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SOCIAL RESEARCH CENTRE

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A PILOT STUDY ON THE VICTIMS OF MOTOR-CYCLE ACCIDENTS — AN EPIDEMIOLOGICAL APPROACH

by

Mrs. B.T.W. Lo Chau and Dr. P.C. Leung

October, 1980

Authors' Note : This paper is an abridged version of a full report on the research which is obtainable from the Social Research Centre of The Chinese University of Hong Kong.

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Preface

The patient suffering from injuries arising from motor-cycle accidents is usually taken as a simple and straight-forward case by the surgeon. Simple and straight-forward , because the causative factors are obviously trauma and no clinical investigation needs to be done at all. So, such a patient is treated and discharged from the hospital within the shortest possible period.

One patient of motor-cycle injury could no doubt be the true victim of a traffic accident. But if the surgeon has to attend not one, but repeatedly one after the other, such patients, he would start asking, why do so many motor-cycle accidents happen? Could the accidents have been prevented at all? With his own efforts, the surgeon can only tackle the medical aspects of the injuries. With the help of the social scientist, he would start exploring the background of the accidents: the persons involved, the vehicle and the environment.

There is only one objective for this integrated effort between the surgeon and the social scientist: to find out more facts concerning the accidents so that more people would be interested in identifying the causative factors, and hence, contribute towards the possible prevention.

Dr. LEUNG P.C.
Princess Margaret Hospital

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We are thankful towards the Medical and Health Department which has given us the permission to carry out this research project at the Princess Margaret Hospital. Similar thanks ought to go to the Royal Hong Kong Police Force which has allowed us to make use of their data at the Police Station of the Casualty Department, Princess Margaret Hospital.

The Traffic Division of the Royal Hong Kong Police has also given us accessibilities to their data collections and has promised to be helpful in any future research of similar nature: we wish to acknowledge our appreciation.

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Introduction

There has been a rising popularity of motor-cycles as an inexpensive form of transport over the past five years. This trend has further increased with the oil crises and soaring prices for motor-cars.

Since the driver and the passenger of the motor-cycle are completely exposed to the driving environment, they are particularly prone to accidents. As the incidence of serious motor-cycle injuries increases, reports appeared rapidly from the U.S.A., Canada, United Kingdom and Australia on this serious problem (Krans 1975; Haddad 1976; Trinca 1979; Andrew 1979).

Hong Kong, a highly industrialised city, where the population is so dense and traffic so congested, cannot escape from this world-wide problem. The number of registered motor-cycles has increased from 14,089 in 1970 to 22,093 in 1978 (Police, H.K. 1978) and the casualties arising from motor-cycle accidents have increased from 815 in 1970 to 1,681 in 1978 (Police, H.K. 1978) (Table I).

Table I. Colony Total of Motorcyclist casualties from 1970-1978

	1970	1971	1972	1973	1974	1975	1976	1977	1978
Fatal	12	22	36	34	22	24	23	25	33
Serious	296	499	604	615	505	538	469	612	626
Slight	507	875	1047	1122	1044	1042	884	1053	1022
Total	815	1396	1687	1771	1571	1604	1376	1690	1681

N.B. Does not include pillion passengers.

Fatal : Any accident where death occurs within a year and a day of the accident.

Serious : A serious accident is one which a person is detained in hospital for more than 12 hours.

Slight : A slight accident is where a person is injured but not to the extent that detention in hospital is required.

In proportion to the numbers of registered vehicles, the incidence of accidents occurring among motor-cycles is far more frequent compared with other types of vehicles. Thus, although the number of motor-cycle licenses issued was only about 1/5 that of private cars, the number of deaths arising from motor-cycle accidents was nearly ½ that of private car accidents in the years of 1973 to 1978.

The extremely busy traffic in Hong Kong would naturally create a high incidence of traffic accidents. However, as the motor-vehicles in Hong Kong run through narrow streets and not motor-ways, the accidents usually occur with low running speeds; hence, not many fatal injuries would result.

With this basic assumption that our motor-cycle injuries should have our own unique features, we planned this prospective study to look into the pattern of injuries of the victims and to explore the factors that might have contributed towards the accidents.

The objectives of the research included:-

1. to describe the profile of the motor-cycle accident victims and find out the pattern of their injuries;
2. to study some of the management problems involved in the surgical treatment, follow-up and rehabilitation of the victims;
3. to find out the victims' views on the nature and possible predisposing factors of the accidents;
4. to explore the socio-economic and psychological effects of the accidents to the victims after a period of 3-4 months.

Method

All injured motor-cyclists who came to the Casualty Department of the Princess Margaret Hospital, Hong Kong, were included as the target population for the present study. The Princess Margaret Hospital is the regional hospital for the North Kowloon, Tsuen Wan and Tuen Mun areas which were holding a population of about a million (Figure I).

The patients were divided into two groups: those who were discharged home after treatment and those who needed hospitalisation.

The study period lasted eight months: from December, 1978 to July, 1979.

