

## **An Innovative Intersectoral Bicycle Helmet Program In Malaysia**

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#### **PROBLEM**

Bicycle fatalities constitute about 4% of road fatalities in Malaysia. The majority of these fatalities occur in rural areas, where children ride bicycles to school. Head injuries accounted for more than 50% of these fatalities.

#### **OBJECTIVES**

To assess the feasibility of implementing of a pilot school based bicycle helmet program

#### **METHOD**

The first bicycle helmet program was implemented in 1995. Since then a total of about 3 000 children have been involved in programs in 11 states of Malaysia. We are now in the process of implementing a program involving 600 children in the eastern state of Terengganu. Many sectors will be involved in the program. Evaluation of this program will involve random assessment of compliance to helmet wearing, outcome of involvement in crashes, if any, etc.

#### **RESULTS**

Results of the implementation and evaluation will be presented at the conference.

#### **CONCLUSION**

Bicycle helmet programs need to be expanded in low and middle income countries

## **Controversies On Helmet Laws**

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### **PROBLEM**

There are controversies relating to helmet laws worldwide. These laws are in force in many parts of the world but they have been repealed in some places like Taiwan and Arkansas, USA. There are opinions in support of its enforcement while the opponents of the laws believe that many published negative findings resulted from biased statistical analyses.

### **OBJECTIVES**

To review the controversies surrounding the use of helmets among motorcycle riders and passengers and the present situation in Ilorin, Nigeria.

### **METHOD**

Medline search on helmet laws and motorcycle was done and the articles generated were used to study the controversies surrounding the helmet laws. The data from the study on motorcycle injuries at the University of Ilorin Teaching Hospital was also used to assess the state of helmet use in Ilorin, Nigeria.

### **RESULTS**

A total of 64 articles were recovered on the subject. The factors advanced in support of making the use of helmet to be voluntary include infringement on fundamental human rights of the motorcycle riders and passengers, that majority of motorcycle trauma morbidity and costs are the results of injuries to body regions other than the head and that many published negative findings resulted from biased statistical analyses. Many prospectively conducted studies have demonstrated higher costs of treatment, higher incidence of head and cervical injuries and mortality in unhelmeted patients. Some of these studies controlled for alcohol, extremity injuries and severity of injuries. All the studies concluded that the use of helmet is beneficial. At the Accident and Emergency Department of the University of Ilorin Teaching Hospital, Ilorin, Nigeria, 96 patients with motorcycle injuries were studied for a period of a year (August 2004 and July 2005). Of these, none used a helmet. There were 60 (62,5%) riders and 36 (37,5%) passengers. There were 71 (74%) patients with head and cervical injuries. Seven (7,3%) patients died from causes relating to their injuries. Of these, all (100%) resulted from head injury.

### **CONCLUSION**

The review of literatures shows that the use of helmet is beneficial and it reduces the morbidity and mortality associated with motorcycle injuries. Our local experience also lends credence to these facts

# **Factors Affecting Motorcycle Helmet Use Among Commercial (Boda Boda) Cyclists in Kawempe Division - Kampala District Uganda.**

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## **PROBLEM**

Road traffic crashes are the most important cause of all unintentional injuries and constitute a major health problem worldwide. By 1998 road traffic accident injuries were estimated to be the 9th leading cause of loss of healthy life globally and are projected to become the 3rd leading cause of death by 2020. Motorcycle crashes are associated with a wide spectrum of injuries, which are often in multiple anatomic regions. The leading cause of death is head injury, occurring in more than 50% of all motorcycle related fatalities. The use of personal protective equipment is recommended for all motorcycle riders. Motorcycle crash helmets are the most important protective equipment and principal safety measure in reducing the risk of hospitalisation, long-term care, rehabilitation, permanent disability and fatal injuries.

## **OBJECTIVES**

Helmet use is the best preventive measure against two wheel motorised vehicles related head injuries. A community survey was undertaken to assess the prevalence of helmet use, determine its association with socio-demographic and motorcycle/rider factors.

