortation, or persuasion

have had little success (Mackay 1985; Williams and Wells 2004). Many surveys have shown that people believe that belt use prevents injuries in a crash but still do not use them.

5.3.3.2 *Example 2. Promotion of helmet use*

The evidence that helmet use can reduce motorcycle rider fatalities by 30–50 per cent without accentuating the incidence or severity of neck injuries or harming the riders' sight or hearing is convincing and overwhelming (Bowman et al 1981; Mishra, Banerji, and Mohan 1984; Mohan et al 1984; Wagle, Perkins, and Vallera 1993; Tsai and Hemenway 1999; Brandt et al 2002; Hurt 1979; Peden et al 2004; Elvik and Vaa 2004). In spite of this knowledge and efforts of governments and civil society groups to promote helmet use all over the world, the majority of riders in a large number of countries do not wear helmets while riding a motorcycle (W.H.O. 2013). Just as in the case with seat belts, the proportion of motorcyclists wearing helmets rarely exceeds 30 per cent in the absence of a law that is enforced (Auman et al 2002; Radin Umar 2006; Keng 2005; Pervin et al 2009; Gururaj 2005; Mohan et al 2009; Houston 2007; Preusser, Hedlund, and Ulmer 2000; Bachani et al 2011; Haglund and Tibaleka 2012). These studies also show that when a compulsory law is enacted and enforced, helmet use rises dramatically and there is a significant decline in serious head injuries and fatalities. When a law is repealed, helmet use decreases and injury rates increase (Gururaj 2001; Preusser, Hedlund, and Ulmer 2000; Muller 2004; Mayrose 2008; Bledsoe et al 2002). In India, the compulsory helmet law applies all over the country, but states do not enforce it. Where the law is enforced use rates can be over 90 per cent, and where it is not the use rate can be less than 10 per cent (Mohan et al 2009). A study from East Africa reports that 97 per cent of motorcyclists on the streets of Kigali (Rawanda) use helmets compared to only nine per cent in the neighbouring Kampala (Uganda). The main difference is that the helmet law is enforced in Kigali but not in Kampala (Haglund and Tibaleka 2012). The experience of over half a century from all over the world shows that we cannot depend on education alone to ensure helmet use by more than 20–30 per cent of the motorcycle riders. It is only when there is a mandatory use law and it is enforced that the helmet wearing rates are more than 90 per cent.

5.3.3.3 *Example 3. Children and traffic safety*

Duperrex, Roberts, and Bunn (2003) reviewed 674 published and unpublished studies dealing with pedestrian education and found that 'Pedestrian safety education can result in improvement in children's knowledge and can change observed road crossing behaviour, but whether this reduces the risk of pedestrian motor vehicle collision and injury occurrence is unknown', and advise that '... environmental modification and the enforcement of appropriate speed limits may be more effective strategies to protect children from road traffic'. The uncertainty arises from the fact that most studies just test children's knowledge and not whether there was a reduction in traffic injuries. The issue of the effectiveness of education of young children in dealing with traffic was raised by Stina Sandels more than forty years ago and she warned that 'It is impossible to adapt fully small children to the traffic environment. They are biologically incapable of managing many of its demands' (Sandels 1975), and she concluded that 'It is concluded that it is impossible to radically lower the number of children's accidents by teaching safety measures' (Sandels 1974).

A study from Sweden examined the effects of the Swedish Traffic Club and found positive results in behaviour, such as more education by parents and more frequent use of safety devices, but the crash rate of the traffic club group increased (Gregersen and Nolén 1994). It is possible that the children became overconfident because of the course and thought they were more skilled than they actually were.