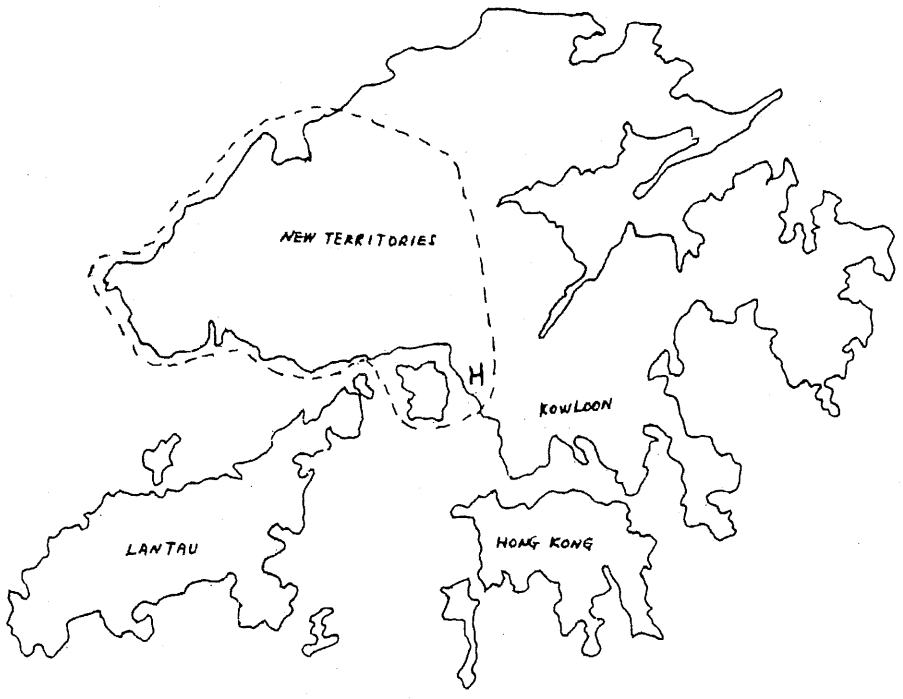


Figure I. Map of Hong Kong
The area of study was marked.
H is the Princess Margaret Hospital.

The first and foremost task of the present study is to look into the inside of the motor-cycle accidents, to find out their seriousness, the social conditions of the victims and the social implications of the accidents to the victims and we intend to take an epidemiological approach to the problem.

The epidemiological study of any disease condition, (including accidents) approaches the causation by an analysis of the condition of the host, the agent, and the environment (Krans , 1975). The host requires predisposing factors to make it susceptible to the causative agent which affects the host under the suitable environment. In the case of motor-cycle accident, the patient-victim is the host, the motor-vehicle being the agent and the road conditions and social conditions of the victims being the environment.

The current belief concerning road accidents is that the human factors are of overwhelming importance (Jamieson 1966). In other words, it is believed that those factors leading the patient-victim to encounter the accident are significantly those related to his physiological and psychological states, such as age, experience, training, mental state, driving habits and physical fitness.

The vehicle, of course, could be responsible for the accident. A particular model might be specially prone to accidents and a normally perfect machine might develop steering defects, worn-out tyres, defective lights or other mechanical troubles that predisposes the accidents. The investigation into these faulty aspects, however, requires the expertise of a mechanical engineer. This study enquired into the model of the motor-cycle only.

The environmental factors include the physical environments: the weather conditions, the visibility, the condition of the intersections, road junctions

and curves, and the road surfaces, etc. The exploration on these aspects likewise, involve highly technical investigations. The environmental factors include also the social environments of the individual victims: their cultural and recreational background, their family and job situation, etc.

In order to explore the data just mentioned, four questionaires were to be filled in by the surgeon researcher (medical data) and social worker (other data). The medical data included: the main injury patterns, the management methods, hospital stays and the final states of the injuries and general condition of the victims at the end of three months. The sociological data included: the profile information, the victims' own account of the accident, his driving habits, his social environment, the effect of the accident on his working capacity, economic condition, and his outlook on driving at the end of three months.

Results

254 patients (220 drivers, 34 back seaters) were included in the study. There were 12 (4%) female victims of whom only two were drivers.

All of these patients were studied for the injury patterns and disabilities. 161 patients were interviewed medicosocially. Of this latter group, 92 were admitted into hospital whereas 69 were not hospitalised.

These patients were collected in the months of December 1978 to July 1979. The monthly incidence of motor-cycle accidents ranged from 28 to 40. No special month was detected to have shown a predominance of casualty admission.

Age: 47.5% of victims were 20-24 years of age. 22% were less than 20 years old and 86% less than 30 years. (Figure II)

Time of accident: The accidents happened round the clock, but the peak hour occurred around 5 p.m. and around mid-night.

The severity of accidents varied with the hours of occurrence. The more serious injuries which required admission into hospital happened more frequently between 10 p.m. to 6 a.m. (46 admitted compared with 16 unadmitted). During the other hours, i.e., 7 a.m. to 10 p.m., admitted and unadmitted cases matched quite closely (92 vs 81).