## **METHOD**

A total of 400 cyclists were recruited from a commercial rider community. Data collected by self-report using a semi-structured questionnaire

## **RESULTS**

The prevalence of helmet use was 28.5 % (95%CI 24.1-32.9). The main factors associated with helmet use were: age 26+ (OR 4.24, 2.39-7.46), owning a motorcycle driving license (OR 2.04, 2.39-7.46) and the use of a reflective vest (OR 2.04, 1.25-3.32).

## **CONCLUSION**

The prevalence of helmet use in Kawempe Division among commercial (Boda Boda) cyclists is low. About one in four of Boda Boda cyclists use a helmet. Older cyclists (26+ years) owning a driving license and using a reflective vest, were independently associated with helmet use.

# **Changes In Cyclist Helmet Wearing Following The Introduction Of Helmet Legislation In Alberta For Those Under Age 18**

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### **PROBLEM**

Helmet use is known to protect against head and face injuries in cyclists; however, voluntary use is low. Helmet legislation was implemented in Alberta, Canada in 2002 and required those under the age of 18 to wear a helmet while cycling.

### **OBJECTIVES**

The purpose of this study was to determine the changes in helmet wearing in Edmonton, AB cyclists following the introduction of a bicycle helmet law in 2002.

### **METHOD**

This study was conducted from July-August 2004 (post-legislation) and data were compared to a similar survey completed at the same locations and days in July-August 2000 (pre-legislation). The assessment of cyclists was made at randomly selected locations in the city by two independent observers. Univariate and bivariate analyses consisted of examining changes in the prevalence of helmet use between observation periods. Logisite regression analysis with adjustment for clustering was used to relate helmet use to cyclist characteristics, location, average annual income level and date (2004 versus 2000).

### **RESULTS**

Data were collected for 271 cyclists in 2004 and 699 cyclists in 2000. The overall prevalence of helmet use increased from 43% (95% CI: 39-47) in 2000 to 53% (95% CI: 47-59) in 2004. Helmet use increased in those under 18 but did not change in those 18 and older. In the cluster adjusted multivariate logistic regression model, the odds of helmet use significantly increased for those under age 18 (Adjusted Odds Ratio (AOR): 13,73, 95% CI: 6.44-29,29) but did not change for those 18 and older (AOR: 0,95, 95% CI: 0,61-1,48).

### **CONCLUSION**

Our results clearly show a substantial post-legislation increase in helmet use but only for those affected by the Alberta helmet law (i.e. those under age 18). These results identify persistent variation in the use of cycling helmets in Edmonton and the extension of the legislation to all age groups should be considered. Future research should focus on cycling rates and cycling injuries.

# **Helmet Use And Bicycle-Related Trauma In Patients Presenting To An Acute Hospital In Singapore**

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## **PROBLEM**

Fatal and non fatal bicycle crash rates have been increasing in Singapore. The cycling population is made up of commuting foreign unskilled and semi-skilled workers, recreational and sport cyclists. There are no bicycle helmet laws or designated cycling lanes in Singapore.

## **OBJECTIVES**

To describe the relationship between bicycle helmet use and injury pattern sustained by patients presented to an emergency department (ED) in Singapore for bicycle-related trauma.

## **METHOD**

Data was collected from all individuals treated for bicycle-related trauma between 1 September 2004 and 31 May 2005 using a closed ended questionnaire.

## **RESULTS**

One hundred and sixty bicyclists with the average age of 34.4 years (range 10 to 89) were surveyed. Among them, 80% were male and 30.6% were foreigners. Helmets were worn by 10.6% of the patients. Alcohol was clinically detected in 11.3% of bicyclists. There was no difference in bicycle helmet use between Singaporean and foreigners ( $P=0.275$ ). However, bicyclists  $\geq 30$  years compared to younger bicyclists ( $p<0.05$ ), and those who commute by bicycle compared to recreational or sport bicyclists tended not to wear helmets ( $p<0.01$ ). Foreigners compared to Singaporeans ( $p<0.05$ ) and bicyclists  $\geq 30$  years compared to younger bicyclists ( $p=0.011$ ) believed that helmets did not protect against head injury. Comparing the helmet wearing group with the non-helmeted wearing group, the injury pattern by body region was: head injury 5.9% versus 40.0% ( $p<0.01$ ); facial injury 5.9% versus 37.1% ( $p<0.05$ ). Not wearing a helmet, being hit by a motor vehicle and age was significantly associated with higher injury severity scores after adjusting for several potential confounding factors.

