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EPIDEMIOLOGICAL STUDY OF ROAD TRAFFIC ACCIDENTS, CASUALTIES AND FATALITIES IN THE UNITED ARAB EMIRATES

A Thesis Submitted in Partial Fulfillment for the Degree of M.Sc. in Environmental Sciences

BY

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FACULTY OF SCIENCE

UNITED ARAB EMIRATES UNIVERSITY

JUNE 1995

بسم الله الرحمن الرحيم

Epidemiology of road traffic accidents, casualties and fatalities in the United Arab Emirates

The Thesis of Ahmad Saif Al-Falasi for the degree of Master of Science in Environmental Sciences is approved.

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ABSTRACT

In the United Arab Emirates (UAE), with its rapid expansion of road construction and increase in the number of vehicle, road traffic accidents are becoming a serious public health problem. It was aimed to study road traffic accidents (RTA) in view of the fact that cause a substantial waste of national resources which could be used fruitfully for the improvement of health schemes and other aspects of life in UAE. It was observed that there has been a dramatic increase in the number of registered vehicles during this period. During the ten years period 1983 to 1992, the population of UAE increased at the rate of 7.2% per year and the number of registered vehicles increased at the rate of 5.4% per year. Despite the enormous increase in the population there is a decline in the vehicle per capita, the total number of cars went on decreasing till 1991, but in 1992 there has been substantially an increasing trend in the number of registered vehicles. Road traffic accidents rates per 100 vehicles sharply decreased from 184.3 in 1983 to 91.9 in 1992. Also, casualty rates doubled from 27.5 in 1983 to 51.7 in 1992. Then, motor vehicle accident fatalities have gone up from 539 in 1984 to 770 in 1992 during the decade showing an average annual growth of 4.8%. UAE showing lower accident rate but higher casualty and fatality rates. In addition, the population , number of registered cars, accidents, casualties and fatalities in the seven Emirates were reviewed. Overall, results showed a decrease in accidents at the Abu Dhabi and Dubai Emirates. But there were increase in injuries and fatalities at the Sharjah, Ajman, Umm Al-Quwain , Ras Al Khaimah and Fujairah Emirates. It was observed that 1.4% of the accidents , 16.2% of the casualties and 14.8% of the fatalities were pedestrians their age less than 11 years of age. The findings of this study into the road safety in the UAE and other Gulf countries indicate that fatality rates (per 100 accident and per licensed vehicle) are high in comparison with those in developed countries.

A descriptive study was carried out using available data and records of Accident Emergency Department of Al-Ain Hospital in Al-Ain, UAE. The study presents the results of a all patients with road traffic accidents (RTA) injuries that attended the Accident Emergency Department of Al-Ain Hospital, Al-Ain, UAE for the period 1 January - 31 December 1993. The Al-Ain Hospital recorded a total of 1383 road traffic accidents (RTA)

casualties with 63 deaths during year 1993. The road traffic accident rate was 461 per 100,000 population and the death was 21 per 100,000. Three-fourths of all were under 35 years of age (77%). The great majority of the victims (84%) were males. UAE nationals comprised 29% while those of other Arabs 36% and Asian origin formed 35% respectively . It is noteworthy that 44% suffered from head & neck injuries . Most of the casualties occurred between 8.00am to 2.00pm The main single cause for these RTA was excessive speeding. The injuries produced a severe strain on the manpower.

Also, this study describes the magnitude of this problem and studies some aspects of road user behaviour in UAE. Road injuries, besides being a major health hazard lead to a high rate of morbidity, impact on the victims, his family, and the nation as a whole. The magnitude of the problem could be greatly reduced if appropriate measures were taken concerning road user behaviour. Some factors which influence driver behaviour are presented and discussed.

Additionally, a cross sectional study was carried out between November 1993 and June 1994 to assess the knowledge, attitudes and practices of hospitalized drivers involved in road traffic accidents regarding seat belt usage in U.A.E. During this period, a total of 1000 vehicle drivers were seen and treated in the Accident and Emergency Departments of two general hospitals (Tawam and Al-Ain Hospitals). A total of 787 (78.7%) drivers gave responded response for the study. This study demonstrated that the rate of constant seat belt usage among drivers was 9.4%, and the rate of frequent seat belt usage was 5.2%. There was statistically significant difference between seat belt usage versus non usage by age groups ($p=0.007$) and nationality($p=0.001$). However, there was no significant statistical differences between seat belt usage versus non usage by sex, and marital status . There were statistically significant difference between user and non-users of seat belts concerning their educational level ($p<0.002$) and occupation ($p<0.02$). The results demonstrated a reduction in the number of injuries due to usage of seat belts. Those patients who were not wearing seat belts were at risk 5.84 times as often as drivers who were restrained by belts. There were statistically significant differences between number of persons injured wearing and not wearing seat belts for head injury [Odds ratio (OR)=1.74; Confidence Interval (CI)= 1.18-2.56 ,and $p=0.003$], neck injury

[OR=1.73; (CI)= 0.99-3.04 ,and p=0.04], spinal injury [OR=4.64; (CI)= 2.30-9.47 and p<0.0001], limbs injury [OR=2.11; (CI)= 1.45-3.08 ,and p<0.0001]. But, we did not find statistically significant differences between number of person injured in chest ,abdomen and pelvis by wearing or not wearing seat belts [OR=0.62; (CI)= 0.34-1.14 ,and p<0.101]. It was observed that the majority of patients stated that seat belts are the best protective measure against all injuries (66%) and severe injuries (26%) of road traffic accidents. Also, there was very strong support for the mandatory use of safety seat belts (53%). We may suggest that these data are encouraging, and would suggest general acceptance of seat belt legislation in the United Arab Emirates.

In the UAE , as in other GCC countries , RTA poses a major health problem. It is the second major cause mortality , after coronary heart disease in the UAE . Information concerning RTA is therefore valuable in taking appropriate measures to reduce their incidence and also to plan health services in the area. The result of this study would provide vital results and essential statistical information for health education, safety education, planning programming managing and evaluating anti-motor vehicle accidents activities aiming at significantly reducing the road traffic accidents and hazards.

CONTENTS

CHAPTER ONE:

1.1. GENERAL INTRODUCTION

It is generally acknowledged that road traffic accidents constitute one of the major problems of modern daily life. Motor vehicle accidents have become one of major problems in UAE as well as other parts of the world. This is almost equally acute in developing societies as in the industrialized ones.

UAE is no exception, indeed, given the doubling of vehicle ownership at short and regular intervals, as well as the ready availability of petrol at a remarkably low price, it is not unexpected that the number of traffic accidents would rise dramatically. Nonetheless, the rate at which such as increase has taken place has been far more than many would have anticipated, and far exceeds that in other adjacent oil-producing countries of the Middle East.

Road fatalities constitute a major health problem in the UAE. Road traffic fatalities have been a major leading cause of morbidity and mortality in developed and developing countries. Various research carried out on traffic accidents in developing countries (Jacobs, 1982), and in rich developing countries (Bayoumi 1981; Jadaan 1983; Mekky 1985; Bener and El-Sayyad 1985; Bener et al. 1988; Ergun 1987; Weddell and McDougall 1981; Jadaan 1983, 1988, and 1989a; and Ofosu et al. 1988) has revealed that, compared with many western industrialized countries, developing countries have a significant increase in mortality rates due to road injuries. Jacobs and Cutting (1986), in their study of accidents in a number of developing countries, showed that the traffic safety situation is worsening in many of these countries. The fatality rates are generally

decreasing in Europe and North America, while relatively little attention has been paid to the magnitude of the problem in developing countries.

Road traffic injuries are becoming a public health epidemic in UAE. Yet, relative to other causes of mortality and morbidity, the amount of attention they have received from public health professionals and the scientific community is minuscule, (Bener and Jadaan, 1992). This could be the situation in a number of countries and has been reported to be partly due to the absence of comprehensive documentation of the situation (Langley and McLoughlin, 1989).

In the oil-rich Arabian Gulf countries, many aspects of life changed shortly after the discovery of oil. There was an explosion both in populations and in number of vehicles, accompanied by rapidly expanding road construction. Unfortunately, patterns of behavior did not change so rapidly. The result is a large and growing number of casualties caused by traffic accidents.

The World Health Organization, in the report of a conference on the epidemiology of road traffic accidents, (WHO, 1976), observed that public health authorities should be aware of the extent of permanent incapacity from road accidents and reported that there was evidence that this incapacity was increasing. Among factors associated with this increase were thought to be the greater power of the vehicles involved, and an increasing number of heavy goods vehicles. Also, advances in techniques of medical resuscitation mean that even the most seriously injured may survive.

The role of the epidemiologist in this context includes the provision of data essential to the planning, implementation and evaluation of services for the control of road accidents and management of casualties, and to the correct assignment of priorities among those services (WHO, 1976).

The types of factors leading to RTA and resulting casualties are generally linked to those causing disease which makes them fit for the epidemiological approach. The problem has long been the focus of attention in developed countries and their fatality rates are generally improving while relatively little is done to reduce the magnitude of the problem in developing countries (Jadaan, 1989 a-b).

The three main factors in road accidents are well known (Fraser-Moodie, 1976). They are: the driver, the environment and the vehicle. The important aspects of the driver are: his age, medical fitness, the effect of drugs, alcohol and fatigue, occupation and educational level. The vehicle design has two facets: firstly, factors that help in preventing accidents, such as brakes, tyre condition, lights, indicators, etc; secondly, factors that protect the occupants; these include the passenger cell compartment, set belts, head rests, etc. The environmental factors include: road engineering, weather, road safety education and traffic law enforcement. A detailed study showed that driver errors were wholly or partly responsible for 85% of accidents.

Recently, Bener and Jadaan (1992) reported in their study of the road fatalities in Jeddah (Saudi Arabia) that road traffic fatalities are at the top of the list of major causes of death. Death rates vary with age, but injuries are the most obvious threat to life in the younger, most productive ages of the life cycle.

Motor vehicles account for more than half of unintentional injury deaths in the United States, either as vehicle crashes or collisions of vehicles with bicyclists and pedestrians. Road traffic deaths and injuries constitute a particular problem with the younger age groups (below 35 years), (Krause and Robertson, 1992). The important factors in traffic safety improvements are widely known; traffic speed limits, the mandatory wearing of seat belts, fixing enough sign boards and instructions to road users, traffic education, etc. (Bener and El-Sayyad, 1985; Krause and Robertson, 1992).

A retrospective descriptive study for a 1-year period of all road traffic accidents and injuries received by Jimi Hospital in Al-Ain City (Bener et al. 1992) showed that the majority of victims were males under the age of 35 years. Most of the accidents and the injuries occurred from 8:00a.m. to 2:00p.m. Head injury was the most frequently noted type of injury.

Generally, during the past two decades, there have been large road construction programmes in U.A.E. and a significant rise in the number of vehicles. In Al-Ain City, there have been rapid economic growth and a significant rise in the population and the number of vehicles, especially to the presence of the unique university in the country. These led to an increase in road traffic accidents where the resulting casualties made it a serious public health problem in the country.

The object of this study is to discuss the magnitude of road traffic fatalities in U.A.E. and to compare the situation with that of some developed countries. This study is concerned with fatal motor vehicle accidents and their resulting casualties. We use international death rates to

ascertain both the ranking of this health problem in the UAE and how it compares with other countries, and we offer some specific recommendations as to how the risk can be reduced.

1.2. AIM AND OBJECTIVES

General Aim: The aim of this study is to review the sources of the problem of road traffic accidents (RTA), to discuss the magnitude of RTA in the UAE and to compare the situation with that of some Gulf and developed countries. Additionally, some of the factors which can influence driver's behaviour are investigated and discussed.

Specific Objectives:

The study was designed to meet the following objectives:

1. To describe the epidemiology of road traffic accidents in the UAE for the period 1983-1992,

2. To study the distribution of road traffic accidents, casualties and fatalities according to year (1983-1992) in UAE, and to assess the level of mortality due to motor vehicle accidents during this period

3. To determine the effects of various human characteristics on accident involvement,

4. To shed some light on the road traffic accidents and their resulting casualties admitted & treated at the Accidents Emergency Department of Al-Ain Hospital for the period of 1 January to 31 December 1993, as an example,

5. To describe and study some aspects of road user behaviour in UAE,

6. To study and assess the knowledge, attitudes and practices of hospitalized drivers involved in road traffic accidents regarding seat belt usage in UAE, and to identify the reasons for using and non-using seat belts among drivers in the UAE,

10. To study RTA in the UAE and compare the situation with that of some developed countries so as to provide an international comparison of mortality levels due to motor vehicle accidents

11. To provide baseline data for future evaluation of preventive measures.

CHAPTER TWO:

2. LITERATURE REVIEW

There has been considerable interest worldwide in recent years regarding road traffic accidents and related environmental and public health issues. Since these issues are diversified, the following review will be classified under four broad titles for convenience.

2.1. MORTALITY AND MORBIDITY DUE TO MOTOR VEHICLE ACCIDENTS IN THE UNITED ARAB EMIRATES DURING 1983-1992: TRENDS AND DIFFERENTIALS

Road traffic fatalities have been a major leading cause of morbidity and mortality in developed and developing countries. Various research carried out on traffic accidents in developing countries (Jacobs 1982), and in rich developing countries (Bayoumi 1981; Jadaan 1983; Mekky 1985; Bener and El-Sayyad 1985; Bener et al. 1988; Ergun 1987; Weddell and McDougall 1981; Jadaan 1988, 1989a-b; and Ofosu et al. 1988) has revealed that, compared with many Western industrialized countries, developing countries have a significant increase in mortality rates due to road injuries. Jacobs and Cutting (1986), in their study of accidents in a number of developing countries, showed that the traffic safety situation is worsening in many of these countries. The fatality rates are generally decreasing in Europe and North America, while relatively little attention has been paid to the magnitude of the problem in developing countries. Bener and Jadaan (1992) in their study of the road fatalities in Jeddah (Saudi Arabia) showed that road traffic fatalities are at the top of the list of major causes of death.

The types of factors leading to RTA and resulting casualties are generally linked to those causing disease which makes them fit for the epidemiological approach. The problem has long been the focus of attention in developed countries and their fatality rates are generally improving while relatively little is done to reduce the magnitude of the problem in developing countries (Jadaan, 1989a).

Comprehensive accident statistics would enable an administrator to judge the importance of the road accident problem and the need for expenditure on its alleviation. However the use of statistics and computer in road accidents is relatively recent innovation in Gulf Countries and few papers have been published on this subject recently. .

Generally, during the past two decades, there have been large road construction programmes in U.A.E. and a significant rise in the number of vehicles. In Al-Ain City, there have been rapid economic growth and a significant rise in the population and the number of vehicles, especially due to the presence of the university in the city. These led to an increase in road traffic accidents where the resulting casualties made it a serious public health problem in the country.

This study is carried out to determine and assess the level of mortality and morbidity due to motor vehicle accidents in the United Arab Emirates and its trend during the decade 1983-1992. Also, to evaluate and discuss the magnitude of road traffic fatalities in the UAE and to compare the situation with that of some developed countries.

2.2. AN ANALYTICAL STUDY OF HOSPITALISED ROAD TRAFFIC ACCIDENTS CASUALTIES IN AL-AIN, UAE

Previous studies have shown that casualty and fatality rates in Gulf Countries, are much higher than in the developing and developed countries with comparable vehicle ownership levels Bener and El-Sayyad (1985), Weddel and McDougal (1981), Bener et al.(1988), and Jinadu (1984). The magnitude of the problem therefore dictates the need for more research into road accidents and associated costs.

The discovery of oil just before the middle of the century changed many aspects of life in UAE. There has been a dramatic rise in the national economy, expressed, perhaps most convincingly in terms of income per-capita. Road construction programs have increased parallel to other developments. This has led to an increase in road traffic accidents (RTA) and casualties causing it to be a serious public health problem in the country.

The types of factors leading to road traffic accidents (RTA) and resulting casualties are generally linked to those causing disease which make them suitable for the epidemiological approach. The problem has long been the focus of attention in developed countries and their fatality rates are generally improving while relatively little is done to reduce the magnitude of the problem in developing countries (Bener et al. 1992). Unfortunately, Al-Ain City has contributed substantially to the severity of RTA problem in UAE .

This part of study is conducted to shed some light on the road accident problem in the Al-Ain district UAE. The study analyses all RTA injuries treated at Al-Ain Hospital of Al-Ain for the period 1 January-31

December 1993. It is hoped that the results and recommendations of this study will be useful to traffic and health authorities in UAE.