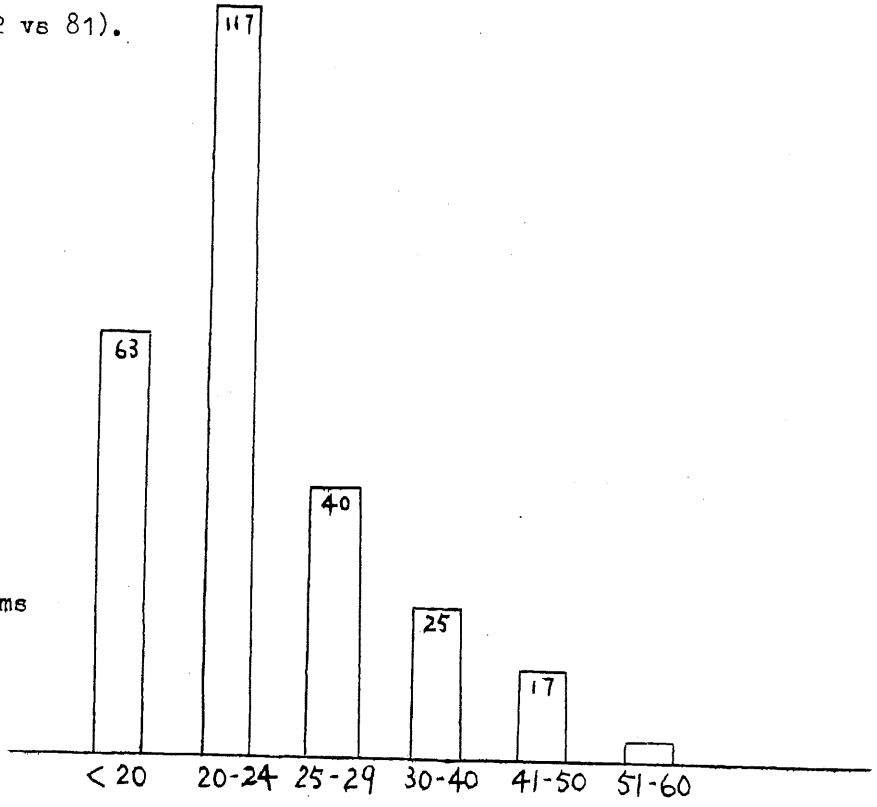


Figure II.
Age of the Victims

Personal and Family Data

179 victims were interviewed for personal and family data. Of these respondents 92.2% were male while only 7.8% were female. 70.9% of the

respondents were single while 27.4% were married. 1.7% were either separated or divorced.

Respondents' Educational Attainment

38.0% of the respondents had achieved lower secondary education (middle 1-3 or Form 1-3); 33.5% of them had achieved upper primary education (primary 4-6); 20.0% upper secondary education (middle 4-6 or Form 4-5); 3.4% lower primary education (primary 1-3); 2.9% vocational training and 2.2% matriculation and above education.

Respondents' Occupation

49.2% of the respondents were skilled workers while the rest were personal service or disciplined service workers, namely bus conductors, junior policemen (17.9%), unskilled workers (15.1%), clerical staff (11.2%), and others which included self-employed stall owners, semi-skilled workers in family owned factory (6.1%). 0.5% was a student.

* The occupation classification was taken from the classification issued by Social Research Centre, C.U.H.K. and was simplified.

Respondents' Family Size

Generally speaking, the family size of the respondents were not too large. 49.8% of the respondents had small-sized families, i.e. from 0 to 4 members in the families; 30.2% had medium sized families (5-6 members) and 19.0% had large-sized families (9-12 members).

Types of Housing of Respondents

19.0% of the respondents lived in Type A Public Housing estates; 33.5%

in Type B Public Housing estates; 32.4% in private housing and 11.2% lived in stone or village huts. In view of the mean family income of the respondents ($2,925 per month), they belong to the low socio-economic class of Hong Kong.

Length of Residence in Hong Kong of Respondents

69.8% were born here while 24.0% have been living here for 11 years and above. Only 3.9% have lived here for 6 to 10 years while the rest of 2.3% varied from 1 to 5 years.

Respondents' Leisure Time Activities

Respondents were requested to give 2 answers of their leisure time activities. Of the first answers given, 30.7% of the respondents had cinema going or T.V. watching as their leisure time activities; 16.8% had outdoor activities; 11.7% had motor-cycling. In the 2nd answers given, cinema going or T.V. watching (39 respondents; 21.8%) were the most popular among the rest of the leisure time activities; second popular being outdoor activities; shopping being the third and fourth motor-cycling.

General Health

Out of 179 respondents, 122 (68.2%) did not suffer from short-sightedness while 56 (31.3%) did have. As for other diseases, 157 (87.7%) were free from any disease while the remaining 22 (12.3%) used to suffer from minor ailments such as stomach ache, hay fever, skin allergy, old injuries, etc. On the whole, the 179 respondents are in good general health.

Injury Patterns and Managements

(i) Mortality

There were five mortalities during the 7 months of study (0.019%). One

died of serious head injuries, two of ruptured abdominal organs and concussion and two of severe thoracic injuries.

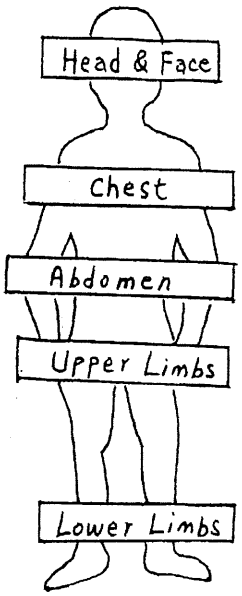
(ii) Severity of Injuries

Of the 254 cases of motor-cycle accident, 133 (52%) were considered to be more serious, so much so that they required hospitalisation. The rest (48%) required only treatment at the Casualty Department and were discharged home immediately afterwards.

(iii) Sites of Injuries

The types of injuries were best described according to the five regions of occurrence, viz., head and face, thorax, abdomen, upper limbs and lower limbs. (Figure III)

Figure III. Distribution Injuries



Head & Face	66	25.6%
Chest	17	6.6
Abdomen	19	7.4%
Upper Limbs	126	48.8%
Lower Limbs	129	50.0%

(1) Head and Face

66 victims (25.6%) sustained injuries on the head, face and neck region. One died of severe brain damage, 38 of these patients (57%) required hospitalisation.

The unadmitted cases consisted of minor injuries like abrasions and lacerations over the facial area, or transient loss of consciousness.

