NATIONAL TRANSPORT RESEARCH CENTRE

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ROAD ACCIDENTS IN PAKISTAN

NTRC-64

M. Sadiq Swati
Chief
A. J. Downing
Adviser

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CONTENTS

1. INTRODUCTION

Since 1972 the Overseas Unit of the Transport and Road Research Laboratory in the United Kingdom (U.K.) has carried out a number of studies[1,2,3,4] of road accidents in developing countries which have demonstrated the severity of the road accident problem in the Third World. These studies indicated that the fatality rates (per licenced vehicle) of developing countries were high in comparison with those of developed countries and many of the former were faced with a worsening situation whereas the situation in Europe and America was generally improving.

In 1981, the Overseas Unit began a programme of research to evaluate low cost remedial measures in collaboration with the National Transport Research Centre (NTRC). The first stage in the programme was the identification of priority areas for research. To determine these priorities, it was necessary first of all to obtain an understanding of Pakistan's road accident problem by examining the available accident data in some detail. This review summarises the results of this examination.

2. PURPOSE

The objectives of the review were as follows:

1. To assess the magnitude of the road accident problem in Pakistan in relation to other coun tries.
2. To obtain a greater understanding of the nature of the road accidents problem in Pakistan, particularly with respect to the following:
   a) road users and vehicles involved in accidents.

b) the location of accidents

c) time of occurrence of the accidents

d) environmental conditions at the time of the accident

e) type of collisions

f) accident causes

3. To identify the major road accident problem areas in Pakistan.

3. DATA SOURCES

The main sources used for international comparisons were the United Nation's Statistical and Demographic Year Book[5] and the Transport Bulletins[6,7] published by the National Transport Research Centre (NTRC) of Pakistan. More detailed information was obtained from the Accident Study for Punjab[8] (1974), from provincial summaries of accident statistics sent to the NTRC and from some un-published police reports.

4. RESULTS

4.1. The magnitude of the road accident problem in Pakistan

In 1981 there were 9,647* injury accidents reported to the police in Pakistan of which 3,458* were fatal. 4008* people died in these accidents and a further 10,366* were injured.

One way of relating one country's accident problem with that of another is to compare the accident rates per 10 million

*See foot note on page 3.

vehicle kilometres. Unfortunately, vehicle kilometre data were not available for the whole of Pakistan but they were available for one province, the Punjab. The Punjab's injury accident rate was found to be slightly lower than that of the UK (103 in Punjab - 1980 and 131 in the UK - 1977). This difference may have been due to under-reporting of injury accidents in Pakistan rather than to any difference in safety. The fatal accident rates presented a very different picture and the Punjab rate was more than 16 times higher than the UK figure (49 compared to 3 fatal accidents per 100 million vehicle kilometres). Clearly, as regards fatal road accidents, Pakistan has a very serious problem compared to the U.K.

It is also possible to make international comparisons of other forms of accident rates and, in order to do so, appropriate data were extracted from the United Nation's Statistical and Demorgraphic Year Book for the year 1978[5]. The fatality rates** and severity indices*** for 29 developing countries and the average figures for 10 developed countries are presented in Table 1. According to the U.N. Statistics, Pakistan had the fourth highest fatality rate and the highest severity index of all the countries included in the table.

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*These figures do not include accidents in Baluchistan.

**Fatality rate = $\frac{\text{the number of people killed} \times 10000}{\text{the number of vehicles in use}}$

***Severity Index = $\frac{\text{the number of people killed} \times 100}{\text{the number of people killed \& injured}}$

Some caution is needed when interpreting these results as vehicle registration records are not absolutely reliable and, in addition, there is likely to be under-reporting of road accidents in many countries. For example, severity indices may be misleadingly high if large proportions of injury accidents go unreported. Nevertheless, Pakistan clearly has a serious road accident problem compared with other countries and, even if there is some under-reporting of injury accidents, it would appear that people are more likely to die when injured in road accidents in Pakistan than they are in other countries. The latter may be due to a number of reasons such as relatively poor medical facilities, inadequate emergency services and lower standards of vehicle occupant protection.