2.3. RISK-TAKING BEHAVIOUR IN ROAD TRAFFIC ACCIDENTS

Previous studies have shown that casualty and fatality rates in UAE and in other Gulf countries, are much higher than in the developing and developed countries with comparable vehicle ownership levels, Bener and Jadaan(1992), Bener et al.(1992) and Jadaan et al.(1992). The magnitude of the problem therefore dictates the need for more research into road accidents and associated risk factors.

The discovery of oil just before the middle of the century has changed many aspects of life in UAE. There has been a dramatic rise in the national economy, expressed convincingly in terms of income per-capita. Road construction programs has increased parallel to other national developments. and with an increase in road traffic accidents (RTA) and casualties reaching serious public health proportions, Bener and Jadaan (1992).

The types of factor leading to road traffic accidents (RTA) and resulting casualties may be viewed in the light of those causing injury which makes them suitable for the epidemiological approach. Although the problem has long been the focus of attention in developed countries and their fatality rates are generally improving, relatively little has been effective in reducing the magnitude of the problem in developing countries ,Jadaan (1988).

Although most researchers today agree that it is not appropriate to attempt to isolate a single main cause of an accident. Early accident studies demonstrated that about 90% of all accidents could be attributed to road user characteristics. However, the basic assumption for this approach compels the researchers to choose a single factor from many which could have contributed to the accident. Hence, road user behaviour is usually examined for compliance with existing traffic rules and regulations Jadaan et al.(1992) .

Overall, the behaviour of the road user clearly constitutes an important risk factor. However, age, sex, marital status, education, training, experience, way of life, emotional status, fatigue, reaction time, vision, vigilance and driving speed also play significant roles and need to be considered associated risk factors in road traffic accidents.

2.3.1.PSYCHOLOGICAL FACTORS IN ROAD TRAFFIC ACCIDENTS

Many aetiological factors play a role in road traffic accidents. Some of the more significant are:

1. Functional state of the vehicle
2. Environmental factors
3. Other road users
4. Behaviour of the driver (focus of this study)

Driver's Behaviour:

The effect of several factors on the driver's behaviour can cause errors in judgment which increase the risk of a traffic accident. Some of the factors influencing driver's behaviour include:

a. Age

b. Hearing

c. Vision

d. Fatigue

e. Alcohol and other psychoactive substances

f. Training and education of drivers

g. Psychological factors

1 Intelligence

2 Personality

3. Social maturity

4 Arousal

5 Risk taking behaviour

*1. **Intelligence**:* Safe driving needs an intelligent application of driving skill as well as foresight to avoid danger. Ability to anticipate the behaviour of other road users correctly and almost "think for them" helps to avoid RTA's, whereas inability to make an intelligent assessment of the actions of other road users or indeed the state of repair of a road could lead to the occurrence of RTA's. A reasonable level of intelligence is required to make such judgments.

*2. **Personality:*** A stable personality, well-adjusted in all social spheres is an asset to safe driving. Careless "irritable", impulsive, impatient and aggressive dispositions are detrimental to safe driving. An impulsive driver is likely to make mistakes that can lead to RTA's. Similarly, the overcautious driver is likely to confuse other road users by his hesitation and thus precipitate a RTA. The antisocial personality thinks mainly of self and immediate gratification and may drive in such a way as to cause RTA's especially when under the influence of psychoactive substances including drug and alcohol.

3. Social maturity: Social and emotional maturity affects driver behaviour. A driver who is emotionally mature is better equipped to consider the rights and feelings of other road users than one who is not. An immature person may not be mindful of personal safety, and of the needs and rights of other road users and is more likely to create situations that can lead to RTA's. A well disciplined person would normally set out on his destination in time so as to avoid hasty and speedy driving which otherwise could lead to a RTA. Having a sense of responsibility will enhance a driver making certain that his car is always in a road worthy state, drive in the correct lane, and respect the needs of others .

4. Arousal: Some people have a psychologic need for heightened arousal and may seek ways of increasing their stimulation either internally or externally. These stimulation-seekers or sensation-seekers will often drive riskily to increase their arousal to an optimum level, thus, precipitating RTA's. Sensation-seeking lifestyle peaks during late adolescence (16-19 years) and then decreases with age subsequently.

The level of arousal (alertness) of a driver affects his judgment. Conditions like epilepsy and intoxication by alcohol and drugs will impair the level of alertness of a driver and thus precipitate a RTA. Fatigue and somnolence especially for long distance drivers also impair a driver's concentration and lead to behaviour that can cause RTA's.

5. Risk taking Behaviour: Persons with high risk taking behaviour (e.g. young people aged 16-24 years) tend to drive in a manner that increases the chances of accidents occurring (e.g. drive too close to car in front i.e. tailgating, driving at high speed, undertake impaired driving (i.e. under influence of alcohol or drugs), and cutting-in sharply when overtaking another vehicle). Over-confidence and feelings of invincibility impairs the ability to recognize hazards and so increases the chances of

RTA's. There may be an apparent purposefulness of a risk taking behaviour to the risk taker. These include outlet for stress, aggression, expression of independence, means of increasing arousal, impressing others, means to an end (i.e. speeding to avoid being late), and are more commonly associated with younger drivers. Among adolescents risky behaviours have been thought to serve the following psychologic functions:

i-taking control over their lives by acting independently,.
ii-striving for independence,.
iii-expressing opposition to adult authority and conventional society,
iv-managing to cope with anxiety,
v-frustration, gain acceptance by a peer group,
vi-demonstrate show that one has matured into adult lifestyle.

2.4. ALLEVIATION OF INJURIES BY USE OF SAFETY SEAT BELTS IN THE UNITED ARAB EMIRATES

The advantage of seat belt usage has clearly shown that it saves money and life and there are other benefits to the community , (Campbell and Campbell 1986). The technical difficulties of seat belt mounting and design have been largely compared ,with remarkable improvement. Presently data are available showing seat belt effectiveness and reduction of traffic accidents fatalities in developed countries (Mackay 1987 ; Jonah and Lawson, 1984; and Evans 1986,1987). Scientific as well as observational studies also show that seat belt wearers take less risk than non seat belt wearers Hamer(1981) and Ashton et al.(1983). Investigations showed that, although automobile accidents often result in multiple injuries, the use of seat belts has resulted in 60% decrease in injuries and

35% reduction of major or fatal trauma Evans (1986,1987). Given the wider compliance with seat belt legislation, reports began to appear of seat belt injuries, Arjavi et al.(1987).

Road traffic accidents represent a significant health care problem in the United Arab Emirates (UAE) Bener et al.(1992) , where they are a major cause of mortality and morbidity .Road traffic accidents, injuries and fatalities in UAE are considered a major public health problem since they are the second leading cause of death after coronary heart disease, Bener et al.(1992). Since fatal accidents mostly involve young men, the resulting tragedy becomes a particularly painful loss to families and the nation. Methods to reduce this loss include early evacuation of victims from the scene of the accident and their aggressive treatment at skilled trauma centres, as well as effective preventive measures of which seat belting is one example Shawan et al.(1992). Many investigators have published reports on the beneficial effects of wearing safety seat belts in prevention motor-vehicle accidents, but the growth in their widespread use has been only very slow Bener and Jadaan(1990).

Unfortunately, nationwide educational programmes have consistently failed to persuade car users to wear seat belts. For example, in the U.K. in the 1970s, the rate of voluntary seat belt usage was 30%, and educational campaigns had a minimal effect, Mackay (1987) and Ashton and Warn (1976). When persuasion failed, legal compulsion was used and it resulted in belt usage rising to 90% Mackay (1987). It appears that the general use of safety seat belts can only be achieved by legislation. The results in the USA showed that "mandatory seat belt law is effective in significantly increasing seat belt use, Pace et al. (1986). Seat belt legislation has also been in force in some countries and states including

Australia since 1970 ,Mackay (1987);in Canada since 1976, Hoffman et al.(1987);in Germany sine 1976 , Marburger and Friedel (1987); in UK since 1983 Mackay (1987) and California since 1986 Dodson and Koban (1986). In the United Arab Emirates, seat belt legislation is currently not in force.

Many reports demonstrated that seat belts were most effective in reducing head and facial injuries Watson (1983).Those patients who were not wearing seat belts required hospital admission twice as often as occupants who were restrained by belts, Dreghorn (1985). In Australia, after compulsory wearing of seat belts was introduced, the severity of spinal injuries was reduced by 27% Watson, (1983). Evidence for the reduction of fatalities and injuries after seat belt legislation is quite widely reported in the literature [Bener et al.(1992), Sumchai et al. (1988), Arajavi et al.(1987), Watson (1983), Dodson and Koban (1986), Dreghorn (1985), Mackay (1987), Evans (1986), Shawan et al.(1992)],where reductions of up to 46% have been documented, Evans (1986).

It is now generally agreed that securely fastened seat belts reduce death and injuries in road traffic accidents. However, the extensive publicity concerning the wearing of safety seat belts in UAE has been unsuccessful since we do not have legislation enforcing their use. Road traffic accidents in UAE is a major cause of death second only to coronary heart diseases. This study is planned to investigate seat belt usage in UAE, since the extent of seat belt usage while driving is not known. This study was conducted to establish, knowledge, attitude ,and practice of the drivers in motor vehicles who have been hospitalized as a result of road traffic accidents (RTA) thereby providing base-line data for future evaluation of this preventive measure.

CHAPTER THREE:

3.1. MATERIALS AND METHODS.

3.1. MORTALITY AND MORBIDITY DUE TO MOTOR VEHICLE ACCIDENTS IN THE UNITED ARAB EMIRATES DURING 1983-1992: TRENDS AND DIFFERENTIALS

3.1.1. STUDY AREA AND POPULATION:

The study was included all United Arab Emirates, Abu Dhabi, Dubai, Sharjah, Al-Ain, Ras Al Khaimah, Fujairah, Ajman, and Umm Al Quwain. The data for this study was taken from the Ministry of Interior's Yearly Statistical Report and in collaboration with the Traffic Departments of Abu Dhabi, Dubai and Al-Ain City, for a period of 1983-1992 years.

3.1.2. STUDY SUBJECTS:

The study was based on the collection of data about all accidents, casualties and fatalities resulted from motor vehicle accidents that had occurred in United Arab Emirates during the period from 1 January 1983 up to end of 31 December 1992. The Annual Statistical report contains information such as number of registered vehicles, number and nature of accidents, number of casualties and fatalities, age of driver, and frequency of accidents. The main source of data for study was obtained from the Planning and Training Division of Directorate of Traffic, Ministry of Interior and Ministry of Health's Annual Reports. Additional data was obtained from various sources, including government census, United Nations Reports (1981, 1985). International Road Federation (1983) and World Bank (1985).

3.2.ANALYSIS OF AL-AIN HOSPITAL ACCIDENT MERGENCY DEPARTMENT RECORDS ON ROAD TRAFFIC ACCIDENTS

3.2.1. Study area and subjects:

This is a descriptive study using available data and records of Accident Emergency Department of Al-Ain Hospital in Al-Ain, UAE. Al-Ain Hospital is a general hospital with over 350 beds. The records of the Accident and Emergency Department of the hospital for the period of from 1 January to 31 December 1993 were scanned for all those seen as result of road traffic accidents. These patients have to be reported to the police and are specifically identified in the records. A specially designed data collection form was constructed for abstraction of the records. A cross-check was made by searching the records of the X-ray Department for all those examined radiologically. In each search the date, hospital registration number, number of hospitalization days, sex, age, nationality, injury , month and time of injury were recorded.

3.3. ANALYSIS OF FATALITY RATES

3.3.1. STUDY SUBJECTS AND STATISTICAL ANALYSIS:

The data used for this study were taken from the Ministry of Interior's Yearly Statistical Report and in collaboration with the Traffic Department, United Arab Emirates (UAE). The study is based on the collection of data covering all fatal motor vehicle accidents that occurred in United Arab Emirates during the period 1 January to 31 December 1990. The annual statistical report contains information such as number of registered vehicles, number and nature of accidents, causes of road

accidents, number of fatalities and casualties and age and sex of drivers. Additional data were obtained from various sources, including Ministry of Public Health, Health Statistics Annual Report for the year (1990) Additional sources of data were obtained from the Annual Report, Ministry of Health of UAE, World Health Statistics Annual Report, WHO (1992), and Accident Facts National Safety Council (1992).

3.4. ALLEVIATION OF INJURIES BY USE OF SAFETY SEAT BELTS IN THE UNITED ARAB EMIRATES

3.4.1. STUDY AREA AND SUBJECTS:

A cross sectional study was carried out between November 1993 and June 1994 to assess the knowledge, attitude and practice of hospitalised drivers involved in road traffic accidents (RTA) regarding seat belt usage in the United Arab Emirates. During this period a total of 1000 vehicle drivers were seen and treated in the Accident and Emergency Department of the two teaching hospitals namely Al-Ain and Tawam Hospitals, in Al-Ain , UAE.

The subjects were selected from admissions to the Accident and Emergency Departments. Both male and female patients between the ages of 18 and 70 years were included. The subjects under study were selected from among hospitalized patients in order to ensure standardized environmental circumstances.

The data on each of patients were recorded by one of the casualty officers on a standardized questionnaire when the patient was first seen. The criterion used to assess the severity of the injury was the need for admission to hospital, as those who were allowed home after treatment were assumed to have sustained only minor injuries. The details recorded were age, sex, nationality, marital status, educational level, occupation,

driving experience, the wearing or not wearing of seat belts, type of injury, attitude towards seat belts before and after accident, speed limit, the reasons for not wearing a seat belt, the time and place of the accident and the nature of the injuries.

3.5.1. DATA PROCESSING AND STATISTICAL ANALYSES:

All data variables was coded, processed and analysed on the IBM computer of the Department of Community Medicine, Faculty of Medicine and Health Sciences at the United Arab Emirates University. Data Entry was performed using DOS-5 Editor. The Statistical Software Package SPSS [Statistical Package for Social Sciences, Norusis 1992] analysis was used for performing all statistical analysis. Also, Harvard Graphic Package was utilized for graphing such as bar chart, histogram, line chart and pie chart.

3.5.2. STATISTICAL METHODS AND ANALYSIS

The questionnaires were coded, entered and processed in the Department of Community Medicine on the IBM computer of the Faculty of Medicine and Health Sciences at the United Arab Emirates University. The statistical package program SPSS,(Statistical Package for Social Sciences) was used to calculate Chi-square to ascertain the association between two or more categorical variables, Norusis (1992). In 2x2 tables, the Fisher exact test (two-tailed) was used instead of Chi-Square, in particular, when the sample size was small. The Normal Z-test (equivalent to 2x2 table Chi-Square) was used to evaluate the significance between two proportions. The Geometric mean was used for the annual growth rate. Also, an attempt was made to test the relationship between fatality

rate and other parameters that are believed to have some impact on fatalities in U.A.E. The Odds ratio (OR) and their confidence intervals (CI) were obtained by using Mantel-Haenszel test, EPI5 INFO (1992) statistical package. The level $p<0.05$ was considered as cut-off value for significance.

CHAPTER FOUR:

4.RESULTS AND DISCUSSIONS

The issues related to the epidemiology of road traffic accidents in the UAE are diverse. However,the factor influencing casualties and fatalities are very much interrelated. This chapter presents and discusses the results obtained concerning: 4.1.- Trends in mortality and mobidity due to motor vehicle accidents ; 4.2.-Hospitalized road traffic accidents casualties in Al-Ain Hospital ; 4.3.-Risk taking behaviour in road traffic accidents; 4.4.-Alleviation of injuries in road traffic accidents by use of safety seat belts.

4.1. MORTALITY AND MORBIDITY DUE TO MOTOR VEHICLE ACCIDENTS IN THE UNITED ARAB EMIRATES DURING 1983-1992: TRENDS AND DIFFERENTIALS

Table 4.1.1 gives the magnitude of the road traffic accident problem in the United Arab Emirates (UAE) for the period of 1983-1992. It can be seen that there has been a dramatic increase in the number of registered vehicles during this period, [Figures 4.1.1 and 4.1.2]. The number of registered cars trend increased stastistically significant by years.

During the ten years period 1983 to 1992, the population of UAE increased at the rate of 7.2% per year and the number of registered vehicles increased at the rate of 5.4% per year. Considering the UAE as a whole the population (7.2%) number of registered cars (5.4%) and total number of accidents (4.4%) as given in Figure 4.1.3 , showed almost a steady increase.