## **CONCLUSION**

Bicycle helmet use was low among our sample of injured patients. When worn, protection against injury was demonstrated. A campaign to promote use of bicycle helmets should be targeted at foreign workers and older bicyclists. Authorities should consider compulsory helmet laws for bicyclists and expanding anti-drunk driving campaigns to target alcohol intoxicated bicyclists.

# **Motorcycle Helmet Legislation for Preventing Injuries in Motorcyclists**

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## **PROBLEM**

Motorcycle riding is an accessible and cheap form of transport for many people worldwide, particularly in low and middle-income countries where other forms of private transport are not affordable. Despite evidence that motorcycle helmets are effective in reducing crash-related head injury, many low and middle income countries either do not have legislation for mandatory helmet wearing or the legislation is not enforced.

## **OBJECTIVES**

To examine the effect of motorcycle helmet legislation on death and injury rates in motorcyclists.

## **METHOD**

The protocol describing the proposed methods for the review was published in the Cochrane Collaboration Library in 2004. A range of electronic databases were searched for research studies on the topic using a set of pre-determined keywords. Reference lists of papers were searched for relevant articles and authors contacted and websites searched for unpublished papers. Study types included in the review were all relevant randomised controlled trials, quasi-randomised trials and observational studies. Two reviewers independently screened the search results for relevance to establish whether the study met the inclusion criteria, extracted data and rated study quality, with disagreements adjudicated by a third reviewer.

## **RESULTS**

15 studies were included in the review, including 5 interrupted time series studies, one controlled before after study and 8 studies that analysed state level data using a variety of regression models. Approximately 50 uncontrolled before-after studies were excluded from the review as they failed to meet the inclusion criteria; however, the results of these studies will be discussed. The data extraction, quality control and data synthesis is currently underway and detailed results will be presented.

## **CONCLUSION**

Using systematic and well defined methods, this Cochrane systematic review will summarise all available research examining the effectiveness of motorcycle helmet legislation in reducing injury and death. The results of this review will have significant implications for governments (particularly in low and middle-income countries) and policy makers seeking a concise synthesis of the research in this field.

# **Bicycle Helmet Legislation For The Prevention Of Head Injuries: A Cochrane Systematic Review**

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## **PROBLEM**

Bicycling is a very popular pastime and mode of transportation for children. However, bicycling-related injuries are common and frequently lead to hospitalisation or death. Bicycle helmets have been shown to be effective in preventing head, brain and facial injuries to cyclists, however, they are not universally used. Barriers to use helmets include prohibitive costs, discomfort, lack of belief of necessity and an unpopular image of helmets among young cyclists. In order to overcome resistance to helmet usage, legislation has been enacted in various parts of the world, including Australia, New Zealand, the United States and Canada. Evaluations have shown that legislation is successful in increasing helmet use. However, few studies have focused on head injury as the primary outcome. The few studies that have evaluated changes in head injury rates have mostly used a time-series design without a concurrent comparison group. Therefore, any reduction in head injury rates could be attributed to a general downward trend for reasons other than increased helmet use. Without conclusive and scientifically sound evidence, the issue of helmet legislation remains controversial. Opponents of helmet legislation claim that children will use bicycles less if they are required to wear a helmet and thus miss out on the health benefits and enjoyment that may be derived from cycling. Others adhere to the risk compensation theory, claiming that helmeted riders ride more dangerously and are at greater risk of injury. A systematic review of the highest level evidence is the first step to providing a clearer picture of the effectiveness of bicycle helmet legislation. If helmet legislation leads to a reduction in bicycle-related head injuries, the public health benefits could be substantial.

## **OBJECTIVES**

To examine studies that have evaluated the effectiveness of bicycle helmet legislation for reducing bicycle-related head injuries. The review will also examine studies that evaluate changes in helmet use, in order to assess enforcement across jurisdictions and additionally those assessing the popularity of bicycling to gauge possible deterrent effects of legislation.

## **METHOD**

The Cochrane systematic review methodology is being used to summarise the evidence for all high quality studies reporting outcomes related to bicycle helmet legislation. Electronic database searches, reference snowballing and contact with key personnel are being undertaken in order to identify potential studies. Two reviewers will independently screen potential studies against inclusion criteria, which stipulate that a community control is used for comparison. Data from included studies will be extracted independently by two reviewers and presented in a qualitative summary.