Smeed[10] and subsequently Jacobs[1,2,3,4] have demonstrated that there is a tendency for the number of fatalities per motor vehicle to decrease with increasing vehicle ownership in developed and developing countries. Jacobs and Fouracre[2] derived the following equation for developed countries in 1970:

$$\left(\frac{F}{V}\right) = 0.00039 \left(\frac{V}{P}\right)^{-.56}$$

F = the number of road accident fatalities

V = the number of motor vehicles in use

P = the population

The equation for 25 developing countries (using U.N. Statistics) was:

$$\left(\frac{F}{V}\right) = 0.00078 \left(\frac{V}{P}\right)^{-.44}$$

Both the above equations have been plotted in figure 1. From the figure, it is clear that the fatality rate for the 25 developing countries is not decreasing as rapidly as it is in developed countries. Therefore, in the future, when developing countries attain much higher levels of vehicle ownership, it is likely that many of them will have much higher fatality rates that those of countries currently classified as developed, unless something happens to change current trends.

The position of Pakistan (according to the U.N.Statistics is also shown in figure 1. As it is above the line for developing countries, the fatality rate is higher than one would have expected from the vehicle ownership level in Pakistan. If Pakistan was to be positioned exactly on the line for the same level of vehicle ownership then the number of people killed would have to be reduced by 367 (10 per cent) to 3,358. To be on the developed country line the deaths would have to be reduced by 568 (15 per cent) to 2700. Pakistan's position above the line is likely to be due to the existance of poorer standards compared with elsewhere in such areas as driver behaviour, vehicle condition, road condition and medical facilities.

4.2. Road accident trends in Pakistan

In the last 10 years between 1972 and 1981 the number of fatal road accidents in Pakistan* has increased by 74 per cent

*The data in this section have been extracted from the Transport Bulletin[6] and the Transport Bulletin (Supplementary No. 1)[7]. They do not include data from Baluchistan. In many instances the figures are higher than those presented in U.N. Statistics and Demographic Year Book for the same years. It is not clear why these discrepancies exist between the two sources.

from 1929 to 3465. The number of injury (including fatal) accidents during the same period increased by 103 per cent from 4751 to 9647. Such increases are not unexpected as the number of vehicles registered on the road has trebled in the last ten years.

During the last 3 years (see figure 2) the increases in fatal accidents have been relatively small and the number of non-fatal accidents has in fact dropped.

The accident rates and severity indices for the last 10 years are shown in figure 3. Since 1975, the fatality rate has been consistantly dropping. However, the severity index has changed little although in the last two years it has been higher than at any other time in the last seven years.

4.3. Vehicles involved in accidents

From table 2, it can be seen that 2 groups of vehicles; 1) buses (32 per cent) and 2) cars, wagons* and Suzuki* Pick Ups (32 per cent) were more frequently involved in road accidents in the Punjab than any of the other groups.

In Sind and in the North West Frontier Province (NWFP), the police identified only the 'main' vehicle involved in accidents. It is not clear how they determined which was the 'main' vehicle in the case of two (or more) vehicle accidents. However, it can be seen from Table 3 that trucks were most frequently identified as the 'main' vehicle in Sind (24 per cent) whereas in NWFP, wagons and mini buses were the most frequently identified group (29 per

*Wagons & Suzukis are often used for carrying fare paying passengers.

cent).

From figure 4, it can be seen that buses and trucks represented very small proportion of the vehicles estimated as "on road" in the Punjab (4 per cent each) and yet they were involved in a high proportion of accidents (32 per cent and 19 per cent), respectively. This result is to some extent not unexpected as buses and trucks are likely to be travelling for much longer periods on average per day than are other vehicles. Indeed a comparison of the accident involvement figures with traffic percentage figures (figure 4) indicated that trucks were less likely to be involved in accidents than one might have expected from their share of the traffic (5 per cent less). Buses on the other hand would appear to be over-involved in accidents as they accounted for only 18 per cent of the traffic whereas they represented 32 per cent of the vehicles involved in accidents.

Data from a study of accident black spots on the National Highway N-5 being carried out by the NTRC (see table 4) also indicated that buses were over-represented in accidents (9 per cent above their share of the traffic) whereas trucks were under-represented (10 per cent less than their share of the traffic).