Table 4.1.2 demonstrates motor vehicle in use and vehicle per capita for the UAE for the period of 1983 to 1992. Despite the enormous increase in the population there is a decline in the vehicle per capita. As can be seen form Table 4.1.2, the total number of cars went on decreasing till 1991, but in 1992 there has been a substantial increasing trend in the number of registered vehicles.

Table 4.1.3 shows accident rates per 1000 vehicles, casualties per 100 traffic accidents and fatalities per 100 traffic accidents. It can be observed from this table, road traffic accidents rates per 100 vehicles sharply decreased from 184.3 in 1983 to 91.9 in 1992. Also, as can be seen from Table 4.1.3 that casualty rates almost doubled from 27.5 in 1983 to 51.7 in 1992. Then, motor vehicle accident fatalities have gone up from 450 in 1983 to 770 in 1992 during the decade showing an average annual growth of 4.8%. This shows lower accident rate but higher casualty and fatality rates,in the UAE [Figures 4.1.4, 4.1.5, and 4.1.6].

Tables 4.1.4 to 4.1.10 gives the population , number of registered cars, accidents, casualties and fatalities in the seven Emirates. As can be observed from these tables there is an overall decrease in accidents at the Abu Dhabi and Dubai Emirates. But there is increase in injuries and fatalities at the Sharjah, Ajman, Ummm Al-Quwain , Ras Al Khaimah and Fujairah Emirates.

Table 4.1.11 gives the age groups of drivers who have been involved in road traffic accidents. As can be observed from this Table, almost two-thirds of drivers were less than 31 years. It can be seen than 1.4% of the accidents , 16.2% of

the casualties and 14.8% of the fatalities were pedestrians who are less than 11 yeras of age, [Figure 4.1.7].

As UAE began its explosive development through the seventies , so did the traffic picture. One significant development has been rapid increase in vehicles during recent years. In 1983 , there was about 223,899 cars on the roads of UAE but the figures reached about 344,539 in 1992 [Table 4.1.1.]. Data on population and number of registered vehicles over a ten year period between 1983 to 1992 were used to show the changing pattern in vehicles. The country is now a wholly mobile society where the numbers of cars increase rapidly. The average annual growth in population during the same period was found to be 7.2% per year, compared with 5.4% for the increase in the number of cars. The vehicle ownership decreased from 0.192 vehicle per capita in 1983 to 0.171 vehicle per capita in 1992.

The dramatic increase in population led to an increase in the number of which was accompained by an increase in road traffic accidents, injuries and deaths. By 1983 , there was already a total of 41,269 traffic accidents which decreased to 31,708 accidents in 1992. During the study period 1983 to 1992 a total of 343,835 accidents were reported causing 131,793 injuries and 6595 fatalities. Figure 4.1.3 and and Figure 4.1.6 show the changes that occurred in population, number of cars, number of accidents, injuries and fatalities.

Accident statistics for UAE were converted into accident rates as related to human and vehicle population. The changes in accident , injury and fatality rates during the study period are shown in Table 4.1.3 and Figures 4.1.3 to 4.1.6. It will be

observed that accident rates per 1000 vehicles have reached a peak in 1983 followed by a significant drop in 1992. The drop could have been attained due to the introduction of a set of traffic laws that imposed heavy penalties on violaters. However, there is a tendency for all casualties per 100 traffic accidents to increase with time. Over the nine years period (1984-1992) fatality rates per 100 traffic accidents increased with the time. Overall, the mortality rate 100, 000 population due to motor vehicle accidents decreased from 42.60 in 1984 to 38.28 in 1992. Bener and El-Sayyad,(1985); Bener et al.(1988), Ofosu et al.(1988), Bener and Jadaan (1992) and Bener (1994) found similar results for Saudi Arabia and Kuwait.

In UAE , the young drivers age <31 years were found to be most frequent casualties since they form over two-thirds of drivers (67.4%). As can be seen from Table 4.1.11 and Figure 4.1.7 age groups 21-30 years showed highest rate for accidents, injuries and fatalities. Also, Bener et al.(1988), Bener and Jadaan (1992) and Bener (1994) obtained similar results for Saudi Arabia and Kuwait.

The death rates per 10,000 population and per 10,000 vehicles in 1982 for the GCC countries are shown in Table 4.1.12. The table demonstrates very high rates per 10,000 population of Qatar and UAE while Oman shows the highest death rate per 10,000 vehicles. Kuwait , with the second highest vehicle ownership in 1982 shows the lowest death rate per 10,000 vehicles. If fatality rates are compared with a selection of Middle Eastern and industrialized countries, Gulf countries can be seen to have much higher rates (both per 100,000 population and per 10,000 vehicles) than the

industrially developed countries. Almost all Gulf countries have higher fatalities per 10,000 persons but lower fatalities per 10,000 vehicles than Middle Eastern countries,(Table 4.1.12). Most Middle Eastern countries with comparatively low vehicle ownership appear to have a lower death rate per 10,000 population and higher death rate per 10,000 vehicles compared with industrialized countries and rich developing countries (except Oman which may be due to the late boom of its economy by oil).

The changing pattern of fatality rates over time in Gulf Countries and selected Middle Eastern and developed countries was investigated . Data on the population, vehicle and traffic fatalities between 1971 and 1981 were obtained. Vehicle ownership levels and fatality rates per 10,000 persons and per 10,000 licenced vehicles were calculated for the years 1971 and 1981 and changes were determined. These changes over 10 year period are given in Table 4.1.13. It will be observed that all Gulf countries showed a significant increase in vehicle ownership levels over the ten year period, Oman and Saudi Arabia had a considerable increase.

There was a decrease in the number of fatalities per 10,000 vehicles in all Gulf countries.Conversely, all countries but Kuwait showed an increase in the number of fatalities per 10,000 persons.Comparing these trends with those for developed countries , Table 13 shows that in all the developed countries quoted except Spain there was a decrease in both rates between 1970 and 1980. Almost all Middle Eastern countries showed an increase in vehicle ownership levels. All countries but Turkey showed an increase in fatalities per

10,000 persons and all but Tunisia showed a decrease in fatalites per 10,000 vehicles.

The analysis of road traffic accidents, casualties and fatalities rates and their trends over time carried out in this study exhibited the magnitude of the road safety problem in the UAE. The findings of this study into the road safety in the UAE and other Gulf countries indicate that fatality rates (per 100 accident and per licensed vehicle) are high in comparison with those in developed countries. However, the collected traffic accident data are often inadequate or insufficient to undertake proper analysis.

Pedestrians are particularly at risk and they are involved in slightly over 20% of the total fatalities. This could be largely attributed to the lack, or sometimes the absence , of facilities for pedestrians especially on the newly built motorways.

Traffic signals, traffic signs and pavement markings in UAE suffer from substantial deficiencies that tend to confuse drivers and cause erratic or hazardous driver action and may consequently lead to accidents. Drivers of observance of "stop" signs was found to be very low and an alarming proportion of drivers violate the speed limit on the UAE roads. Results , however, suggest that improved education, training and law enforcement have great potential for improving road safety. All efforts should be made to reduce the frequency and severity of accidents and casualties. Although some problems may take years to improve, others can be tackled immediately. UAE is most unlike other developing countries in having the economic resources to set up and implement a comprehensive road safety programme catering for all aspects of the problem of RTA.

It was observed that there has been an dramatic increase in the number of registered vehicles during this period. During the ten years period 1983 to 1992, the population of UAE and the number of registered vehicles increased substantially. Despite the enormous increase in the population and cars there is a decline in the vehicle per capita, the total number of cars went on decreasing till 1991, but in 1992 there has been substantially an increasing trend in the number of registered vehicles. Road traffic accidents rates per 100 vehicles sharply decreased from 184.3 in 1983 to 91.9 in 1992. Also, casualty rates doubled from 27.5 in 1983 to 51.7 in 1992. Then, motor vehicle accident fatalities rose from 539 in 1984 to 770 in 1992, during the decade showing an average annual growth of 4.8%. UAE showed declining accident rates but rising casualty and fatality rates. In addition, the population, number of registered cars, accidents, casualties and fatalities in the seven Emirates individually were reviewed. Overall, results showed a decrease in accidents at the Abu Dhabi and Dubai Emirates. But there were increases in injuries and fatalities accident at the Sharjah, Ajman, Umm Al-Quwain , Ras Al Khaimah and Fujairah Emirates. It was observed that 1.4% of the accidents , 16.2% of the casualties and 14.8% of the fatalities were pedestrians their age less than 11 yeras of age. An analysis of road traffic accidents, casualties and fatalities rates and their trends over time exhibited the magnitude of the road safety problem in the UAE. The findings of this study into the road safety in the UAE and other Gulf countries indicate that fatality rates (per 100 accident and per licensed vehicle) are high in comparison with those in developed countries.

Table 4.1.1. Population,registered vehicles and road traffic accidents for the United Arab Emirates (1983-1992)

YEAR	Population	Total Registered Vehicles	Collision of Vehicles	Fail Vehicles	Run over Vehicles	Accidents	Injuries	Deaths
1983	1166324	223899	32353	5513	3404	41269	11357	450
1984	1265100	239212	29150	4302	3147	36595	9543	539
1985	1306200	253239	33362	4818	3397	41442	11202	586
1986	1304700	247794	27921	4938	3504	36770	14428	620
1987	1517100	256529	24582	3430	4226	32337	10485	534
1988	1587100	270889	31205	4184	3328	38704	14492	672
1989	1633200	293082	23207	3972	2649	29829	13979	605
1990	1844300	303284	21412	3916	2556	27887	14937	626
1991	1927850	309539	20514	3920	2580	27294	14962	757
1992	2011400	344856	24988	3886	2834	31708	16408	770
Total	15563274	2742323	268694	42879	31625	343835	131793	6595

Figure 4.1.1 Population and Vehicles statistics for UAE

(1983 - 1992)

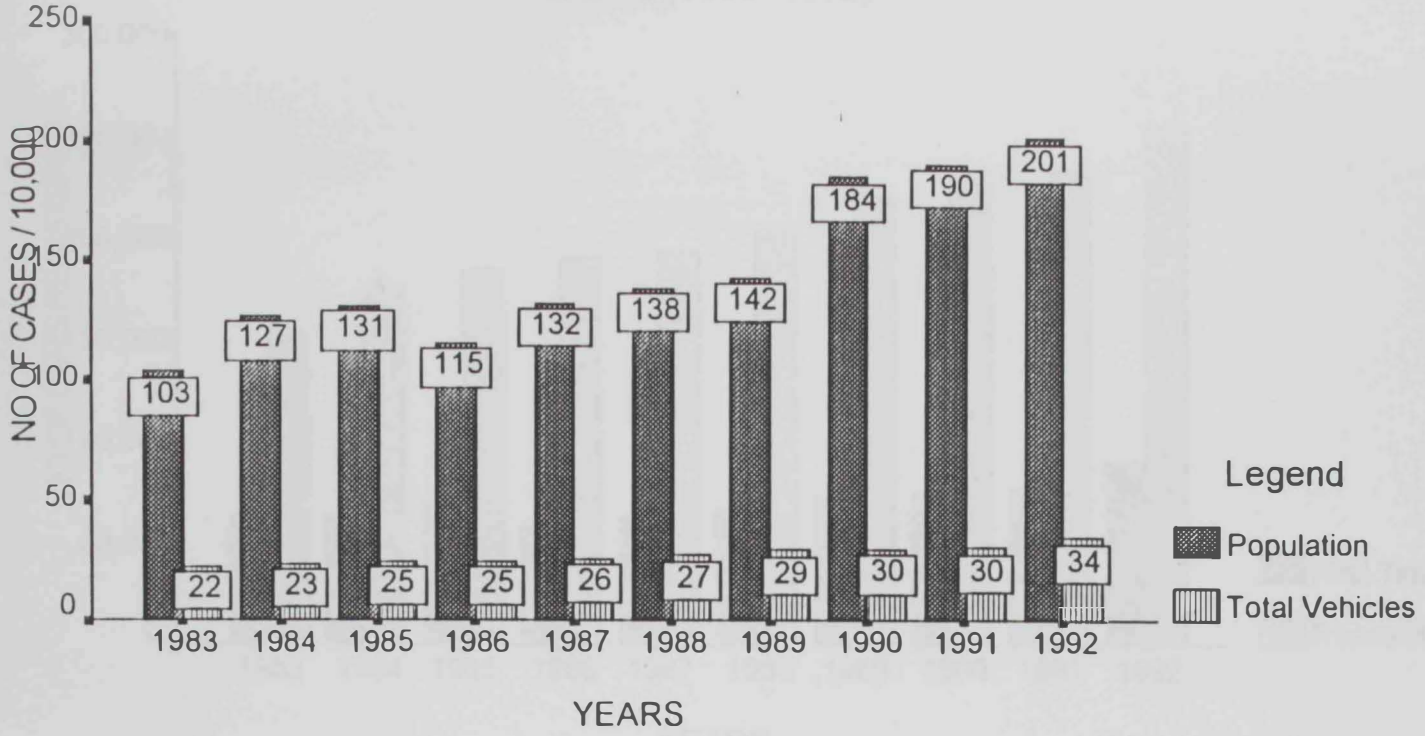


Figure 4.1.2. Comparision of Registered New Vehicles and Old Vehicles in UAE (1983- 1992)

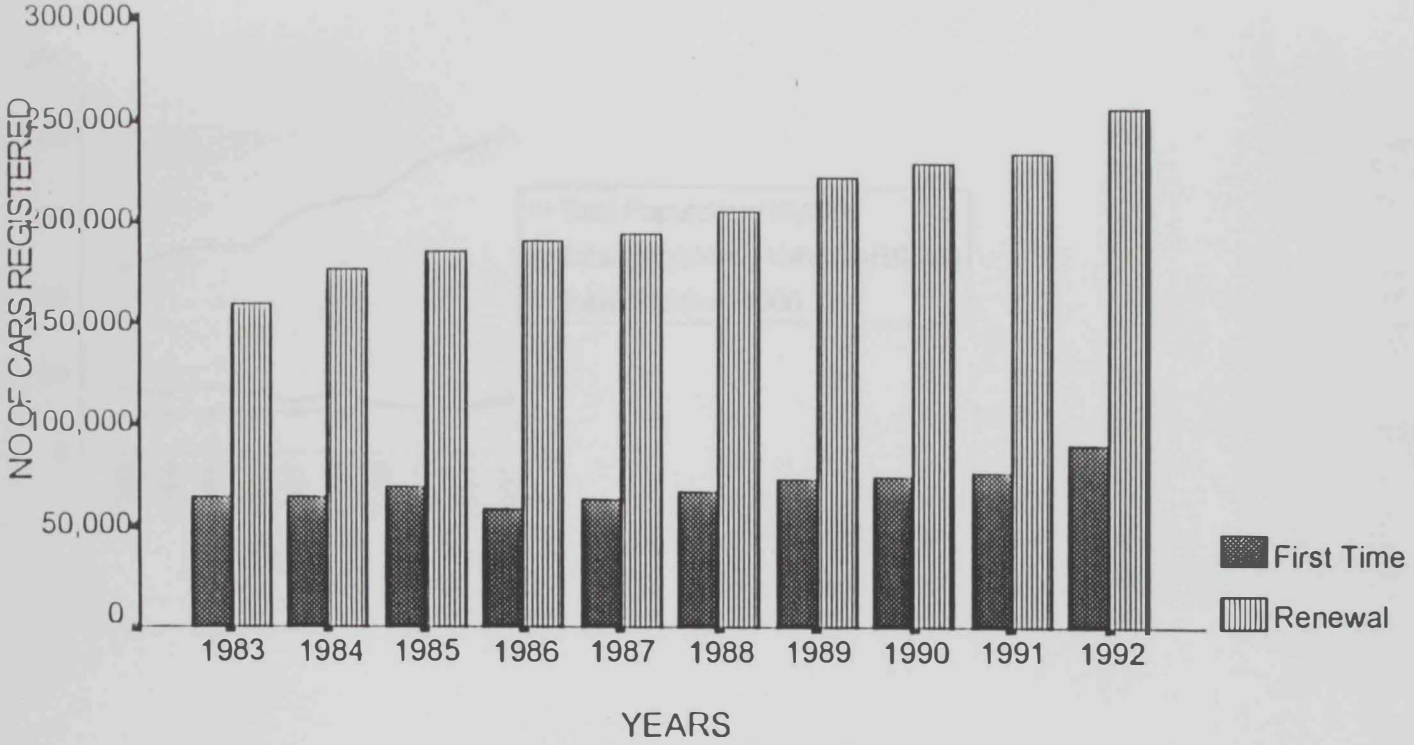


Figure 4.1.3. Distribution of population, registered vehicles and accidents 1983 - 1992