## **RESULTS**

Preliminary search efforts have thus far identified 23 articles in the published literature which describe outcome evaluations of bicycle helmet legislation. Nine of these studies have met the Cochrane inclusion criteria and subsequently been included in the systematic review. The outcomes of these studies will be synthesised for discussion.

## **CONCLUSION**

The Cochrane methodology for systematic reviews provides a concise summary of the literature relating to the effectiveness of bicycle helmet legislation for preventing head and facial injuries to cyclists.

# **The Human Factor: Law Enforcement Or Safety Of Motorcycle Riding In The Developing World, Kwara State, Nigeria As A Case Study 2004 -2005 June**

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## **PROBLEM**

The downward economy of the country forced unemployed youths to become commercial motorcyclists. As a result most commuters now use motorcycles as commercial transport because of its availability and speed during city hold-ups. These motorcycle taxis have led to a high rate of fatal accidents involving cyclists and passengers who do not wear crash helmets.

## **OBJECTIVES**

The aim of this paper is to investigate the effect of culture in the non-use of crash helmet by the cyclists and their passengers.

## **METHOD**

The problem was tackled in three approaches, i.e. a rider, vehicle and road approach. Hospitals were visited and various unions were interviewed and questioned in Kwara state.

## **RESULTS**

From the investigation, culture was found to be responsible for the non-compliance of use of safety helmet by riders.

## **CONCLUSION**

It was discovered that culture and religion were two major reasons for not wearing crash helmets by the motorcyclist. There is need for an aggressive public awareness campaign on the effect of non-use of crash helmets by riders.

# **Helmets For Kids Programme: The Vietnam Experience**

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## **PROBLEM**

Rapid economic growth and development in Asia is taking its toll on the roads. Road traffic injuries, especially motorcycle injuries are a major public health problem. Helmet use is not universal and where a law is enacted, enforcement is lacking, especially in rural areas. Vietnam has identified motorcycle crash-related injuries as a problem and is taking steps to address the prevention of all types of injuries. Though a motorcycle law exists, compliance is still lacking. Children are often carried on motorcycles and helmets for them are still not widely available.

## **OBJECTIVES**

The objective of the project was to implement and evaluate a motorcycle helmet programme for school children.

## **METHOD**

Johnson and Johnson worked with Asia Injury Prevention Foundation (an NGO) in implementing this project since April 2004. Five primary schools, where motorcycle injuries were common, were identified in four cities: Hanoi, Ho Chi Minh City, Da Nang and Hai Phong. In 2005, a further five schools in rural Quang Binh province were selected for the project. Children were given motorcycle helmets free of cost and instructed to wear them at all times when riding pillion on a motorcycle or when riding a bicycle. The helmets were produced locally and met international helmet safety standards. The children were also taught the importance of wearing these helmets correctly, i.e. buckling and right fit.

## **RESULTS**

A total of 10 831 helmets were given away during the project. From April 2004, there were nine recorded instances where participating children were involved in motorcycle crashes and escaped serious head injuries. We believe that more children could have had accidents but escaped injuries; however, our data collection system needs to be improved, especially in rural areas.

## **CONCLUSION**

This programme scored a success when serious head injuries were prevented in children involved in crashes by wearing motorcycle helmets. Johnson and Johnson will continue to support and help fine tune the programme to make it more effective.

# **Motorcycle Helmet For Kids, With Love And Care**

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## **PROBLEM**

Deaths and economic loss from transport crashes; especially from motorcycles were important problem of the Thai government. Since 2002, Thai motorcycle riders were killed by crashes with the average of 1 person per hour. In children less than 15 years old, 68 % of deaths from transport crashes were vehicle users and 72% of the child vehicle users died from riding on motorcycles. Estimated from death registry and National Injury Surveillance of 2003, approximately 12,000 children were admitted to provincial hospitals for treatment at the average of 33 persons per day or 1.4 people per hour. There were 1.5 child died every day, approximately 4 times of DHF deaths. In 2006, the information was presented to the deputy prime minister who acted as the Chairman of Road Safety Directing Center (RSDC), together with proposing to prohibit children from riding on MCs. After a three -month's consideration, the RSDC Board decided not to prohibit but seek for protection to the child instead.