The hospitalised cases consisted of either more serious concussion or facial lacerations that required surgical repair. None of these cases had fracture of the skull or intracranial damage that required neurosurgical operation. There were three cases of fractured mandible, two of which required dental fixation. However, maxillo-facial fractures were not found. Although lacerations to the eyelids were found in three cases, there was no serious eye injury. The lacerations of varying depth occurred anywhere on the face but one common site for deep laceration was the lips. This happened in seven cases.

45 (67%) of these patients had associated injuries elsewhere.

(2) Thoracic Region

19 (6.6%) of the victims suffered from injuries around the chest. Two died from lung lacerations and severe bleeding (post-mortem finding), and nine (53%) required hospitalisation. Injuries included contusions, fractured ribs and internal injuries. Two cases required thoracotomies which revealed haemopneumothorax resulting from fractured ribs and ruptured diaphragm associated with fractured ribs. Both cases survived after surgery.

There was no injury to the heart but all these cases were associated with other injuries, either in the limbs or the head region.

(3) Abdomen and Pelvis

19 cases (7.4%) had injury to the abdominal and pelvic regions; three died and seven cases required hospitalisation, either because of internal injury or associated problems. The internal injuries included ruptured liver (3), ruptured spleen (2), ruptured or contused kidney presenting as frank haematuria (7) and fractured pelvis with perineal lacerations (3). Three of these patients died on arrival and the internal damages were post-mortem findings.

The unadmitted cases consisted of contusion to the abdominal region and abrasions.

(4) Upper Limbs

126 patients sustained injuries to the upper limbs: 62 (50%) had fractures which required hospitalisation and treatment; the rest consisted of simple lacerations and abrasions. With a few exceptions, unilateral involvement was the rule.

There was no significant predominance on the left or right side of the body for the occurrence of fractures (left : right ratio = 63/82). Most of the fractures (54 = 87%) were simple fractures whereas 8 (13%) belonged to the compound type.

The specific bones involved were tabulated in Figure IV. The commonest type of bone injury was Colles fracture (14 cases) while fractured humeral shaft and forearm bones would rank next.

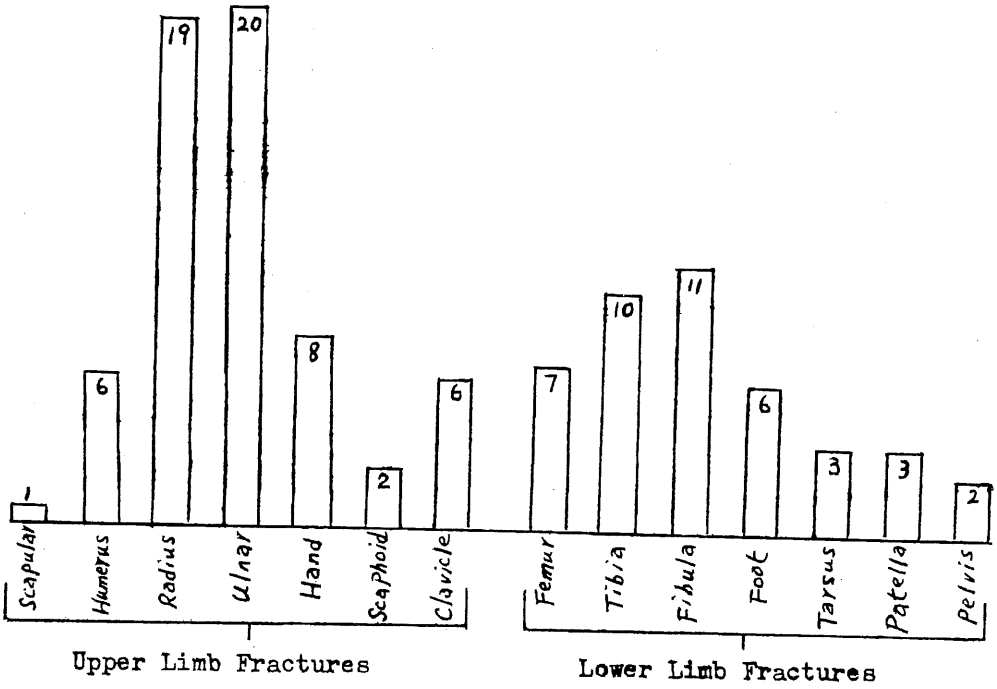


Figure IV Fractures of Upper and Lower Limbs

None of these patients suffered from brachial plexus injury. Surgery was necessary in only 20 cases (29%) where internal fixations were done. Treatment for the others consisted of simple bandages or plaster splintings.

(5) Lower Limbs

The total number of cases with lower limb involvement amounted to 129, resembling very much that of the upper limbs. Like the upper limbs, both left and right sides had equal distributions (77 vs 78) and most of the time, only one side was involved.

Only 40 cases of fractures were found, of these, 27 were simple fractures and 13 were compound fractures. The specific bones involved were tabulated in Figure IV. The highest incidence of fracture occurred in the leg while fracture femur ranked second in the frequency of occurrence.

Treatment and Hospitalisation

Treatment ranged from simple dressing, stitching, to operations on bones and joints and internal organs.

There was no mortality in all the operated cases. 140 admitted cases were followed up three to four months after the injury to detect any disability that might have resulted from the accident.

Hospitalisation was mostly short since most of the patients treated with plaster casts could be discharged in 1-2 day's time. The average number of days of hospitalisation was 8.1 days (excluding convalescent hospital and rehabilitation centres).