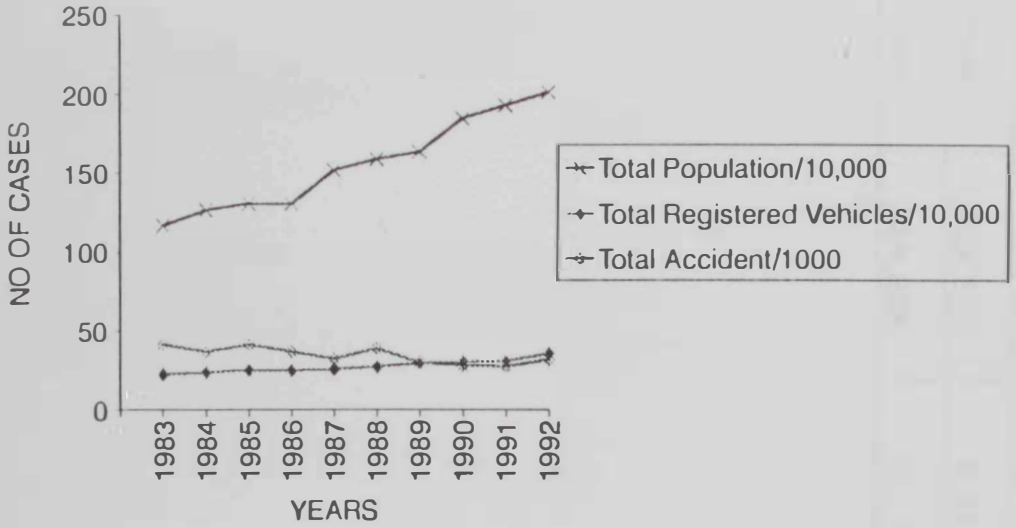


Table 4.1.2. Motor vehicles in use and vehicles per capita for the United Arab Emirates during 1983 - 1992

Year	Population	No.of Registered vehicles	Vehicles Per capita	perecentage increase over previous year
1983	1166324	223,899	0.192	7.4
1984	1265100	239,212	0.189	6.3
1985	1306200	253,239	0.194	6.4
1986	1304700	247,794	0.189	-0.02
1987	1517100	256,529	0.169	3.5
1988	1587100	270,889	0.171	5.6
1989	163200	293,082	0.179	8.2
1990	1844300	303,284	0.164	3.4
1991	1927850	309,539	0.161	2.1
1992	2011400	344,856	0.171	11.4

Table 4.1.3. Accident, injury and fatality rates in RTA in the UAE

Year	Accident rates per 1000 vehicles	Casualities per 100 traffic accidents	Fatalities per 100 traffic accidents
1983	184.3	27.5	2.1
1984	152.9	26.1	1.5
1985	163.6	27.0	1.4
1986	148.4	39.2	1.7
1987	126.0	32.4	1.7
1988	142.9	37.4	1.7
1989	102.0	46.9	2.0
1990	92.0	53.6	2.2
1991	88.2	54.8	2.8
1992	91.9	51.7	2.4

Fig. 4. RTA Casulties for a period of 1983- 1992

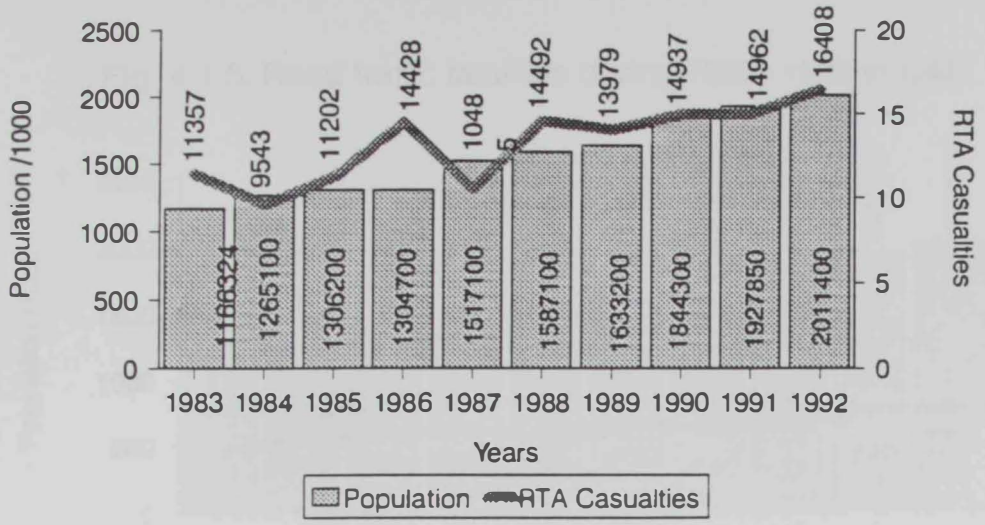


Fig. 4.1.5. Road traffic fatalities during 1983- 1992 in UAE

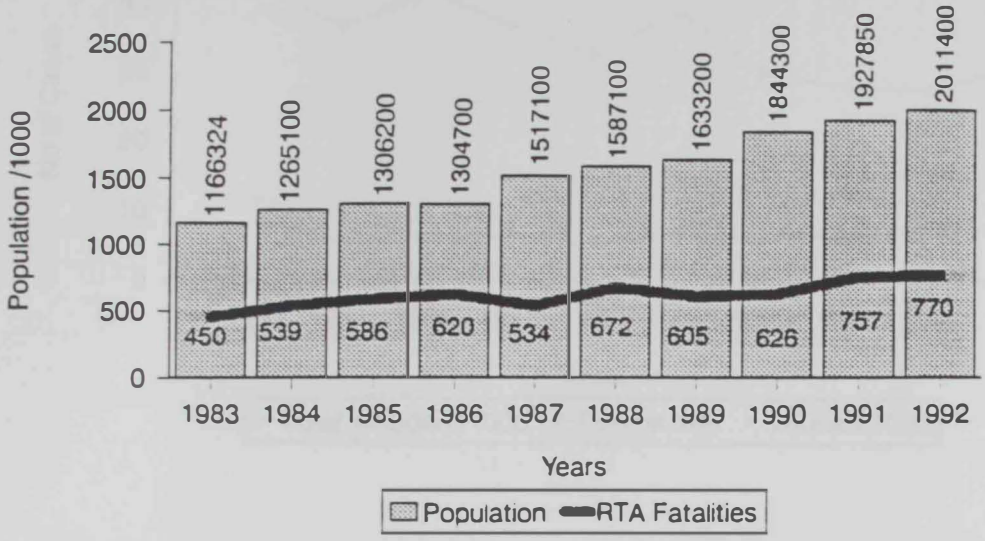


Fig.4.1.6 A comparison of RTA accidents, injuries and fatalities for a period of 1983-1992 years in UAE

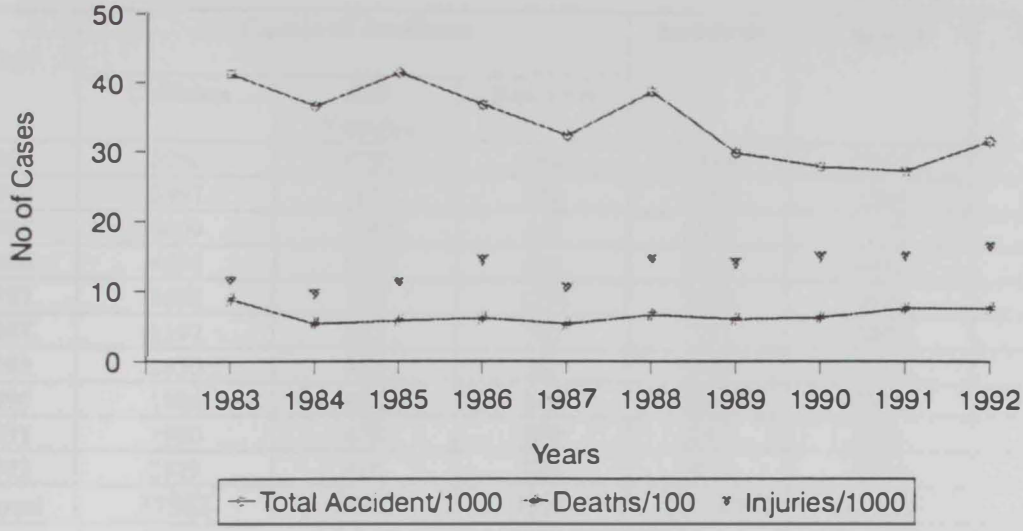


Table 4.1.4. Road Traffic accidents causes, total number of accidents, injuries and fatalities in Abu Dhabi Emirate (1983 -1992)

Year	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
1983	5080	1750	484	7314	2247	166
1984	3497	1322	336	5155	1361	76
1985	4609	1567	442	6618	2193	125
1986	4556	1555	436	6543	4430	125
1987	3895	397	1296	5588	1646	78
1988	6392	583	785	7751	3000	156
1989	2650	456	387	3493	2340	81
1990	1884	420	349	2653	2541	84
1991	1960	472	299	3011	2565	138
1992	2829	426	388	3643	2770	98
Total	37352	8948	5202	51769	25093	1127

Table 4.1.5 Road traffic accidents causes, total number of accidents , injuries and fatalities in Dubai Emirate(1983 -1992)

Year	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
1983	7076	458	522	8055	1924	100
1984	7177	415	509	8101	1914	95
1985	7658	434	534	8526	1778	70
1986	4906	446	521	5874	2129	87
1987	3601	565	391	4557	2039	100
1988	3461	548	395	4400	2269	77
1989	2816	660	382	3859	2621	90
1990	2820	643	453	3916	2887	96
1991	2787	654	476	3917	2840	102
1992	2752	626	506	3884	3153	125
Total	45054	5449	4689	55089	23554	942

Table 4.1.6 Road traffic accidents causes, total number of accidents, injuries and fatalities in Sharjah Emirate (1983 -1992)

Year	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
1983	1325	190	208	1723	320	78
1984	1728	103	199	2030	428	38
1985	1998	118	212	2292	479	38
1986	1929	176	320	2825	588	46
1987	2070	247	134	2451	507	30
1988	2643	394	185	3222	549	48
1989	2699	341	187	3227	562	50
1990	2636	343	164	3143	615	46
1991	2176	331	192	2699	607	49
1992	2260	368	177	2805	710	59
Total	21464	2611	1978	26417	5365	482

Table 4.1.7. Road traffic accidents causes, total number of accidents, injuries and fatalities in Ajman Emirate (1983 -1992)

Year	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
1983	375	37	79	491	232	12
1984	349	42	64	455	224	11
1985	446	36	79	561	227	7
1986	450	23	49	532	186	6
1987	494	83	15	592	227	7
1988	528	84	38	650	320	13
1989	563	78	29	670	314	16
1990	409	81	23	512	242	8
1991	379	92	22	493	311	12
1992	1407	113	49	1569	274	15
Total	5400	669	447	6525	2557	107

Table 4.1.8. Road traffic accidents causes, total number of accidents, injuries and fatalities in Umm Al Quwain Emirate (1983 -1992)

	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
1983	214	87	56	357	112	16
1984	173	84	64	321	130	8
1985	191	72	61	324	115	7
1986	166	72	51	289	90	4
1987	161	56	78	295	113	11
1988	234	80	69	383	169	7
1989	308	71	113	492	255	14
1990	261	72	92	425	212	8
1991	309	79	79	467	190	9
1992	291	104	80	475	199	18
Total	2308	777	743	3828	1585	102

Table 4.1.9. Road traffic accidents causes, total number of accidents , injuries and fatalities in Ras Al Khaimah Emirate (1983 -1992)

Year	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
1983	1308	159	293	1750	678	40
1984	1210	137	345	1688	569	24
1985	1334	134	324	1793	628	30
1986	1403	151	341	1895	630	25
1987	1778	333	151	2261	443	27
1988	1850	359	148	2357	762	23
1989	2007	316	164	2487	712	27
1990	2200	320	152	2676	767	34
1991	2020	296	168	2484	754	33
1992	2545	278	169	2992	781	38
Total	17655	2483	2255	22383	6724	301

Table 4.1.10. Road traffic accidents causes , total number of accidents, injuries and fatalities in Fujeirah Emirate (1983 -1992)

Year	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
1983	357	63	38	458	127	24
1984	343	45	46	434	145	17
1985	445	48	46	539	181	11
1986	400	46	36	482	161	17
1987	342	34	48	424	166	14
1988	384	35	43	462	177	12
1989	493	41	55	589	181	21
1990	460	58	41	559	204	34
1991	504	36	36	576	214	37
1992	410	28	48	486	217	32
Total	**4138**	**434**	**437**	**5009**	**1773**	**219**

Table 4.1.11. Road Traffic accidents causes, total number of accidents, injuries and fatalities according to the age groups (1983-1992)

Age groups	Causes of Accidents			Accidents	Injuries	Deaths
	Collision	Fail Vehicles	Run over			
less than 11 yr	1747	442	257	2437	10552	490
11-20 yr	20717	3426	2946	27322	10969	411
21-30 yr	56469	8930	6540	71800	22402	1118
31-40 yr	36164	5852	4110	46539	14494	720
more than 40 yr	18274	2721	1898	22922	8234	541
Total	**133371**	**21371**	**15874**	**172815**	**65142**	**3315**

Fig. 7. Road Traffic Accidents, Injuries, and Fatalities according to the age groups (1983-1992)

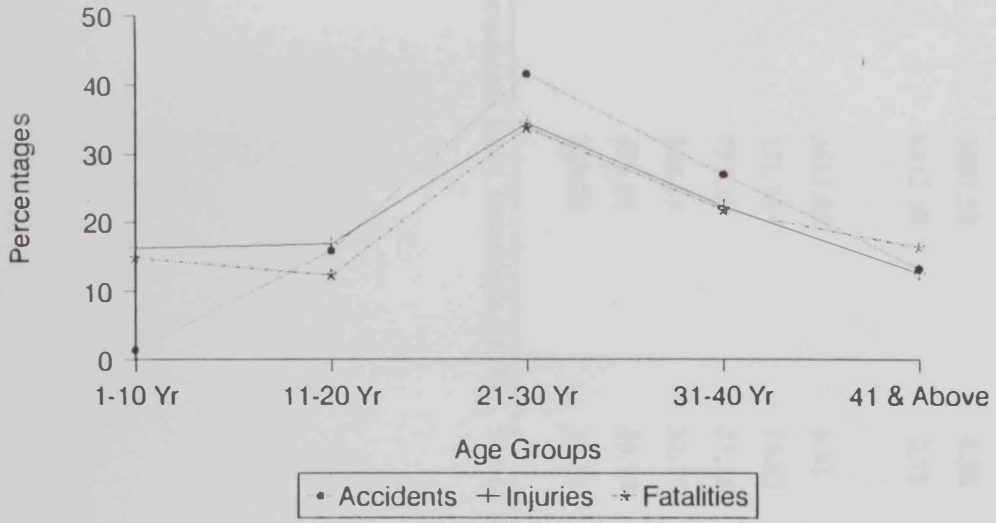


Table 4.1.12. Motorization levels and fatality rates for various countries 1982.