Motorcycle helmet wearing is important for motorcycle riders. If the helmet wearing rate among motorcycle riders on the road is achieved at 90%, deaths and severe head injuries in motorcycle riders would be decreased by 30%. Motorcycle helmet law has been enforced in Thailand since 1996. This law did not exempt children. However, from the National Injury Surveillance report, 99.9% of the child motorcyclists who got severely injured did not wear motorcycle helmet. The causes of the problem were inadequate knowledge and lack of enforcement. This made the helmet industry not produce child motorcycle helmet for 3-5 year old child and helmet for 6-15 was difficult to find especially outside of Bangkok.

The Motorcycle Helmet for Kids, With Love and Care was a pilot project to communicate risks of the children in riding on motorcycles and appropriate measures for protections. It promoted helmet wearing in 3-14 year old children but did not accept driving by under 15 year old children. The concept of the project was to deal with predisposing factor (knowledge regarding risks and protection, enabling factor (the distribution of the child helmet and reinforcing factor (behavioral control by the major leaders in the province).

## **OBJECTIVES**

1. To raise awareness at the national level in the risks of the children in riding on motorcycle and the importance of the helmet wearing at all time on motorcycle.
2. To increase the helmet wearing rate of the child motorcyclists on the streets of the central district of the 15 pilot provinces to 90%.
3. To obtain concerns in the problem in related organizations in the pilot provinces.

## **METHOD**

1. Fund raising from the private sectors to support the production of the helmet for children from 3-5 year old and for project implementation was tried.
2. A contract was to be signed by the governors, the chief police and the education chief of each province with the RSDC director in order to apply to be the pilot provinces.
3. Meeting with the multi-sectoral team of the province to discuss the project concept, planning and activities in the central and provincial at the beginning, then again in the middle of the project to exchange experience and lessons learned.
4. Set up of internal monitoring system.
5. Empowering visit to the province by project manager.
6. Educational campaign within the pilot provinces and between the provinces.
7. Enforcement on helmet wearing in children within each province.
8. Evaluation by external evaluator.

# **The Evidence-Based Approach For A New Motorcycle Helmet Standard In Thailand**

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## **PROBLEM**

Motorcycle crashes have been reported as major killers on Thai roads since 1995. Almost all of the riders (80% of the injured and 90% of the deaths) did not wear helmet even though the law had been enacted for the whole country since 1996. The helmet wearing rate from the surveys in 2003 were about 40 % on Thai roads. One of the reasons for not wearing helmets, were discomfort in wearing and accumulated heat in the helmet. These were similar to Vietnam where the helmet was called “rice cooker”.

A new design of tropical helmet for motorcycle was recommended but hindered by the existing helmet standard which does not allow ventilating holes, in order to prevent penetrating injury

## **OBJECTIVES**

To identify the magnitude and proportion of penetrating injury to the head of the injured motorcycle riders in Thailand.

## **METHOD**

Secondary data analysis was done on the database of Thailand Injury Surveillance which was data of the severe injuries cases reported from 27 provincial hospitals with high capacity (500- 1,000 beds or more) under the Ministry of Public Health in 2003. It was presented in the technical seminar of the subcommittee of measures for helmet, Road Safety Directing Center with the presence of the manufacturers and the representative from Thailand Industrial Standard Institute.

## **RESULTS**

Out of 78,141 transport injuries, there were 60,802 motorcycle riders. Among them, there were 24,457 head and neck injury cases, with 92 % non-helmeted. Among these, 89.4 % had blunt injury only 0.6 % had penetrating injury. Among all diagnosis the largest proportion ( 66.2 % ) was intracranial injury (S06), followed by fractured skull and facial bones (S02) 12.6 %. Among all head fractures, fractured base of skull were most common (47.5 %).The study result would be proposed to Thailand industrial standard committee to consider a new standard helmet which allows ventilating holes to increase acceptance in motorcycle riders. This important enabling factor would obtain more compliance to the helmet law and save more lives.

## **CONCLUSION**

Evidence-based information is important for decision making.