Factors Leading to Accidents : Respondent's Views

102 (59%) of respondents thought the accidents were produced by human factors like carelessness or aggressiveness of themselves or other drivers; 53 (30.7%) thought the physical environments were faulty; 8 (4.62%) thought the accidents were 'pure accidents'; whilst 6 (3.5%) attributed their accidents to faulty vehicles.

In the views of most of the respondents, the environment conditions at the time of the accident, such as weather, conditions, road gradient, lighting etc., were not unfavourable for motor-cycling. However, a significant proportion described unfavourable environmental conditions like : bending road (61%), and presence of debris and sand on road (49%).

Respondents' Driving Habits and Experience

41% of the respondents gave a positive history for previous accidents which varied from one to seven in number.

Only 48.6% of the respondents were motor-cycle licence-holders while 41.3% were learner driver and the rest (10.1%), back seaters, 47% of the licence-holders had only 1-2 years driving experience. Of the learner driver group, 48.7% had less than 50 hours of actual driving experience.

Although over 40% of the respondents were learner drivers, only 15% of them admitted that they were actually learning to drive the vehicle while the accident occurred. The rest were using the motor-cycle as if they were qualified drivers.

The purpose in using the vehicle included: working purposes (40%), fun driving (23%), learning (15%) and transporting (10%).

Respondents' Aggressiveness on Road

Questions which were directed towards the respondents driving behaviour were asked to reflect on their road aggressiveness. These questions included their reactions to traffic lights, congested traffic conditions and other drivers; their average driving speed, speed at time of accident and their concept about speeding.

79.8% of the respondents would overtake a slow car in front of them; 62.6% of them would cut in and out of lane when the traffic was heavy; and 60.1% would get angry when someone bump at their vehicles.

The respondents' average driving speed was around 31-50 miles per hours. 70% of the respondents' speed at time of the accident was around 21-40 miles per hour (Figure V) while the speed at which they considered as fast driving was around 41-60 miles per hour.

Most of the respondents (80.5%) were aware of a high motor-cycle accident rate in Hong Kong.

Figure V. Driving Speed before Accident

Speed m.p.h.	No. of Patients	Percentage
10	13	7.4
11-20	18	10.2
21-30	64	36.4
31-40	59	33.5
41-50	16	9.1
51-60	6	3.4

Respondents' Psychological State

In order to reveal the respondents' psychological state and personality which might have bearings on the occurrence of the accident, their relationship with their family and friends were explored by putting multiple direct questions to them.

Over 80% respondents were having good relationship with their parents and spouses and admitted that they would often accept the latter's suggestions and opinions. Over 90% respondents described their parents and spouses as 'caring'.

Over 50% respondents would share problems with their friends and 80% of them found their friends helpful.

Respondents' Job Satisfaction

Questions concerning the respondents' general feeling towards their jobs, their degree of satisfaction with their salaries, supervisors, working environment and working conditions and their relationship with their co-workers were asked. The answers were affirmative in 70-90% of respondents.

Follow-up Interviews and Examinations for Residual Disabilities

A total of 150 victims were interviewed 3-4 months after the accidents for residual disabilities. Of these victims 80 turned up at the surgeon researcher's office for assessment. All these patients were examined and the injured regions were checked for physical disabilities. The rest of the respondents refused to turn up at the office either because of other commitments or they thought their disabilities were too trivial to warrant a medical check-up. This latter group was therefore interviewed via the telephone by a medical colleague of the surgeon researcher who was well informed of the nature of this study and what was required for the follow-up assessment.

Of these 150 respondents, 110 (73%) belonged to the major accident group who had been hospitalised. 40 (27%) belonged to the minor group who were just treated at the Casualty Department.

All except one respondents were male.

Apart from soft tissue scarring, which was the commonest complaint of the respondents, joint symptoms were causing most disabilities. The joints

involved included all the joints of the upper and lower limbs.

There was an even distribution of the affected joints in both the upper and lower limbs. The wrist was the commonest joint giving trouble on the upper limb (24%) and the knee was that for the lower limb (26%).

The symptoms occurring in the joints included pain (16 cases i.e. 30%), swelling (8 cases i.e. 15%) and stiffness (30 cases i.e. 55%).

Three grades of stiffness were identified, namely, mild, when the respondent felt that the joint was not as smooth but its general function was not affected; moderate, when the general function was affected; and severe, when the stiffness was severe and usually pain was associated, and the patient could hardly use the joint. There was an equal distribution of the three grades.

Fifty two respondents found that there was either swelling (67%) or deformity (33%) at the site of the healed fracture.

Twenty seven respondents had history of concussion during the motor-cycle accident. When they were questioned about the occurrence of post-concussional symptoms, only 3, i.e. 11%, complained of more frequent headaches and 2, i.e. 8%, complained of deteriorating memory.

Although it was difficult to explore the psychological state of the respondents after the accidents, an attempt was made to find out whether the accident had any effect on his state of mind when he was once more exposed to traffic on the road. The question was: "Do you experience a sense of fear when you see moving vehicles after the accident?" If the answer was positive, it was considered to be a form of road phobia.

31 of the respondents (19%) admitted that they had a phobic feeling towards moving vehicles. 22 (66%) of these respondents suffered from limb fractures and were still complaining of joint stiffness in the affected regions.

A final enquiry was made on the general health of the respondents to see whether it was affected by the accidents.

Only 15, i.e. 10% thought their general health deteriorates after the accident and they suffered more frequent colds and gastro-intestinal ailments.