Country	Vehicles/10,000 people	Fatalities/10,000 vehicles	Fatalities/10,000 person
Bahrain	2190.86	9.23	2.02
Kuwait	4144.21	8.0	3.32
Oman	1197.21	32.40	3.88
Qatar	5357.03	8.49	4.55
Saudi Arabia	3409.83	9.78	2.98
UAE	3507.83	12.23	4.29
Belgium	3582.05	6.27	2.25
United Kingdom	3064.27	3.5	1.1
Netherlands	3488.84	3.42	1.19
New Zealalnd	5828.84	3.58	2.09
Spain	2607.58	4.54	1.18
United States	6812.08	2.71	1.88
Cyp rus	2611.85	6.80	1.78
Egypt	151.62	74.63	1.13
Jordan	737.20	27.26	2.01
Morocco	324.37	32.77	1.06
Tunisia	436.58	30.79	1.34
Yemen A.R.	228.90	32.81	0.75

Sources : International Road Federation (1983) , World Bank (1985) and United Nations (1983)

Table 4.1.13. Percentage change in vehicle ownership and fatality rates in : (a) the Gulf countries 1971 - 1981 ; (b) in other Middle Eastern Countries 1970 - 1980 ; and (c) in the developed countries 1970 - 1980

Country	Vehicle/10,000 people	Fatalities/10,000 people	Fatalities/10000 vehicle
(a) Gulf countries			
Bahrain	+117.3	+13.5	-47.9
Kuwait	+99.8 -	11.4	-55.7
Oman	+5673.7	+3057.1	-45.2
Qatar	+385.7	+21.6	75.0
Saudi Arabia	+1017.7	+179.6	-75.1
UAE	+413.9	+97.3	-61.7
(b) Other Middle Eastern countries			
Jordan	+309.4	+45.5	-64.6
Libya	+153.1	+99.5	-21.2
Morocco	+67.0	+27.1	-24.2
Tunisia	+77.1	+115.3	+22.5
Turkey	+165.9	-5.5	-64.7
(C) Developed countries			
Belgium	+43.6	-20.1	-44.4
Great Britain	+22.0	-23.0	-36.7
Netherlands	+8.3	-42.2	-46.8
New Zealand	+36.3	-17.5	-39.4
Spain	+108.6	+9.6	-47.5
USA	+29.4	-14.9	-34.2

+ Figures for 1969 and 1979 are used.

4.2. AN ANALYTICAL STUDY OF HOSPITALISED ROAD TRAFFIC ACCIDENTS CASUALTIES IN AL-AIN, UAE

The Al-Ain Hospital recorded a total of 1383 road traffic accidents (RTA) casualties with 63 deaths for the period of 1 January - 31 December 1993. The road traffic accident rate,based on city population of 300,000 was 461 per 100,000 population and the death rate was 21 per 100,000. The majority of victims (84%) were males [Figure 4.2.1.]

Figure 4.2.2. shows the nationality distribution of injuries resulting from RTA. The UAE nationals comprised 29% while those of other Arabs 36% and Asian origin formed 35% respectively

Figure 4.2.3. presents age distribution of injuries involved in RTA Of 1383 patients, 10% were under 11 years; 10% were between 11-17 years; 25% were between 18-26 years; 32% were between 27-35 years ;then 11% were between 36-44 years ; and 12% were above 45 years.

Figure 4.2.4. gives the distribution of injuries. Head and neck injury constitutes the commonest site of injury (44%), followed by limbs injury (31%), chest, abdomen and pelvis (8%), skin or superficial injury (8%); then, spinal & back injury (6%) and contusion injury (3%).

Figure 4.2.5. illustrates the number of victims of road traffic accidents in relation to the time of the day.The number of accidents was highest during the 6 am - 12 noon (33%,) followed by the period between 6pm-12 midnight (31%), then between 12 noon - 6 pm (27%) ; and lastly, 12 midnight - 6 am morning (9%.). The most accidents (50%) occurred between 7.30am-2.30pm;the official working and school hours. The least accidents occurred between midnight - 6 am.

Figure 4.2.6. shows the monthly distribution of injuries involved in RTA. During the December month (10.1%), the number of persons who were injured by traffic accidents was slightly higher than other months. The lowest injuries occurred during the January (6.6%).

Figure 4.2.7. gives the distribution of the site of injury by sex. Head and neck injury constitutes the commonest site of injury in males (44%) and in females (44%). The least frequent injury type was contusion in males (3.8 %) and in females (2.2 %).

Figure 4.2.8. presents the distribution of the site of injury by nationality. Head and neck injury constitutes the commonest site of injury in all nationalities. Followed by limbs injury.

Overall, the commenest injury occurred between age group 27-35 (32%) and age group 18-26 (25%). Overall, the most head and neck injury occured between 6 am-12 noon (33%), the official working and school hours.

Table 4.2.1. shows the distribution of injuries according to sex of drivers. Males received injuries of different types than females . However, did not find any statistical significance differences between type of injury and sex of drivers.

Table 4.2.2 shows the distribution of injuries according to nationality of drivers. We have found statistically significant differences between type of limbs injury and nationality. Also we have found statistical significance differences between injury type of head & neck and nationality of drivers.

According to the hospital administration most of the injured patients (47%) required a hospital stay of under 10 days.33% of patients required a hospital stay of between 10-20 days . Then, 20% of the injured patients required a hospital stay of more than 20 days.

Road traffic accidents in the UAE as well as in other Arab Gulf Corporation Countries (GCC) constitute a major public health problem. This epidemic of road accidents in UAE is ranked second only to coronary heart diseases. It is an epidemic as serious as plague or smallpox were to earlier generations (Bener and Jadaan 1992).

This study provides the results of an investigation into the hospital managed traffic accidents using the limited information available on the patients who were admitted. The results follow the same general trend of a previous study from this country Weddel and McDougall (1981).

The most common injury was to the head which was also the chief cause of death.

The proportions of patients who die from RTA in Saudi Arabia (Bener and Jadaan 1992),and in Kuwait (Bener et al.(1993), in Jordan (Jadaan 1989) and in UAE are perhaps the highest in the world. The largest group of the traffic accident victims are under 35 years of age. This study also demonstrated that the numbers of pedestrian injured (19.5%)[Figure 4.2.3.] was high in age groups less than 11year and between 11-17 years. Saudi Arabia, Kuwait and UAE head the list of pedestrians injuries in the world, the possible reasons for this are discussed in detail in earlier studies by Bener and Jadaan (1993), Jadaan et al. (1992) . This is a big loss for the economic potential of the country.

In the UAE as a whole,other studies have suggested that excessive speed is the main reason for the RTA, with failure to obey traffic regulations being the next contributor . Driving tests are compulsory and can only be taken by those over the of 18 years, but not all have licences, nor is the age limit universally observed. 10% of RTA victims were drivers aged between 11 to 17 years and not holding driving licence.

The length of stay in the hospital reported in this study was maximum for spinal and head injuries. Those patients with multiple fractures stayed considerably longer than those with fractures at one site only .

Road traffic accident casualties , besides being a major health hazard,caused a high rate of morbidity, disability and death have a great socio-economic impact on the victim, his family and the nation as a whole. The main points to emerge from this analysis are the high proportions of pedestrian casualties, the number of victims under the age of 18 years.

Head injuries (the most common type of injury) and limbs injury are most frequent injury, a disabiling and economically debilating consequence.The high frequency (77%) with which people less than 35 years of age are involved, causing a major depletion of the resources needed for the development of the country. Preventive measures are

important in the reduction of the number of road traffic accidents. It will be some years before these measures become effective in a rapidly growing, predominantly young, population.

Table 4.2.1. Distribution of injuries according to drivers' sex *

Injuries	Number injured	Males n (%)	Females n (%)	RR	95 % Conf.level	p-value signif.
Skin or superficial injury	105	88 (84)	17 (16)	1.00	0.92-1.09	NS
Contusion	46	41 (89)	5 (11)	1.07	0.96-1.19	NS
Limbs injury	426	364 (85)	62 (15)	1.03	0.98-1.08	NS
Chest abdomen pelvis,injury	122	94 (77)	28 (13)	0.91	0.83-1.01	NS
Head & Neck injury	604	505 (84)	99 (16)	1.00	0.95-1.05	NS
Spinal injury	80	64 (80)	16 (20)	0.95	0.85-1.07	NS

*Drivers were involved in multiple injury.
RR = Relative risk
NS = Not-significant
**Mantel-Haenszel test was performed.

Table 4.2.2 Distribution of injuries according to drivers' nationality *

injuries injured	Number n (%)	Arab n (%)	Non-Arab	RR Conf.level	95 % signf.**	p-value
Skin or superficial injury	105	72 (69)	33 (31)	1.1	0.97-1.28	NS
Contusion	46	25 (54)	21 (46)	0.87	0.67-1.14	NS
Limbs injury	426	244 (57)	182 (43)	0.89	0.81-0.98	<0.014
Chest abdomen pelvis,injury	122	76 (62)	36 (48)	1.10	0.96-1.26	NS
Head & Neck injury	604	395 (65)	209 (35)	1.10	1.01-1.19	0.023
Spinal injury	80	46 (58)	34 (42)	0.92	0.76-1.12	NS

*Drivers were involved in multiple injury.
RR = Relative risk
NS = Not-significant
**Mantel-Haenszel test was performed.

Figure 4.2.1. Sex Distribution of injuries involved in Road Traffic Accidents (RTA)