Child safety seats were available on the market in many western countries in the early 1970s and there a host of educational programmes were initiated to encourage parents to transport their children in the seats and not in their laps. Before the use of child seats was made

compulsory an observational study of children in cars in 1976 in USA reported that 'Ninety three per cent of passengers less than 10 years old were not restrained. Eighty nine per cent of passengers 10 or older and 78 per cent of the drivers were not restrained. Sixteen per cent of child motor vehicle restraint devices observed were not used, and 73% of those in use were not used correctly' (Williams 1976). However, the state of Michigan (USA) implemented a law in April 1982 mandating the use of child restraint devices for children under age four travelling in automobiles, and a study done in 1985 reported that 'the proportion of young children travelling restrained increased from 12 per cent before to 51 per cent after the law was implemented. More importantly, a 25 per cent decrease in the number of children under age four injured in crashes was associated with the law' (Wagenaar and Weblster 1985). Reisinger et al (1981) studied the effect of paediatricians' counselling to parents on infant restraint use among 269 women who gave birth to infants in Pittsburgh hospitals. They report that paediatricians were effective in increasing the protection of infants in cars at ages 2 to 3 months but diminished by age four months to an improvement of only 9 per cent.

5.3.3.4 *Example 4. Driver education*

Driver education and training for beginning drivers and refresher courses for experienced drivers are thought to be very important measures to control traffic crashes. Almost all committees on traffic safety propose establishment of regulated driving schools as an important component of safety policies. However, reviews of driver education conclude that the research evidence suggests that most driver education/training contributes little to reductions in accident involvement or crash risk among drivers of all ages and experience (Williams 2013; Mayhew and Simpson 1996; Vernick et al 1999). In fact some of these programmes can make things worse. Many secondary schools in the United States used to offer classes on driving motor vehicles. Financial cutbacks led to the cancellation of driving classes at several schools. A comparison of locations providing school based driving education and those that did not found that motor vehicle death rate for teenagers fell in those communities discontinuing the classes, compared with communities whose schools continued to offer them (Robertson 1980a). This result has been confirmed by a systematic study of the literature on school-based driver education which concludes that 'There is no evidence that driver education reduces teenage involvement in road traffic crashes. Because driver education encourages earlier licensing it may lead to a modest but potentially important increase in the number of teenagers involved in road traffic crashes' (Roberts, Kwan, and Cochrane Injuries Group Driver Education 2003).

Most evaluations of driver training evaluate knowledge and skill but not the actual records of road traffic crashes after the training. It is assumed that better skills will always reduce the incidence of crashes, but this may not be so. One of the earliest studies to demonstrate this was a study of race car drivers who had been trained in crash avoidance techniques; they had more crashes per driver and per mile than ordinary drivers (Williams and O'Neill 1974). The limitations of driving skill were confirmed by a study in the United States in which the group that scored higher on the road performance test than did those in a control group or a minimum training group had more crashes subsequent to the training (Stock et al 1983).

As drivers' errors are thought to be an important factor contributing to traffic crashes in-service drivers are sent by many organisations for refresher or advanced training courses, but the experience with these types of interventions is also not very positive. A systematic review of post-licence driver education provides no evidence that is effective in preventing road traffic injuries or crashes (Ker et al 2005). The authors conclude that 'Although the results are compatible with a small reduction in the occurrence of traffic offences, this may be due to selection biases or bias in the included trials. Because of the large number of participants included in the meta-analysis (close to 300,000 for some outcomes) we can exclude, with reasonable precision, the possibility of even modest benefits'.

Since motorcycles are more unstable and more hazardous than cars for their occupants, rider training is promoted as a requirement by many authorities. However, we still do not have any evidence on what kind of training would result in a reduction in crash rates. In a systematic review of 23 research studies the different types of rider training were evaluated (Kardamanidis et al 2010). The findings suggest 'On the basis of the existing evidence, it is not clear if (or what type of) training reduces the risk of crashes, injuries, deaths or offences in motorcyclists and the selection of the best rider training practice can therefore not be recommended. That educational efforts may actually increase injuries is also possible'.