Effect of the Accident on the Respondents

1) Working Ability and Economic Conditions

The duration of sick leave taken by the respondents varied from 1-7 days (38.2%) to over 60 days (21%).

91.8% of the respondents resumed work in 3 months' time after the accident, leaving only 8.2% of them still away from work. 82.1% of those already back to work went back to their original job and 94.5% received the same pay, 17.9% of those already back to work did not go back to the same job as before for reasons mostly un-related to the accident.

39.0% (48) of the respondents had received financial help from their families for medical treatment. Of the 48 respondents who had received financial help from their family, only 27 respondents' (56.2%) families were being affected economically.

2) Respondents' Attitude towards Driving a Motor-cycle after the Accident

The respondents' attitude towards driving a motor-cycle immediately after

and 3 months after the accident was enquired into.

The respondents' attitude towards driving a motor-cycle immediately after the accident was diversified, 25.7% said, "never drive again in future", there were still 68.0% who would drive again.

Of the 58 respondents who drove, learned to drive and sat again on a motor-cycle, 44.8% of them felt more or less the same as before when riding on a motor-cycle; 39.7% of them were more careful while 13.8% of them still had some fear when riding again.

51.9% of those who drove or learned to drive again used the same motor-cycles as before the accident while 48.1% did not use the same ones due to various reasons.

72.6% of the respondents approved of others learning to drive motor-cycles. Only 27.4% of them showed disapproval.

A large proportion of their fathers, mothers and spouses still disapproved of their driving or learning to drive a motor-cycle. The major reasons for their disapproval was the same as before i.e. motor-cycling is dangerous (67.5%; 83).

The respondents' feeling about motor-cycling 3 months after the occurrence of the accident was more or less the same as immediately after the accident.

Their aggressiveness on road also had not changed in 3 months' time after the accident. Their average driving speed and the speed at which they considered fast driving remained the same as before.

Discussion

When this study was being planned, we had a number of questions in our minds. These included:-

(1) Questions related to the severity of the motor-cycle accidents

i) How serious was the problem medically?

ii) How serious was the problem socially?

(2) Questions related to the victims of the motor-cycle accidents

i) Who were the victims?

ii) How did they get the accident?

(3) Questions related to the human aspects of the epidemiology of motor-cycle accidents

i) What were the predisposing basic human factors leading to the accidents?

ii) What were the predisposing psychological factors leading to the accidents?

iii) What were the predisposing social factors leading to the accidents?

The data analysis of this study indicates that these questions can now be answered to a reasonable depth.

How Serious was the Problem Medically?

According to statistical data supplied by the traffic division of the Hong Kong Royal Police, the incidence of motor-cycle accidents and fatalities has remained more or less stationary for 7-8 years. The accidents ranged from

1376 to 1690 and the fatalities from 22 to 36 annually in the years of 1971 to 1978 (Hong Kong Police, 1978).

In our present study, within our region of investigation, viz., the North Kowloon - New Territory region, there had been 254 motor-cycle accidents in the 241 days of case collection (i.e. more than 1 a day) and 5 cases of fatality. These figures are low compared to other accidents, but will keep the casualty worker constantly reminded of their occurrences.

Most of the injuries were minor ones and the majority of the hospitalized cases required only simple treatment. Since the wearing of helmet was made legally compulsory, fatal head injuries markedly decreased (University of Hong Kong, 1975). The fact that nearly all the accidents took place at relatively slow travelling speeds limited the severity of the accidents. Bone fractures were still quite common as the limbs were vulnerable. However, there were much more upper limb fractures than lower limb fractures. This was unlike other reports where the lower limbs were fractured much more frequently (Drysdale, 1975; Deaner, 1975; Bothwell, 1960). The low speed nature of the accidents probably explained this difference, and the fact that not a single case of brachial plexus injury was found.

As only a very small proportion of the victims suffered from serious permanent disability, most of them did not feel the real danger of the accidents. For the same reason, they did not feel any social or economic pressure which might dissuade them to continue using the motor vehicle.

As far as residual disabilities are concerned, although three victims were still in convalescent homes when the follow-up study was carried out

3-4 months after the accidents, the majority did not suffer from serious permanent disability. Only 30 victims suffered from impaired limb mobility secondary to joint stiffness or pain. Of this unfortunate group, only 6 suffered from really severe joint disability.

The commonest complaint of residual problem resulting from the accident was soft tissue scarring which, however, did not usually give functional trouble.

As only a minor proportion of the victims suffered from serious permanent disability, most of them did not feel the real danger of the accident which might dissuade them to continue using the vehicle.

How Serious was the Problem Socially?

Statistical analysis of the study showed that 61.2%, i.e. 76 out of 123 respondents being followed up 3 months after the accident had been incapacitated to work for 1-7 days. 45.0% (50) of the respondents had taken extra sick leaves in addition to sick leaves granted by doctors at the Princess Margaret Hospital. Some of the respondents also suffered from the withholding of pay during their sick leave period. 91.8% of the follow-up respondents finally resumed work in 3 months' time after the accident. 82.1% of them went back to their original job and received the same pay. Those who did not go back to their original jobs had reasons unrelated to the accident.

39.0% (48) of the respondents received financial help from their families for medical treatment and physical build-up. Of the 48 respondents who had received financial help from their families, 27 (56.2%) were in real financial need. This study therefore suggests that the accident did affect the respondents' working capacity and their financial conditions though on a temporary basis and

and of a comparatively slight degree.

Who were the Victims?