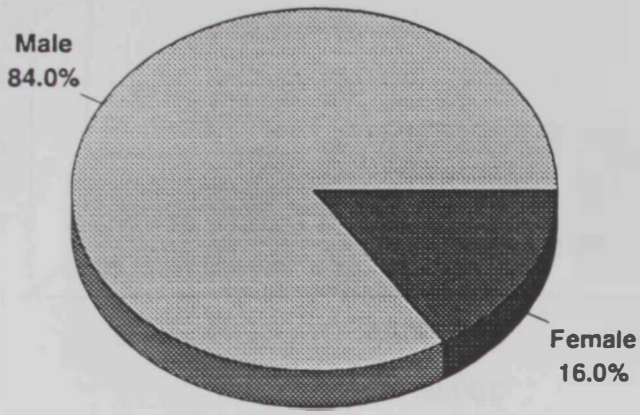


Figure 4.2.2. Nationality Distribution of injuries involved in RTA

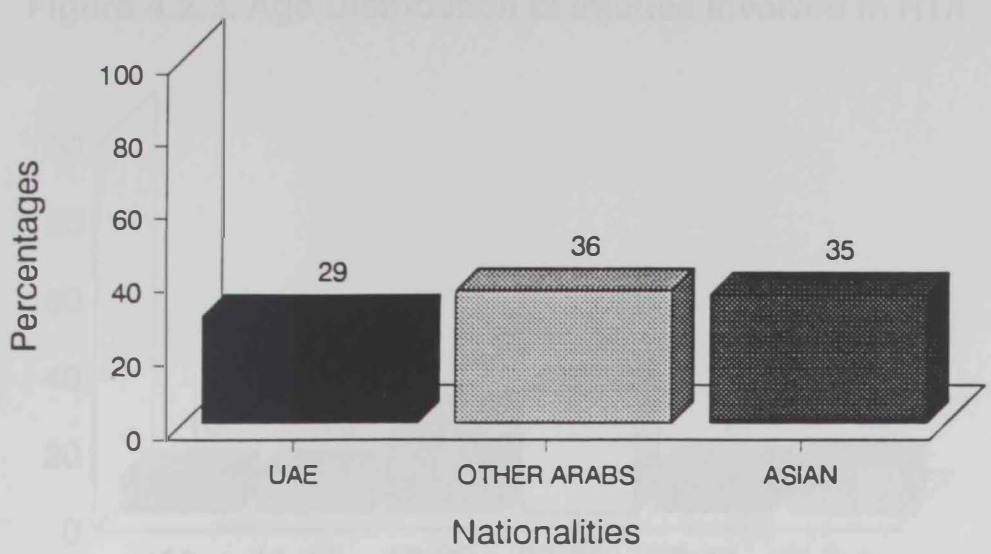


Figure 4.2.3. Age Distribution of injuries involved in RTA

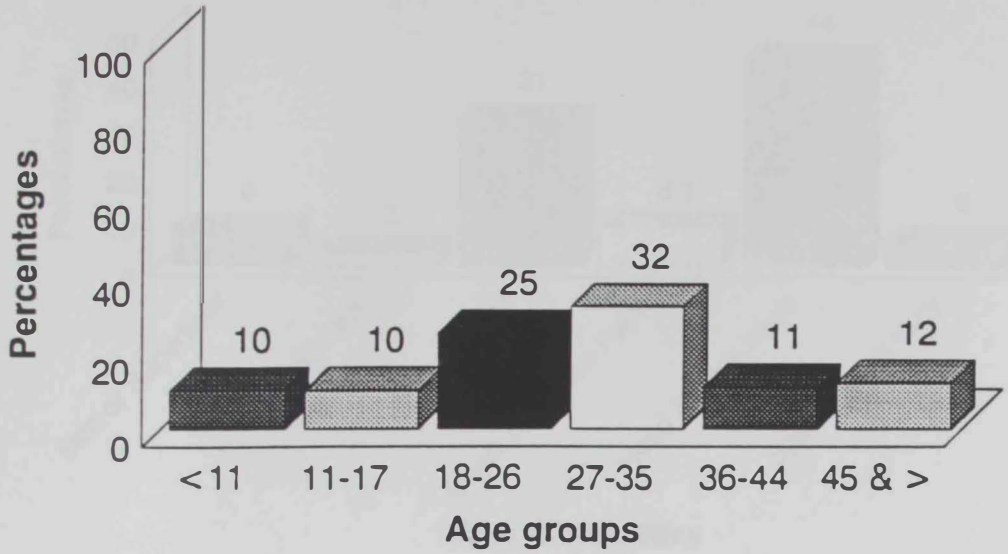


Figure 4.2.4. Injury Distribution of injuries in RTA

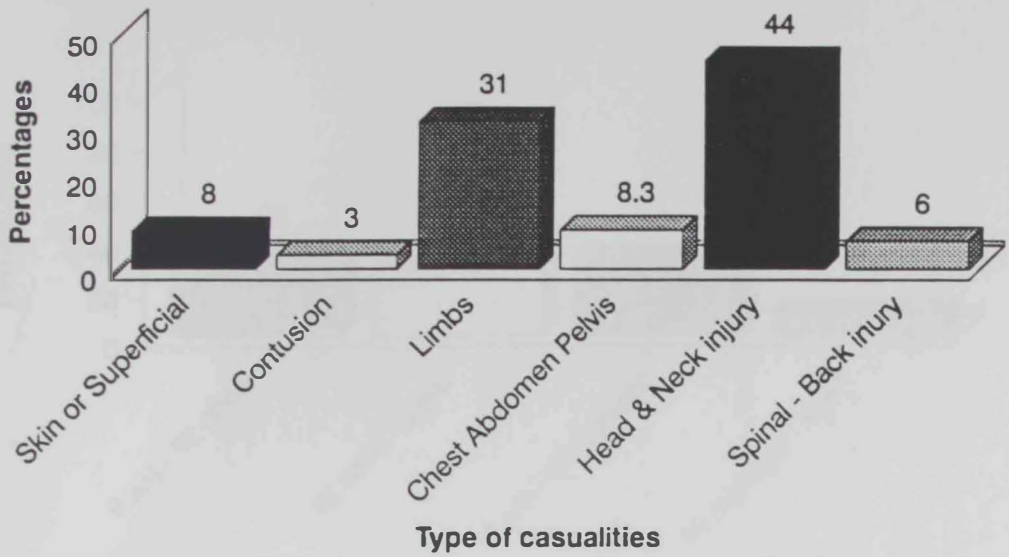


Figure 4.2.5. Time distribution of injuries involved in RTA

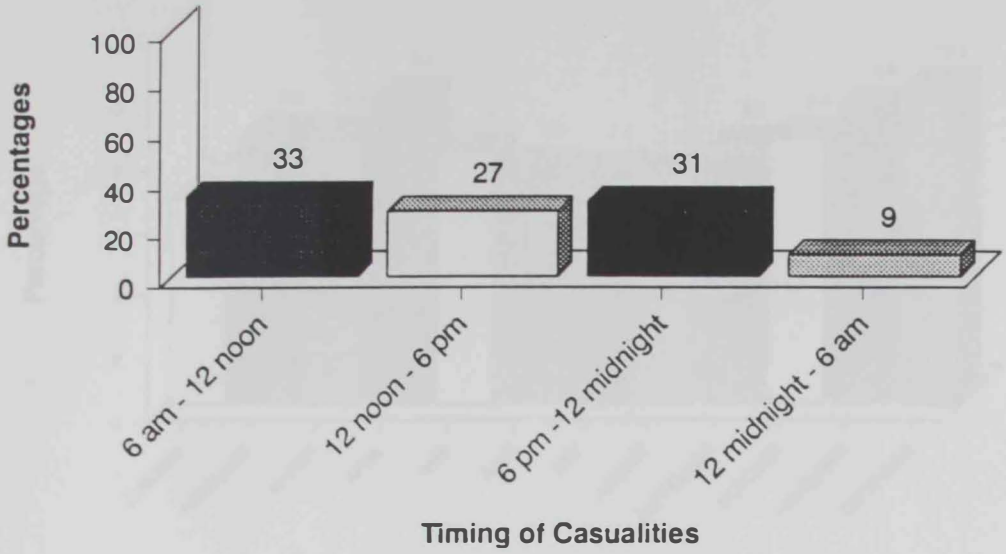


Figure 4.2.6. Monthly Distribution of injuries

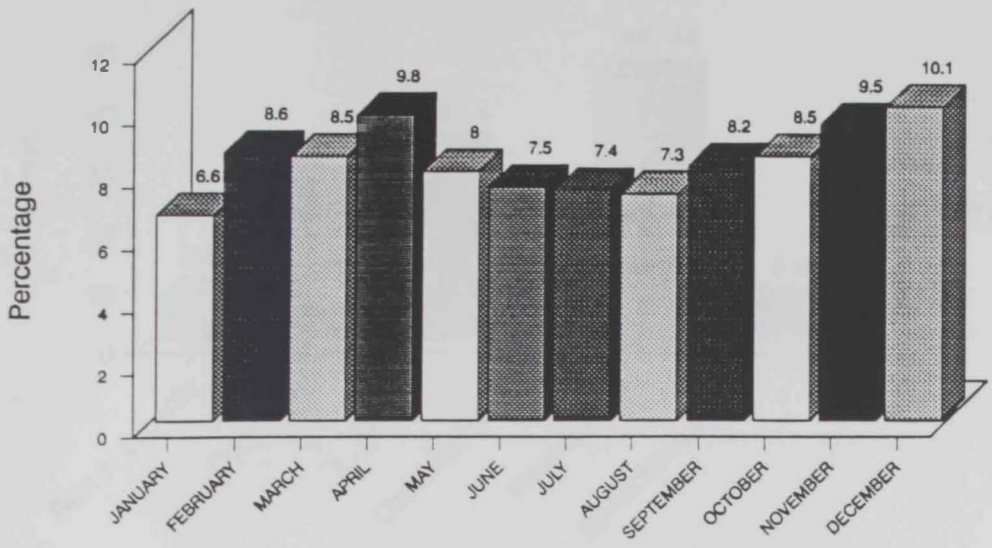


Figure 4.2.7. The distribution of injuries by sex

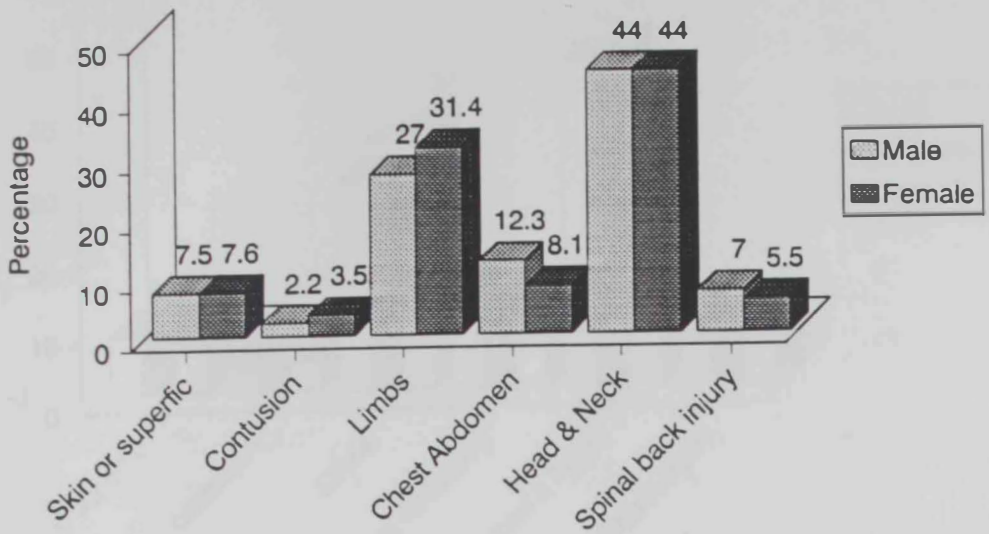
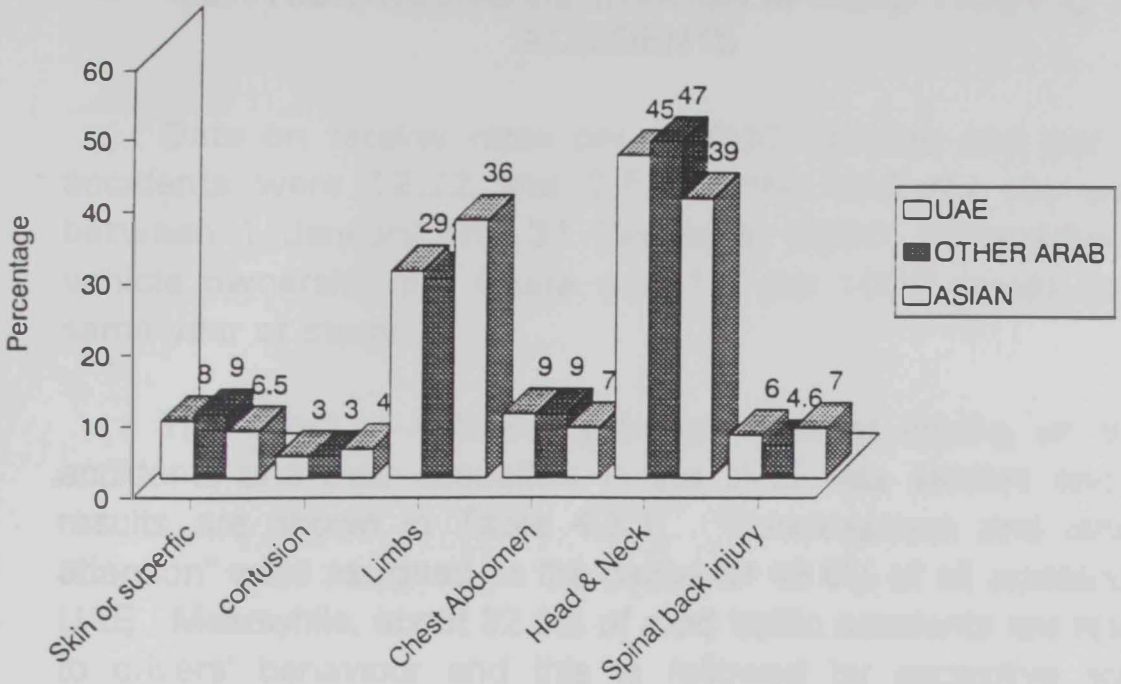


Figure 4.2.8. The distribution of the site injury by Nationality



4.3. RISK-TAKING BEHAVIOUR IN ROAD TRAFFIC ACCIDENTS

Data on fatality rates per 10,000 vehicles and per 100 accidents were 12.72 and 2.52 in the UAE for the period between 1 January and 31 December 1990. Meanwhile the vehicle ownership per capita was 1.7 per 1000 person in the same year of study.

The effect of different types of improper driving on traffic accidents and their casualties in the UAE was studied and the results are shown in Table 4.3.1. "Carelessness and lack of attention" were assigned as the cause for 48.6% of all accidents in UAE. Meanwhile, about 32.3% of road traffic accidents are related to drivers' behaviour and this is followed by excessive speed (14.4%), drugs and alcohol (2.6%), vehicle condition (1.0%); climate and dust storm (0.9%) and road construction (0.2%). Terms such as "carelessness" and "drivers' behaviour" is deficient in specificity and would be more useful if they could be assigned to a more definitive position in the list of psychologic factors.Of course such detail is not always possible.

Table 4.3.2. depicts the fatality rates often used, which allows comparison to be made between different countries: the fatality rate per 100,000 population, the fatality rate per 100,000 registered vehicles, and fatality rate per million vehicle kilometers travelled. For comparison purposes,the last rate is most meaningful.However,comparing a number of epidemiological variables relevant to fatal motor vehicle fatalities between UAE,USA and Great Britain is instructive.Table 4.3.2. shows that death rates per hundred million vehicle kilometers of travel ,per 100,000 registered motor vehicles and per 100,000 resident population of UAE in 1990 were about 2.10, 21.4 and 5.3 respectively which is higher than many developed countries. Also, population per car in UAE at (5.9) is higher than in UK and USA .

An attempt was made to test the relationship between fatality rate and other parameters that are believed to have some impact on fatalities in the United Arab Emirates. The parameters used were as follows :

1- Vehicle per-person;
2- Gross National Product (GNP) per-capita;
3- Population per - physician ;
4- Population per hospital bed ; and
5- Percentage of the school age population attending schools.

The reason for choosing parameters is that they are believed to reflect some social , economic and health characteristics of the United Arab Emirates with sufficient variable data.Simple regression analysis was carried out to quantify separately the dependence of the fatality (per-licenced vehicle) on those parameters .The logarithmic values of fatality rates per-vehicle in UAE for 1980 -1990 were related to the above parameters.The results of the regression analysis results obtained showed that the fatality rates follow the following trends :

a- decrease with increasing vehicle ownership ;
b- decrease with increasing GNP per-capita;
c- decrease with increasing percentage of the school-age population attending schools;
d- increase with population per physician ; and
e- increase with population per hospital bed .

The results of this study, bearing in mind data limitations , throw some light on how social and economic parameters might affect the road safety situation in particular country. The fatality rate were inversly related to parameters indicating prosperity and education also suggest that fatality rates due to road accidents could be reasonably reduced by improving the medical services and education of population in the country.

Road traffic accidents in the UAE and in other countries constitute a major cause of death and are responsible for a wide variety of social problem and wastes of human resources (Bener and Jadaan 1993). As a result, RTA's are viewed as an increasingly serious health problem It has been compared to an epidemic as serious as plague or smallpox in previous generations, Mufti(1983). In the list of the major causes of death for all age groups in the United Arab Emirates during the years 1982 and 1990 are shown in Table 4.3.3. The present study shows that road traffic fatalities are second only to cardiovascular diseases in the list of major causes of death. Road traffic accidents generally cause more serious trauma than other accidents. This is reflected in the high number of fatal and serious injuries (Bener and Jadaan 1992). A previous section of the present study showed road traffic fatalities as the second most common cause of death in all age groups and similar results were found in other studies Al-Qabasi et al.(1989), Baker (1980), Kreis et al.(1986), Somers (1990). Road traffic accidents generally cause serious injuries than other accidents which is reflected in the high number of fatal and serious injuries Bener and Jadaan(1992).

In 1981, preliminary studies by Jacobs et al.(1981) were made of road user behaviour in several developing countries at traffic signals, "Zebra-type" (i.e. uncontrolled) pedestrian crossings, and priority junctions. Comparisons were made with similar observations in the United Kingdom. It was found that a higher proportion of drivers choose not to stop at the red signal in developing countries than in Reading and London. Although it is mandatory for drivers to stop for pedestrians in all cities studied, the average proportion of drivers stopping in developing countries ranged from 10 to 17 percent compared with 72 percent in Reading and 40 percent in London. Studies of gaps accepted by drivers of major-minor junctions with stop lines indicated the 'on average' drivers in developing countries were accepting smaller gaps than drivers at similar junctions in the United Kingdom.

Investigations into some aspects of driver behaviour in some affluent developing countries indicate that drivers acquire many dangerous and harmful driving habits and that driver compliance

traffic regulations are poor. In Kuwait, for example, only 4 percent of drivers obeyed the STOP sign and 5 percent stopped at pedestrian crossings to allow pedestrians to cross. The wearing rate for seat belts is 3 percent in Kuwait and 2.5 percent in Jeddah, Saudi Arabia ,(Bener and Jadaan 1992).

Although road and vehicle engineering measures proved to be effective in reducing accidents, engineers must recognize that road safety is multidisciplinary and ensure that their work is integrated with that of others. They must take into account erroneous road user behaviour, and accordingly design the system to reduce the consequences. It is, therefore, recommended that, to provide better understanding, a comprehensive in-depth study of accident causation with a focus on the human factor be carried out.

Overall, road traffic injuries, besides being a major health hazard leading to a high rate of morbidity, disability, and death, have a great socio-economic impact on the victim, his family and the nation as a whole. The problem is tractable, and the toll could be greatly reduced if appropriate measures were taken. The present study suggests that motor vehicle accidents are probably the most common single cause of death in UAE. Motor vehicle accidents are a preventable diseases like other epidemic disease.

The United Arab Emirates is a young nation which during its twenty-two year existance has undergone enormous rapid growth in road construction,number of vehicles and the emergence of high risk road user behaviour. These factors have converged to produce a dramatic number of road traffic accidents,presently constituting the second leading cause of death in the nation. Automobile accident rates are considerably higher in the UAE and other Gulf nations than in developing or developed countries with comparable vehicular ownership levels.

Psychologic factors such as intelligence, personality, maturity and risk taking behaviour play significant roles in explaining these

high levels and point to the compelling need for road engineers to take them into account in their planning.

TABLE 4.3.1. Causes of road traffic accidents in UAE during 1990.

Reasons	Number	%
1. Carelessness	5753	48.6
2. Driver's behaviour	3828	32.3
3. Excessive speed	1713	14.4
4. Drugs and alcohol	309	2.6
5. Vehicle condition	118	1.0
6. Climate & dust storm	101	0.9
7. Road egrembankment	27	0.2
T o t a l	11,849	100.0

Table 4.3.2. Statistical comparison of motor-vehicle trafic fatalities in Great Britain, USA, and United Arab Emirates (UAE)

Item	Great Britain (1990)	USA (1990)	UAE (1990)
Motor-vehicle deaths	5,628	44,599	394
Vehicle travel (million kms.)	315,800	3,060,803	18,754
Registered vehicle	26,301,748	193,057,000	349,000
Passenger cars	22,527,963	145,951,175	310,000
Registered population (100,000)	57,863,846	249,415,000	1,844,300
Death rates			
Per hundred million vehicle kms.	1.78	1.46	2.10
Motor-vehicle deaths (100,000)	9.7	17.9	21.4
population per vehicle	2.2	1.3	5.3
Population per car	2.6	1.7	5.9

TABLE 4.3.3: Leading causes of death for all age groups in UAE during 1982 and 1990 *.

Causes of death during 1982	Number	%
1. Cardiovascular diseases	539	17.0
2. Motor vehicle fatalities	445	14.0
3. Respiratory	235	7.4
4. Cancer	207	6.5
5. Birth defects	138	4.4
6. Infection	41	1.3
7. Other	1562	49.4
T o t a l	3,167	100.0
Causes of death during 1990	Number	%
1. Cardiovascular diseases	641	16.7
2. Motor vehicle fatalities	432	11.2
3. Respiratory	269	7.0
4. Cancer	233	6.1
4. Birth defects	164	4.3
6. Infection	71	1.9
7.Others	2035	52.8
T o t a l	3,845	100.0

* Ministry of Health Annual Reprots 1982 and 1990

4.4. ALLEVIATION OF INJURIES BY USE OF SAFETY SEAT BELTS IN THE UNITED ARAB EMIRATES

A total of 787 drivers (78.7 %) out of the 1000 gave consent for the study, while 213 vehicle drivers refused to participate. Those not wearing a belt there were (672/115=5.84) 5.84 times at risk of injuries among drivers was surveyed. Table 4.4.1. shows the characteristics of the population that was surveyed. The population under study was divided into seven age groups. Most of the subjects were in the age range 23 - 40 years. There were statistically significant differences between seat belt usage versus non usage by age groups ($p=0.007$) and nationality($p=0.001$). The United Arab Emirates has a multinational population with only approximatly 35.3% being UAE citizens. However, there were no significant differences between seat belt usage versus non usage by sex and marital status . There were statistically significant differences between users and non-users of seat belts concerning their educational level ($p<0.002$) and occupation ($p<0.02$).

Table 4.4.2. gives an analysis of the injuries sustained by those wearing seat belts and those not wearing seat belts for the entire 8 months of the survey.These results show that for nearly all of the casualties had been reduced for those wearing seat belts. In addition,the average number of injuries per occupant may give an indication of the effectiveness of seat belts. These figures are shown in Table 4.4.2., but do not take into account the severity of the injuries. They show a reduction in the number of injuries due to usage of seat belts , but also give higher rate of limb injuries for those wearing seat belts. There were statistically significant differences between numbers of persons injured wearing and not wearing seat belts for head injury [Odds ratio=OR=1.74;Confidence Interval=CI= 1.18-2.56 ,and $p=0.003$], neck injury [OR=1.73; CI= 0.99-3.04 ,and $p=0.04$],spinal injury, injury [OR=4.64; CI= 2.30-9.47 ,and $p<0.0001$],limbs injury [OR=2.11; CI= 1.45-3.08 ,and $p<0.0001$]. We found no statistically significant differences between numbers of person injured in chest ,abdomen and pelvis by wearing and not wearing seat belts [OR=0.62; (CI)= 0.34-1.14 , $p<0.101$].