The NTRC has estimated the average daily vehicle kilometrage travelled by different groups of vehicles in the Punjab. According to these figures, the accident* involvement rate per 100 million vehicle kilometers in the Punjab was 199

*=all reported accidents.

for buses, 192 for cars, wagons and pick ups, and only 54 for trucks.

Not only were buses more likely to be involved in accidents than other vehicles, but also it would appear that their fatal accident rate was much higher than that of buses in the U.K. For example, the rate for the Punjab Urban Transport Corporation (PUTC) in 1980 was 101 fatal accidents per 100 million kilometers operated compared with a rate of only 11 for London Transport in the U.K.

4.4. Vehicle manoeuvres and types of collision

From Table 5, it can be seen that the running over of pedestrians was the most common type of accident occurring in three of the four regions of Pakistan for which the data was available (between 31 to 42 per cent). It is also likely that the same was true of Sind but accidents involving pedestrians were probably classified as 'other' in the returns made to the NTRC.

'Head on' collisions were the next most common type of accident in Sind and in the Punjab. It is likely that most of these were due to dangerous overtaking and it would appear that the overtaking accident problem in Pakistan is much more serious than in the U.K. where only 5 per cent of the vehicles involved in accidents were overtaking. In cities, however, it would seem that overtaking is not so dangerous, as 'head-on' collisions represented only 6 per cent of the accidents in Rawalpindi and Islamabad. Instead 'side swipes' and 'rear end' collisions were the most common types of 2 vehicles accidents occurring in the two cities.

The relative severities of the different accidents types have been examined in Table 6. In terms of fatalities per 100 accidents, overtaking accidents and 'head on' collisions had the most serious consequences whereas 'rear end' collisions had the least. However, as regards the casualties per 100 accidents, 'vehicles leaving the road' and 'overturning' accidents were the worst and, on average, more than 4 people were hurt in each accident. This latter casualty rate seems very high but it is perhaps not surprising as, in many of the accidents, the vehicles would have been buses or transit wagons carrying large numbers of people.

The severity index (the percentage of casualties that died) was highest for accidents in which passengers fell off vehicle or vehicles ran over pedestrians. Clearly as these casualties had little protection from injury the consequences were very often fatal.

Unfortunately, information was not available on all the vehicles involved in the different types of accidents. However, data from the Punjab (1972) did indicate the 'main' vehicle involved and the results are shown in Table 7. From the table it would appear that cars and motor cycles were more likely to be identified as the 'main' vehicle in pedestrian accidents than were other vehicles. It does not necessary follow, however, that cars and motor cycles are more likely to be involved in pedestrian accidents than other vehicles. A more probable explanation is that the larger vehicles in accidents are usually identified as the main one and therefore cars and motor

bikes will be under-represented by the police in the accidents involving two or more vehicles and as a result it would appear that the majority of their accidents involving pedestrians.

20 per cent of the tractor accidents involved someone falling from the vehicle or trailer. Trailers are sometimes used for transporting people and clearly this is a dangerous practice.

Detailed information about the vehicle manoeuvres before the accidents was given in the study of the road accidents in Islamabad and Rawalpindi[9] (1974-78). The results have been presented in Tables 8 and 9.

At intersections, 'rear-end' collisions were the most common type (28 per cent) followed by those accidents in which vehicles turned onto another road into the path of a vehicle already travelling along the road. As priorities are not clearly marked at intersections and particularly as a study of driver behaviour[11] indicated that many drivers did not stop at stop signs (75 per cent to 100 per cent), it is not surprising that many accidents were of the latter category.

'Overtaking' and 'head on' accidents were the most common type occurring between intersections (51 per cent). Collisions with parked vehicles accounted for 10 per cent of the accidents. This relatively high figure is probably due to bad parking practices such as leaving broken down vehicles in the middle of carriageways and parking vehicles at night without lights.

4.5. Pedestrian and cycle accidents

From Table 10, it can be seen that pedestrians represented

nearly half of the road accidents fatalities in Karachi and slightly lower figures were obtained for other areas of Pakistan. These figures were slightly higher than the equivalent U.K. figure (at least 6 per cent higher).