Motor-cycling is part of the contemporary youth culture (Hershel D. Thornburg, Contemporary Adolescence: A Book of Readings, Cal: Brooks/Cole Publishing Co., 1975, 2nd ed., p.9). Studies on motor-cyclists all over the world (Deaner, 1975; Andrew & Trinca, 1979) revealed that most of them are within the age range of 20-24. This is the age range in which people are in their adolescence or young adulthood. These 2 stages of human growth and development are characterized by adventures, risk-taking, exciting and vigorous outdoor activities. Motor-cycling is a good outlet whereby young people can get adventure, risk-taking chances and exciting, vigorous outdoor activities. A lot of the motor-cyclists in Hong Kong also fall into this age range. In fact, 47.5% of the respondents of this study were in the same age range, and this corresponded well with a study conducted by the Traffic Section of Royal Hong Kong Police Force done in February 1979, which indicated that 49.3% of the respondents were of the same age pattern.

It is believed that these young motor-cyclists are crazy about motor-cycling and often turn roads into racing circuits. Large amount of money are used as rewards for race winner teams and the motor-cyclists, who, in fact, gamble through their races. Traffic is usually very heavy during day time in Hong Kong and these motor-cycling teams would find it inconvenient to hold their races at daytime. Furthermore, their racing activities, especially when in form of gambling, are illegal in Hong Kong. They therefore hold the races during the night especially around mid-night. In order to add excitement and adventure to their races, the participants would modify their vehicles to give

loud noises and in order to give more horse-power to the vehicle engines, they make illegal mechanical conversions. These racing activities usually disturb the slumbers of Hong Kong citizens especially those living in the mid-levels and along the Castle Peak Road, especially the section near 9½ miles. These motor-cyclists have formed a very negative self-image in the minds of a lot of Hong Kong citizens. The latter would turn them as wreckless, anti-social and lawless youths.

In recent years, a lot of complaints have been received by the Traffic Section of the Royal Hong Kong Police Force about these illegal motor racings. These motor-cyclists therefore become the centre of attention of the Traffic Section and more serious measures are being considered to check on them.

Do the motor-cyclists of this study fall into this category of wreckless, anti-social, lawless youths who are being despised and disgusted by the public in general?

The motor-cyclists under study appeared quite different from those described above. They did not impress the researchers to be wreckless, anti-social or lawless youths.

The respondents under study did come from the low socio-economic class of Hong Kong as were indicated by their income and the types of house they occupied. Most of them were either upper primary or lower secondary school drop-outs and thus started to work at an early age. With less schooling, consequently they engaged in blue-collar jobs mostly in skilled and semi-skilled occupations in factories. Despite their low social and economic background, these young people were stable job-holders and were satisfied with their jobs. Furthermore, their

relationships with their families and peers were harmonious and positive. There was reasonable degree of back and forth communication between them. They were totally unlike the motor-cyclists who have projected a very negative self-image onto the citizens of Hong Kong as angry young men who would release their anger or discontent through wreckless motor-cycling or even racing.

The data analysis also revealed that the respondents drive or learn to drive a motor-cycle mainly for practical reasons such as for transporting them to and from work; and for convenience, instead of for fun or for excitement. Their feelings about motor-cycling were apparently quite normal (mostly for excitement and interest rather than for heroism).

How did they get the Accident?

The respondents had disclosed 6 accident patterns, namely skidding (82, 47.4%), being bumped (32, 18.5%), bump onto other vehicles (33, 19.1%), bump to the pavement (19, 11.0%), clash with other vehicles or obstables on road (6, 3.5%), and sudden stop (1, 0.5%).

Earlier statistical data analysis showed that except for debrious road surface and road bends, the environmental conditions at the time of the accident had not been unfavourable for motor-cycling. The present study did not indicate any particular model that is particularly prone to accidents.

Apparently, the accidents under study were unrelated to the environmental conditions such as the weather, the road gradients or the road surface.

However, according to the respondents themselves, to a very large extent, the accidents were affected by human factors like carelessness of other drivers and pedestrians, aggressiveness of other drivers, impatience of car drivers to

motor-cyclists, poor driving skills, speeding, cutting in and out of lanes, fatigue and low-spirit.

What were the Predisposing Basic Human Factors leading to the Accident?

There was an overwhelming predominance of male over female victims who formed only 4% of the population of this study, and only two of these female victims were drivers of the motor-cycle.

47.5% of the victims were 20-24 years of age while 22% were less than 20 years old. When all those less than 30 years were added together, they were found to compose 86.5% of the total population.

This clear predominance of male youths indicates that the adventurous courage of this group of victims could perhaps be one of the predisposing human factors to the motor-cycle accidents.

Most of the accidents occurred around the time when people were going home after a day's work. This could be natural since road traffic tended to be heaviest during those hours. However, 75% of accidents that occurred between 10 p.m. and 7 a.m. were of serious nature, while only about 50% of accidents that occurred during the other hours were of the similar severity. This indicated that serious accidents were more liable to happen among the late home-hurriers who in their eagerness to reach home earlier, might have lowered down their precautions against accidents.

If driving experience and training on the use of the vehicle could be affecting the occurrence of accidents, our data would once more, be useful indicators of these predisposing human factors.

Only 48.6% of the victim-drivers were holding a valid driving licence. 41.3%

were learner drivers, 7 of whom admitted that they did not even possess a provisional driving licence.

42% of the learner drivers had less than four months' learning experience and 66% had less than six months' experience. When enquired about the actual number of hours spent on driving, 33.8% had less than 20 hours experience.