Fig.4.4.1. shows response percentage to the question"what is your speed limit? in the central town". Most of the drivers (54%) drove at between 80-100 km/hr . While 22% of the drivers drove at a speed more than 100 km/hr and, 24% of the drivers drove at a speed less than 80 km/hr.

Table 4.4.3. gives the responses of the patients to various statements of using seat belt among the drivers. Table 4.4.3. shows response percentages to the statement. The majority of the drivers (44% wore seat belts when travelling on a journey more than one hour , (Figure 4.4.2.). Also,this table illustrates response percentages to the statement "Reasons for not using seat belt" . 36% of the drivers found them uncomfortable , (Figure 4.4.3.) ; and 26% of the drivers never tried them and 25% of the drivers stated is inconvenient, [Figure 4.4.3]. The majority of drivers stated that seat belts are the most protective measure against all injuries, (66%), (Figure 4.4.4.). The mandatory use of safety seat belts was supported by 53% of the drivers (Figure 4.4.5.) and given support in general by 88% (Table 4.4.3.).

Figure 4.4.6. shows the number of victims of road traffic accidents in relation to the time of the day. The majority of drivers had accidents in the morning (33%) and evening(32%). Followed by the afternoon (24%) and midnight (11%). Most accidents (50%) occurred between period 7.15 am and 2.30 pm i.e.during office working and schooling hours.

Road traffic accidents in UAE are considered a major public health isssue. Therefore, an urgent and effective measure is required to minimize this. In this study, the rate of constant seat belt usage among drivers was 9.4% and that for frequent usage was 5.2%, giving an overall rate of 14.6% for common usage. This study demonstrated that the rate of usage of safety seat belts in the UAE was very low, much lower than in other developing and developed countries, even those having no seat belt legislation law enforcement,[Bener and Jadaan(1990), Bener et al.(1992)]. It was observed that the majority of patients stated that seat belts are the best protective measure against all injuries (66%) and severe injuries (26%) of road traffic accidents [Table 4.4.3.]. Also, there was general support (88%) among these casualties for the mandatory use of safety seat belts in the United Arab Emirates.

The benefits of seat belting for adults are well documented, and include a reduction in fatalities and serious injuries due to road traffic accidents [Bener et al.(1992), Sumchai et al.(1988), Arajavi et al.(1987), Watson (1983),Dodson and Koban (1986), Dreghorn (1985), Mackay (1987), Evans (1986), Shawan et al.(1992)] , where reductions of up to 46% have been documented, Evans(1986). Since safety seat belt wearing has proved to have a significant life-saving and injury grade moderating effect in road traffic accidents, it seems obvious that all means to increase general belt wearing should be employed . This study was performed to assess the usage of seat belts in drivers of vehicles involved in traffic accidents in the UAE. Our results revealed that there was strong support for the idea that the wearing of seat belts should be mandatory. Given the wider compliance with seat belt legislation, reports began to appear of seat belt injuries, Sumchai et al. (1988),Arajavi et al.(1987), and Upadhyaya (1989), but the benefits have been found to outweigh the dangers Rosenfeld (1987) and Rutherford (1989).

Unfortunately, extensive safety seat belt wearing publicity in the UAE has remained rather unsuccessful since the UAE does not have safety seat belt legislation and enforcement. Therefore,there should be ongoing initiatives which can pave the way to seat belt legislation.Some reports Pace et al.(1986), have urged "physicians to seek similar legislation in every state in the USA ".Also, Sleet(1987) has concluded that: "Programmes that promote the use of safety belts in the context of public health priorities offer greatest hope for reducing the magnitude of the motor vehicle trauma problem.

Even if everyone wore seat belts, there would still be accidents involving cars. Seat belts do nothing to protect pedestrians. Some people speculate that a seat belt gives a false sense of safety to a driver, encouraging him to take more risks. Although this might be particularly true in a country with widespread alcohol abuse, with the drunken driver belting up and believing he has shown a high degree of responsibility towards society, no figures from any country support the claim that the wearing of seat belts actually increases the number of accidents. When the effect of different types of improper driving on traffic accidents and their casualties in UAE was investigated in this study [Table 4.3.1.], the results showed that "carelesness and lack of attention" were assigned as the cause for 48.6% of all accidents in UAE.Also 32.3% of road traffic accidents constitute drivers behaviour and this is followed by excessive speed (14.4%),drugs and alcohol (2.6%), vehicle condition(1%),climate and storm (0.9%) and road construction (0.2%). Besides safety seat belt use,proper driver

education and strict driving tests are other measures that will bring this major health problem to a low or "acceptable" level. Therefore,traffic education that aims at changing the attitudes and behaviour of road users is urgently needed.

Since the problem of road traffic accidents in UAE reported to be one of the main leading causes for deaths for many years, some effective and efficient measures are needed. One of these protective measures that has been proved to be of great value for the car drivers and other passengers, is the seat belt. This study showed that the attitudes of most of the injuried individuals were toward enacting a law requiring mandatory wearing of the seat belts while driving. Therefore, to increase seat belt usage by car occupants is an essential step to prevent more deaths and reduce the severity of the disabling injuries resulting from car accidents. In conclusion, an increased compliance rate among drivers would lead to a reduction of the severity of injuries and in the fatalities resulting from road traffic accidents. There is no better effective measure than legislation to increase seat belt wearing rates .

Table 4.4.1. Characteristics of the population surveyed

Characteristics		Usage of safety seat belts: Yes No.	Yes %	No No.	No %	Significance p-value*
Age years						
< 18		14	3	34	8	
18 - 22		67	18	63	15	
23 - 28		62	17	79	19	
29 - 34		58	16	86	21	p=0.007
35 - 40		82	22	78	19	
41 - 46		43	12	39	9	
47+		49	13	33	8	
Total	**787**	**375**		**412**		
Sex						
Male		306	82	329	80	
Female		69	18	83	20	p=0.596
Total	**787**	**375**		**412**		
Nationality						
UAE		154	41	124	30	
Non-UAE		221	59	288	70	p=0.001
Total	**787**	**375**		**412**		
Marital Status						
Single		154	41	138	33	
Married		200	53	249	61	
Divorced/Widow		21	6	25	6	p=0.088
Total	**787**	**375**		**412**		
Educational Level						
Illiterate		46	12	86	21	
Primary		77	21	92	22	
Intermediate		39	10	54	13	p<0.002
Secondary		127	34	110	27	
University		86	23	70	17	
Total	**787**	**375**		**412**		
Occupation						
Sedentary		69	13	59	14	
Manual		141	43	200	49	
Businessman		46	14	32	8	p<0.02
Student		49	13	49	12	
Housewife		70	17	72	17	
Total	**787**	**375**		**412**		

*The Chi square test was performed

Table 4.4.2. Distribution of injuries according to drivers wearing seat s and not wearing seat belts *

Injuries	No.of injures n (%)	Seat belt worn n(%)	Seat belt not worn n (%)	Odds Ratio	95 % Confidence level	p-value signf.**
Head injury	201	86 (43)	115 (57)	1.74	1.18-2.56	0.003
Neck injury	164	31 (19)	133 (81)	1.73	0.99-3.04	0.04
Spinal injury	167	33 (20)	134 (80)	4.64	2.30-9.47	<0.0001
Limbs injury	202	96 (48)	106 (52)	2.11	1.45-3.08	<0.0001
Chest, abdomen, pelvis injuries	120	23 (19)	97 (81)	0.62	0.34-1.14	0.101
TOTAL	854	269 (31)	585 (69)			

*Drivers were involved in multiple of injury.

**Mantel-Haenszel test was performed.

Figure 4.4.1. Car speed range given by injuried drivers

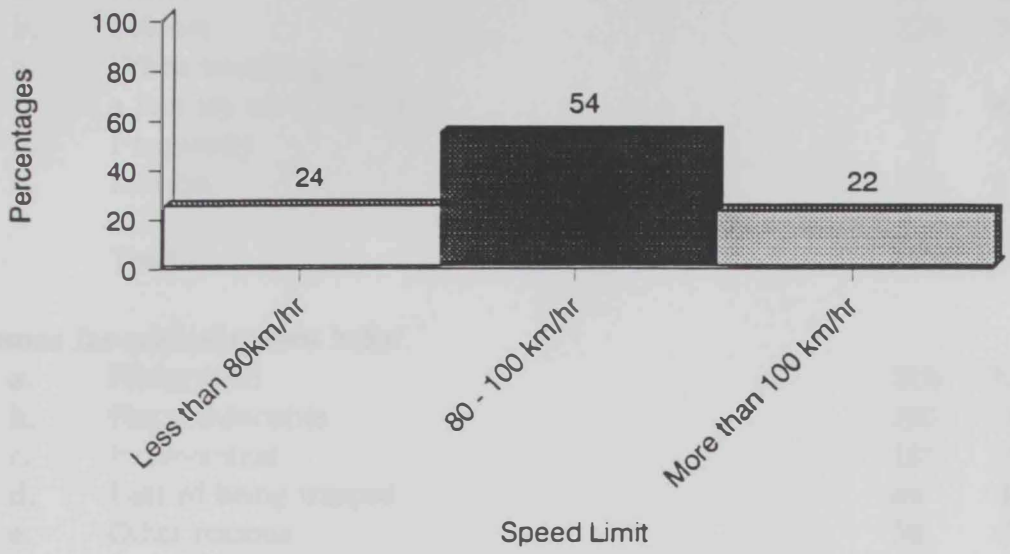


Table 4.4.3. Attitude of drivers towards the wearing of seat belts

Questionnaire		No.	%
1.'How often do you use your seat belts?'			
a.	Never	96	12.2
b.	Seldom	229	29.1
c.	When travelling on a journey of > one hour	347	44.1
d.	Frequently	41	5.2
e.	Always	74	9.4
	Total	787(100%)	
2.'Reasons for not using seat belts'			
a.	Never tried	210	26
b.	Not comfortable	280	36
c.	Inconvenient	195	25
d.	Fear of being trapped	44	6
e.	Other reasons	58	7
	Total	787(100%)	
3.'Drivers opinions towards protection of seat belts usage'			
a.	Prevent all injuries	520	66
b.	Prevent severe injuries	205	26
c.	Prevent minor injuries	41	5
d.	Can be dangerous	21	3
	Total	787(100%)	
4.'Do you think that the wearing of seat belts should be mandatory?'			
a.	Strongly agree	421	53
b.	Mildly agree	275	35
c.	Strongly disagree	6	1
d.	Mildly disagree	85	11
	Total	787(100%)	

Figure 4.4.2. Frequencies of using seat belts by drivers

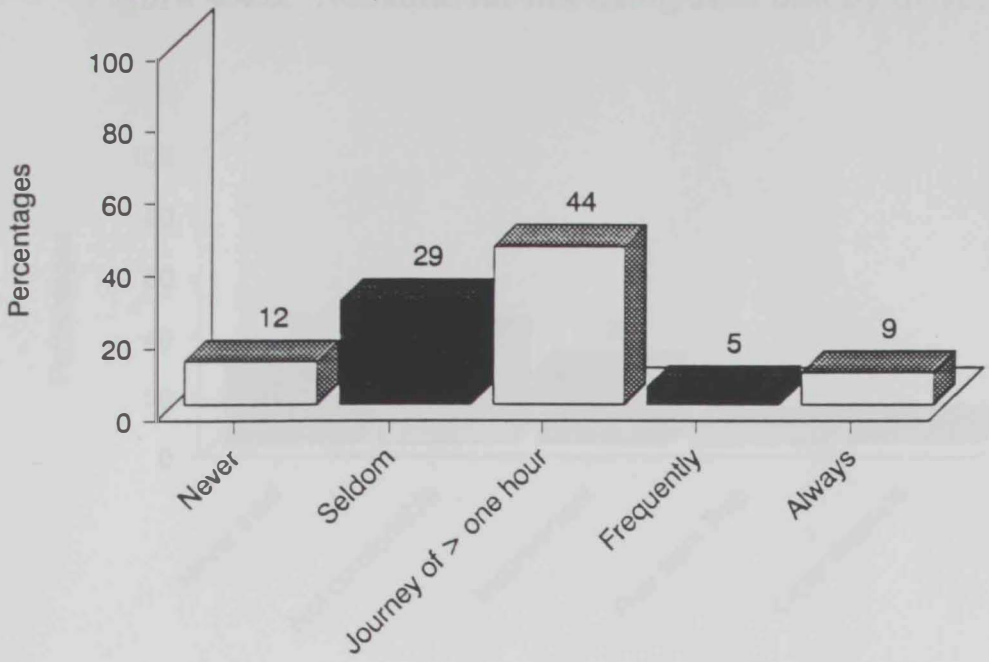


Figure 4.4.3. Reasons for not using seat belt by drivers

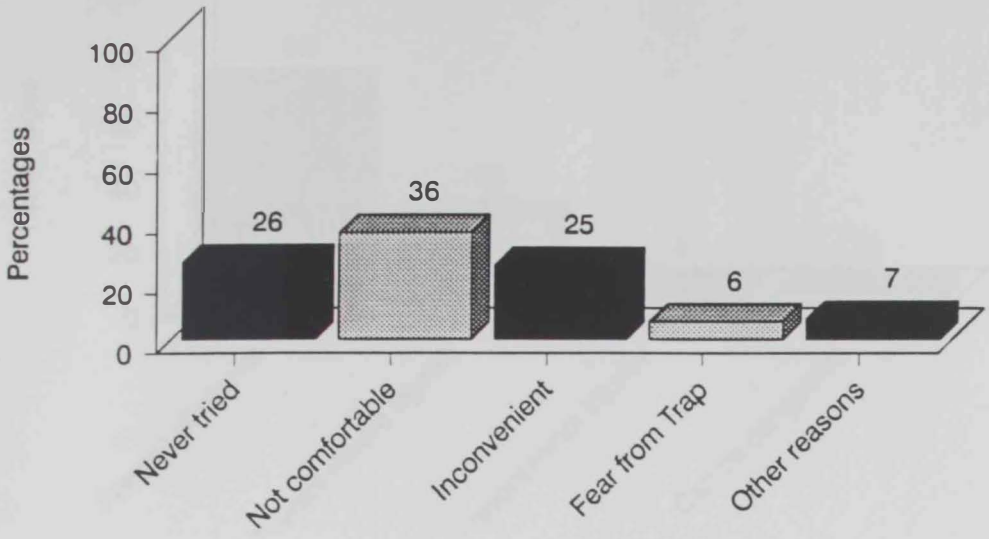


Figure 4.4.4. Drivers opinions towards protection of seat belt usage

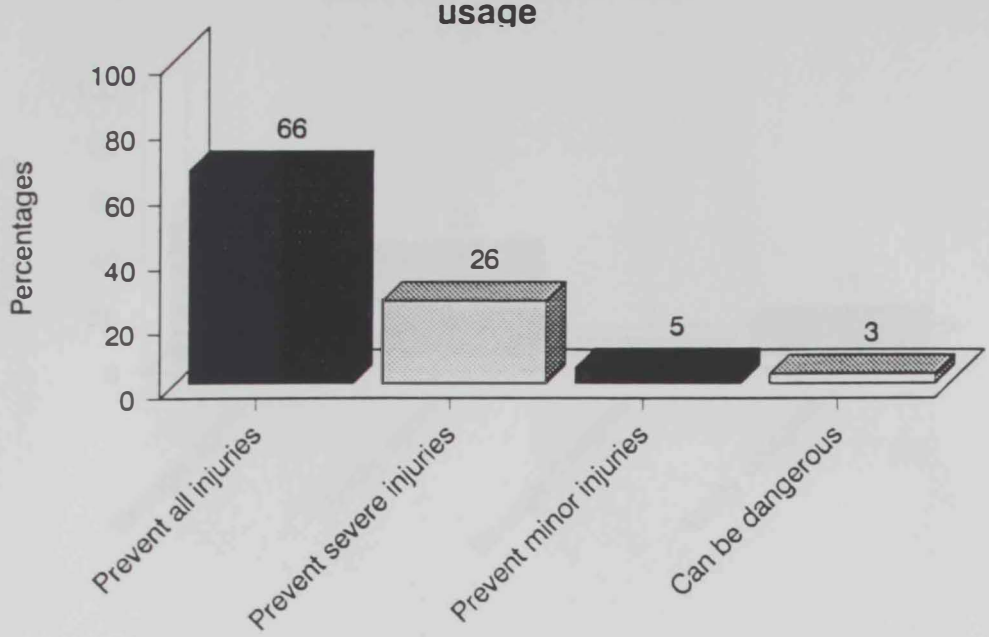


Fig. 4.4.5. Attitude of drivers towards a law that tht wearing of seat belt should be mandatory