The above summary of the effectiveness of driver training programmes paints a gloomy picture. However, this does not mean that driver training and licensing is not necessary. Recent experiments with graduated licensing schemes have shown positive results because the initial driving period of novice drivers is extended and their freedom to drive limited (Williams 2005; Williams 2011; Mayhew and Simpson 1996; Kingham et al 2008; Hedlund and Compton 2004). Driver training is also necessary to make drivers familiar with rules and regulations and to impart important messages regarding driving etiquette. However, it is quite clear that we cannot expect driver education programmes to make significant reductions in crash rates.

5.4 EFFECTIVE COMMUNICATION

Messages that warn car drivers to 'Wear Your Seat Belt' or messages like 'Safety First' or 'Drive Safely' are much too vague, do not give any new information and consequently are ineffective. Even specific messages, however, do not guarantee a reduction in injuries – human behaviour is complex and often unpredictable. Education involves the communication of ideas, knowledge, attitudes, and feelings. Sibley and Harre (2009) advise us that 'Exposure to driving advertisements (either positively or negatively framed) did not significantly alter implicit, automatic self-enhancement biases (measured using a computerized reaction-time task). These findings emphasize that positively framed messages are more effective than negatively framed messages at influencing important psychological processes underlying driving behaviour, although such effects are limited, at least in their immediacy, to deliberative fast-learning(or propositional) processes'. Passive messages on TV, billboards and other media are not very successful in reducing traffic injury rates.

Many road safety agencies believe that frightening people about the outcome of crashes by showing bloody images of disabled and dead victims should encourage road users to adopt safer behaviours. There is no scientific agreement regarding this. Most findings inform us that positively framed messages are more effective than negatively framed messages at influencing driving behaviour, although such effects are limited (Lewis, Watson and White 2008; Lewis, Watson and Tay 2007; Sibley and Harre 2009).

However, we do have methods of effective communication that help us promote policies and regulations in the control of road traffic injuries. The findings can be summarised as follows:

5.4.1 Effective education programmes

1. Joint effort by community leaders and groups, media, schools and professionals based on evidence based countermeasures over long periods of time.
2. Education of professionals and policy makers.
3. Information about new safety products, infrastructure designs and why they are safer.
4. Information on safer but similar (in price and ease of use) vehicles and safety products like helmets, child seats, etc.
5. Programmes in support of new laws and infrastructure designs. The introduction of new laws and infrastructure designs should be preceded by education of road users on the

benefits of the new policies. This should accompanied by descriptions of how and why the proposed designs and polices will be beneficial.

5.4.2 Unsuccessful education programmes

1. Frightening and unpleasant messages are not very effective.
2. Documentaries on TV exhorting people to do things that they already know.
3. Programmes aimed at the powerless people who cannot change their behaviour because of the way traffic is managed and the design of roads. For example, if there are no safe and convenient sidewalks on a road, it is useless telling pedestrians how to behave on the road.
4. Home truths and vague slogans through signs, pamphlets, brochures, and billboards.
5. Painting competitions, rallies and once a year safety programmes for children.

5.5 CONCLUSIONS

There is no evidence that public education and information campaigns when used alone have a significant effect in reducing road traffic injuries. This is especially true for programmes aimed at young children. Some education programmes may change behaviour but not injury rates. Many documentaries and safety advertisements win awards for their artistic quality and retention in people's minds, but they may not result in safety benefits on the road.

Many governments, road safety agencies and road safety activists conduct expensive public education programmes on the assumption that just telling people what to do will change their behaviour for the good. These efforts bring good will to these actors but we have almost a century of experience that these efforts are not very successful. The best efforts to get people to use seat belts and wear helmets have rarely managed to get use rates above 20 per cent. Such efforts also divert attention, resources and energy from policies that will make our roads and vehicles safer and enforcement efforts more successful. On the other hand, education efforts directed at educating policy makers and professionals, giving new scientific information about safer vehicles and safety products, and in support of safety legislation and laws will help us move forward to a much safer world.

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