These were appalling figures which suggested that the lack of driving experience could well be responsible for many of the motor-cycle accidents.

What were the Predisposing Psychological Factors leading to the Accident?

According to the theory of Territorial Aggression, vehicular drivers tend to protect and expand their territory by behaving aggressively. The severity of this in-born aggressiveness was reflected by an exploration of the driving habits of the victims. The degree of aggressiveness, in turn, might indicate the proneness of the individual victims to accidents.

The usual driving speeds of the victims (31-50 miles/hour, 79%; more than 50 miles/hour, 17.3%; less than 30 miles/hour, 3.7%) might indicate that the majority could be categorised as speedy drivers.

23.3% admitted that they would speed across a yellow traffic light; 79.8% loved to overtake slow moving vehicles; 19.6% would overtake an overtaker; 62.6% usually cut in and out of road lanes in order to keep moving; 44.8% would become very impatient in a traffic jam; 17.8% would be easily provoked on road; and 60.1% became extremely angry whenever their vehicle got bumped. These varying figures, when put together, further showed that a fair proportion of these victim drivers did have aggressive tendencies in driving.

The true weight of this argument can obviously not be testified by a study

of the present nature but our data at least have laid down a preliminary network for future studies on the psychological predispositions to road accidents in Hong Kong.

What are the Predisposing Social Factors leading to the Motor-cycle Accident?

The exploration into the predisposing social factors leading to the motor-cycle accidents included both the long-term or more subtle predisposing social factors such as the respondents' relationship with their families, peers, their job satisfaction and the acute predisposing social factors such as any special event that happened before the accident.

The data analysis did not disclose either long-term or acute predisposing social factors which might have played a significant part in the causation of the accidents.

An outstandingly high percentage of respondents lived with their families, expressed that they were well taken care of by their family members and communicated with one another well at home. This illustrates to a reasonable extent, that a cohesive and harmonious relationship between the respondents and their families did exist.

The high percentage of respondents in their relatedness with their friends could suggest that the respondents enjoyed a healthy and normal peer relationship.

Most of the respondents were steady job holders and were satisfied with their jobs in terms of working hours, holidays, welfare systems, interpersonal relationship, working environment and stability.

Acute predisposing factors seemed to have no obvious bearing with the accidents. Over three quarters of the respondents had used the motor-cycle before the accidents

and in fact nearly half of them owned the vehicles. Nearly 90.0% of the respondents experienced no special social events which would disturb them emotionally and in turn affect their driving performance.

Conclusion

This prospective study on motor-cycle accidents is meant to be a pilot one which explores on a preliminary basis the epidemiological aspects of these accidents, the possible causative factors of the accidents and the likely preventive procedures.

The analysis of the limited data does indicate that motor-cycle accidents do have unique features. The most striking ones include : the predominance of young-aged victims, the overall relatively mild degree of injuries, the relatively mild physical, social and economic impact of the accidents and last but not least, the high proportion (48%) of victims not holding a valid driving licence.

These data illustrate the great need for a deeper look into the problem of motor-cycle accidents, and the authorities concerned can perhaps start exploring the practical preventive measures.

Finally, we would like to conclude that the integrated efforts of the surgeon and social scientist in approaching common medical problems like motor-cycle accidents does enable both parties to go into a deeper level in their attempts to understand the problems.

Recommendations on the Prevention of Motor-cycle Accidents

On Education and Propaganda

(1) With the expected further increase in the popularity of the motor-cycle, motor-cycle road safety compaign should be widely carried out. There should

be wide publicity on television and in the press, either singly or in rotation with other road safety subjects publicised by the Government.

(2) Since the majority of motor-cycle drivers and riders are young males, they should form the target of the safety propaganda. Campaign programmes should be specially designed to suit their taste and posters should be displayed at places where male youths gather.

(3) The home-rush hours produce more serious accidents. This fact, when properly disclosed to the motor-cycle riders, will strengthen their safety awareness during those hours.

On the Training of Motor-cycle Drivers

(1) Few motor-cyclists are now having more than two or three hours of instruction. Longer compulsory instructions would be most beneficial to the training of learner drivers.

(2) Official off-street instruction facilities are now lacking. The provision of these facilities would encourage learner drivers to train themselves properly.

(3) More serious driving tests with high standards and requirements are means to demand more and better training.

On Legislation

(1) A fairly high proportion of motor-cyclists never bother to get the proper driver licence because they can legally drive with the provisional licence. A time limit on the validity of the provisional licence should be legally set.

(2) Motor-cyclists without the proper licence should be seriously prosecuted.

(3) Collisions between motor-cycles and other four-wheeled vehicles are largely due to the lack of awareness of the four-wheeled vehicle drivers on the approaching motor-cycle. The Transport and Road Research Laboratory in the United Kingdom is considering to make the turning on of dipped headlights during the day a legal obligation for the motor-cyclists (Armstrong-Wright, 1979).

(4) Accident statistics show that fore-and-aft number plates contribute significantly to injuries in the motor-cycle accidents (Armstrong-Wright, 1979). If this is true, regulations should be amended to prohibit them.

On Road Conditions

(1) Road bends should be regularly checked to see whether they satisfy road safety standards.

(2) Road surfaces should be kept smooth and properly maintained.

On Protective Measures

(1) Since over 75% of motor-cycle accident victims suffer from skin and soft tissue injuries, all motor-cycle riders should be encouraged to wear protective clothings, boots and gloves.

(2) Extension bars from the motor-cycles are expected to be capable of preventive leg fractures when there is a turn over of the vehicle.

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