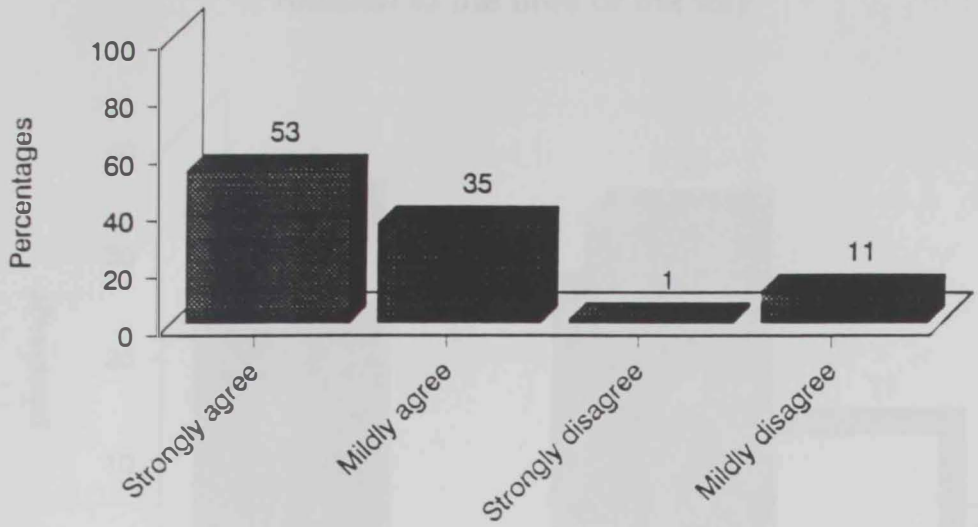
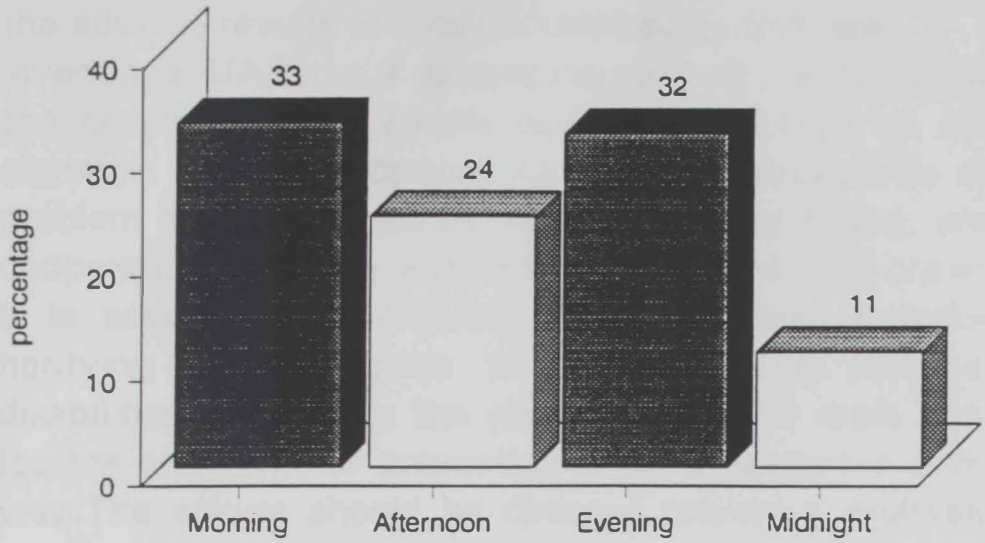


Figure 4.4.6. The number of victims of Road Traffic accidents in relation to the time of the day



CHAPTER: FIVE

CONCLUSION

The world wide problem of road traffic accidents is one of the adverse results of modern technology and new inventions. UAE , as a developing country , is no exception. On the contrary motor vehicle accidents are high on the list of common causes of deaths. As a result , prevention of such a problem has to be tried by various complex forms, and by the cooperations of many authorities, individuals and organizations. It is essential for achieving a real success in reducing the horifying figures figures of RTA fatalities and permanent disabilities, to identify the problem, look for main contributing factors and plan for prevention in an organized and integrated way.The efforts should be directed toward a multidisciplinary programme involving health education, legislative actions and economic incentives.

As UAE began its explosive economic development through the seventies , so did the traffic picture. One significant development has been rapid increase in vehicles during recent years. The country is now a wholly mobile society where the number of cars rate has increased rapidly.

The dramatic increase in population and wealth led to increases in vehicle ownership,resulting in an increase in road traffic acidents, injuries and deaths.

It was observed that accident rates per 1000 vehicles have reached a peak in 1983 followed by a significant drop in 1992. The drop might have resulted from the introduction of a set of traffic laws that imposed heavy penalties on violaters. However, there is a tendency for all casualties per 100 traffic accidents to increase with time. Over the nine years period (1984-1992) fatality rates per 100 traffic accidents increased with the time.

Overall, mortality rate per 100, 000 population due to motor vehicle accidents decreased from 42.60 in 19984 to 38.28 in 1992. The young drivers age <31 years were most at risk since they formed over two-thirds of drivers.

The fatality rates per 10,000 population and per 10,000 vehicles in the GCC countries are showed that fatality rates was very high 10,000 population in Qatar and UAE while Oman showed the highest death rate per 10,000 vehicles. Kuwait , with the second highest vehicle ownership in 1982 showed the lowest death rate per 10,000 vehicles. Almost all Gulf countries have higher fatalities per 10,000 persons but lower fatalities per 10,000 vehicles than Middle Eastern countries.

An analysis of road traffic accidents, casualties and fatalities rates and their trends over time was carried out in this study to exhibit the magnitude of the road safety problem in the UAE. The findings of this study into the road safety in the UAE and other Gulf countries indicate that fatality rates (per 100 accident and per licensed vehicle) are high in comparison with those in developed countries. However, the collected traffic accident data are often inadequate or insufficient to draw firm conclusions.

Pedestrians are particularly at risk and they are involved in about over 20% of the total fatalities. This could be largely attributed to the lack, or sometimes the absence , of facilities for pedestrians especially on the newly built motorways.

The result of this study would provide vital results and essential statistical information for health education, safety education, planning programming managing and evaluating anti-motor vehicle accidents activities aiming at significantly reducing the road traffic accidents and hazards. It is hoped that the results and conclusion of this work will be useful to traffic authorities.

Traffic signals, traffic sign and pavement markings in UAE suffer from substantial deficiencies that tend to confuse drivers and cause erratic or hazardous driver action and may consequently lead to accidents. Drivers observance to "stop" signs was found to be very low and an alarming proportion of the drivers admitted to violating the speed limit on UAE roads. Results, however, suggest that improved education, training

and law enforcement have great potential for improving road safety. Although some problems may take years to improve, others can be tackled immediately. UAE unlike other developing countries, has the economic resources to introduce and enforce comprehensive road safety programme catering for all aspects of the problem .

The problem of road traffic accidents in UAE , reported to be one of the main leading causes for deaths for many years,requires some effective and efficient measures to be applied. One protective measure that has been proved to be of great value for the car drivers and other passenger, is the seat belt. This study showed that the attitudes of most of the interviwed casualties individuals were toward enacting a law requiring mandatory wearing of the seat belts while driving. Therefore, to increase seat belt usage by car occupants is an essential step to prevent more deaths and reduce the severity of the disabling injuries resulting from car accidents.

CHAPTER: SIX

RECOMMENDATIONS

Although preventive measures are important in the reduction of the number of road traffic accidents, it will be some years before these become effective in a rapidly growing predominantly young population . However, much of the road system is very well designed and recently built. Considerable efforts are being made to enforce driving tests and to educate the public in road safety.

Road injuries , fatal or non-fatal, can cause a great strain on the economic resources of the victim, his family and the nation as a whole.Patients often develop a variety of disorders including motor, sensory, vascular, sexual and psychological dysfunction. However, as for many other public health problems, the solution to road injuries does not lie in one magic procedure but rather in a series of concomitant actions, the most important factors are listed below:

1. Traffic rules and regulations should be monitored and enforced very strictly,
2. The law enforcement of safety seat belts deserves serious considerations; such laws have already been passed in many industrialised countries,where safety seat belts have reduced the severity of injuries in car accidents by 50%,
3. Implementation of child-restraining systems could decrease disability injuries by 75%,
4. Speed limits should be reinforced by law and monitored by radar regularly,
5. Safety and health education in accident prevention should be provided,
6. Traffic hospitals or rehabilitation and trauma centers are needed,
7. Important factor contributing to the high fatality rate is the lack of maintenence of vehicle or vehicle conditions. Therefore, vehicles should be examined regularly for safety by traffic auhorities.
8. Ambulance system should be monitored,

9. Police officers should be trained in First Aid .

CHAPTER: SEVEN

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علم الأوبئة المتعلق بالحوادث والاصابات وكوارث الوفيات على الطرق في دولة الامارات العربية المتحدة

اعداد
الدكتور . أحمد سيف الفلاسي

أطروحة مقدمة لكلية العلوم في جامعة الامارات العربية المتحدة كمتطلب جزئي من متطلبات التخرج بدرجة الماجستير في العلوم البيئية

كلية العلوم
جامعة الامارات العربية المتحدة

مايو 1995

ولقد لوحظ أيضا أن نسبة 1.4٪ من الحوادث ونسبة 16.2٪ من الاصابات ونسبة 14.8٪ من حوادث الموت كانوا من المشاة وأعمارهم أقل من 11 سنة . ولقد تم عمل تحليل لحوادث الطرق والاصابات وحوادث الموت واتجاهاتهم في هذه الدراسة لعرض مبلغ مشاكل تأمين الطرق في دولة الامارات العربية المتحدة .

وكانت نتائج هذه الدراسة المتعلقة بتأمين الطرق في دولة الامارات ودول الخليج الأخرى توضح النسب المميتة والعالية لكل (100 حادث ومركبة مرخصة) بالمقارنة مع حوادث الطرق في الدول النامية .

ولقد تم عمل دراسة تفصيلية باستخدام المعلومات المتاحة وسجلات الحوادث في قسم الطواريء في مستشفى العين بامارة العين في دولة الامارات العربية المتحدة . وعرضت هذه الدراسة نتائج كل اصابات المرضى المدخلين في قسم الحوادث بطواريء مستشفى العين لفترة من الأول من يناير وحتى 31 من ديسمبر عام 1993 .

وقد سجل في قسم الطواريء بالمستشفى مامجموعه 1383 حادث طرق واصابات وحالات وفاة بعدد 63 خلال العام 1993 . وقد كانت نسبة الحوادث 461 لكل 100,000 من السكان وحالات الوفاة 21 حالة لكل 100.000 . وكانت أعمار (77٪) أي ثلاثة أرباع المجموعات المدروسة تحت عمر ال35. أما النسبة الأعظم للضحايا فهي (84٪) من الذكور .

وكانت نسبة مواطني دولة الامارات العربية المتحدة 29٪ بينما بلغت نسبة العرب الآخرين 36٪ وأبناء الدول الآسيوية 35٪ . ولقد عانى مانسبته 44٪ من المصابين من اصابات وجروح بالرأس والعنق . أما أغلب الاصابات فقد حدثت بين الساعة 8:00 و2:00 ظهرا وكان السبب الرئيسي لهذه الاصابات هي السرعة الزائدة . وكانت هذه الجروح مصدر اجهاد ونقص حاد في القوة البشرية.

وكذلك فلقد قدمت هذه الدراسة شرحا لمبلغ هذه المشكلة ودرست بعض سلوكيات مستعملي الطرق في دولة الامارات .

ومع كون اصابات حوادث الطرق واحدة من مصادر الخطر الرئيسية فهي تؤدي بالتالي الى نسبة عالية من المخاطر الصحية المرضية وتؤثر على الضحايا تأثيرا كبيرا وعلى أفراد أسرهم وعلى الأمة ككل في الوقت نفسه . وبالامكان تقليل حجم المشكلة من خلال العمل على مراعاة تحصين سائقي الطرق بالمقاييس السلوكية المناسبة ، وهناك أيضا عرض ومناقشة لبعض العناصر التي تؤثر على سلوكيات وتصرفات السائق .

كذلك فقد تمت دراسة عينات بين نوفمبر 1993 ويونيو 1994 لرفد المعلومات ، والاتجاهات والتدريبات المطبقة على السائقين الذين تم ادخالهم المستشفيات بسبب حوادث السير والمتعلقة

باستخدامهم لأحزمة الأمان في دولة الامارات العربية المتحدة .وخلال هذه الفترة السابق ذكرها فان مامجموعه 1000 سائق مركبة تم الاعتناء بهم في أقسام الحوادث بالطواريء لاثنين من المستشفيات العامة (مستشفى توام ومستشفى العين بمدينة العين بدولة الامارات العربية المتحدة) .مجموع 787 بنسبة (78.7٪) من السائقين كانوا مستجيبين للدراسة .

وقد عرضت هذه الدراسة نسبة استخدام حزام الأمان بين هؤلاء السائقين والتي كانت لاتتعدى ال(9.4٪) ، ونسبة استخدامهم لحزام الأمان بصورة غير دائمة كانت (5.2٪) . ولقد كان هناك فرق احصائي محدد بين مستخدمي حزام الأمان وبين الذين لايستخدمونه من خلال المجموعات العمرية (P= 0.007) والجنسية (P=0.001) .

ومن ناحية ثانية فلم يكن هناك فرق احصائي محدد بين مستخدمي الحزام مقابل الذين لايستخدمون حزام الأمان من ناحية الجنس والحالة الاجتماعية . وكانت هناك فروق احصائية معينة بين الذين يستخدمون حزام الأمان والذين لايستخدمونه من ناحية مستوياتهم التعليمية () P<0.002والمركز الوظيفي (P<0.02).

وتوضح النتائج انخفاضا في أعداد الاصابات كلما تم استخدام حزام الامان . وكان المصابين الذين لم يستخدموا حزام الأمان وقت الحادث معرضين للخطر بنسبة 5.84 مرة زيادة عن المصابين المتقيدين بارتداء الحزام أثناء القيادة .

وكان هناك فرق احصائي معين بين عدد الأشخاص مرتدين حزام الأمان والذين لايستخدمونه من ناحية(الاصابات في الرأس (النسبة 1.74) الانفصامات الداخلية (2.56 -1.18) و P=0.003 واصابات العنق (1.73) =3.04-0.99 و P=0.04 واصابات العمود الفقري 4.64 =9.47- 2.30 و p<0.0001 واصابات الضلوع 2.11 =3.08-1.45 و (p<0.0001

ولكننا لم نجد من خلال البحث أية فروق احصائية معينة بين عدد الأشخاص الذين يرتدون حزام الأمان والذين لايستخدمونه من ناحية الاصابات بجروح في الصدر ، والبطن والحوض . ولقد تمت ملاحظة أن أغلبية المصابين صرحوا بأن أحزمة الأمان هي أفضل مقاييس الوقاية والحماية ضد كل الاصابات والحوادث (66٪) والجروح الخطيرة (26٪).

وأيضا فقد كان هناك تأييد قوي لاصدار قانون بالزام السائقين باستخدام حزام الأمان أثناء القيادة (53٪) ونحن بدورنا نؤيد ونؤكد بأن هذه المعلومات مشجعة وبامكانها أن تؤيد اصدار قانون الزامية ارتداء حزام الأمان في دولة الامارات العربية المتحدة .

في دولة الامارات العربية المتحدة ، كما في سائر دول مجلس التعاون ، فان حوادث السير تعتبر من أهم المشاكل الصحية في هذه الدول ، بعد مرض الاصابات القلبية في دولة الامارات

العربية المتحدة .والمعلومات المتعلقة بحوادث السير تعتبر معلومات قيمة لأجل الأخذ بالمقاييس المناسبة لتخفيض الحوادث وأيضا لتخطيط أفضل لخدمات الصحة في المنطقة . وتقدم نتائج هذه الدراسة احصائيات ومعلومات حيوية جدا في سبيل تعلم صحي وتعلم لأجل الأمان والحماية وادارة برامج التخطيط وفي تقييم نشاطات مجابهة حوادث السير والهادفة الى تقليل حوادث السير والموت . وكلنا أمل بأن تكون هذه النتائج وخلاصة العمل ذات أهمية نافعة وناجعة للمسؤولين في ادارات المرور .

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