The results also indicated that cyclists have a greater share of road accidents in Pakistan than they do in the U.K. The higher percentage probably reflected relatively larger amounts of cycling traffic on Pakistan's roads compared to those in the U.K. The percentage of fatalities which were cyclists was lower in Karachi than in the other regions of Pakistan and again these differences were probably due to differences in the amounts of cycle usage in the different regions.

Unfortunately, few details were available about road accident casualties in Pakistan. Some information was available in Karachi concerning the age of pedestrian casualties and this data has been compared with U.K. figures for built up areas in Table 11. From the table it can be seen that percentage of pedestrian fatalities which were children was slightly higher (3 per cent) in Karachi than for built up areas in the U.K. This difference is likely to be even greater if the age groups were exactly matched.

However, an examination of the non-fatal pedestrian casualties reveals a very different picture. The percentage of these casualties which were children is much lower than in the U.K. (26 per cent) and it is likely to remain lower even if the 14 and 15 year olds were to be added into the Karachi group. In

terms of children's share of the population it would appear that their risk of being hurt in road accidents is less than that of adults. This lower risk is likely to be due to children using the roads less than adults.

Data from 2 areas in Pakistan (see Table 12)indicated that just under half the pedestrian casualties were run over while crossing the road (42 to 49 per cent) whereas the remainder were run over while they were standing, playing or walking in the road. The percentage of pedestrians in the latter group was much higher than the equivalent figure for the U.K. (at least 28 per cent higher) and the high figure for Pakistan is likely to be due to the relative lack of footpaths. In addition, matters are probably made worse in Pakistan by poor pedestrian behaviour[12]. For example, a study of pedestrians showed that up to 17 per cent of them failed to use the footpath when one was provided and, when there was no footpath, up to 66 per cent walked in the road with their backs to the traffic.

Information on vehicle movements in cycle accidents is given in Table 13. In 64 per cent of the cases cyclists were struck from behind whilst they themselves were turning or travelling straight ahead. Unfortunately, it is not known how many of these accidents happened at night and therefore it is impossible to estimate how big a part poor cycle conspicuity played in these accidents. However, cyclists do not use lights at nights in Pakistan and few have rear reflectors. It is also probable that few cyclists have read the Highway Code and

therefore their behaviour is likely to be poor especially when turning. Motorists may also contribute to the problem if many of them fail to anticipate the actions of cyclists.

4.6. Location of accidents

From Table 14, it can be seen that more than half Pakistan's road accidents fatalities occurred in the Punjab province and a third in the province of Sind. In terms of fatalities per 10,000 vehicles estimated as on the road, Punjab and the North West Frontier had the highest rates but in terms of fatalities per 10,000 persons, Sind had the highest rate. The road accident problem in Baluchistan was almost negligible compared to the rest of the Pakistan.

Precise location information is rarely given on police accident reports and it is even difficult to estimate what proportion of accidents occur in built up or urban areas. An attempt as the latter has been made in Figure 5. In Sind nearly half the fatal accidents in 1980 and 1981 occurred in Karachi. The total percentage of urban accidents in Sind is therefore likely to be even higher as there are a number of other towns unaccounted for. In Bahawalpur, a district with only one large town, the percentage of fatal accidents occurring in urban areas was much lower (only 30 per cent).

In all cases the percentage of non-fatal accidents in urban areas was much higher than for fatal accidents (15 to 24 per cent higher) and such a difference was also evident in the U.K. Clearly, accidents in Pakistan are less likely to be fatal in urban areas than elsewhere because vehicle speeds

are lower and because medical treatment can be given more quickly in urban areas.

Data collected by the NTRC on accidents on the Grand Trunk Road (National Highway, N-5) in the Punjab indicated that, of all the fatal accidents in 7 districts studied, 27 per cent occurred on the N-5. Similarly, the N-5 road accounted for 22 per cent of the non-fatal accidents, 28 per cent of the fatalities, and 37 per cent of the injured persons in the 7 districts.

As the N-5 road figured prominently in road accident casualty statistics, it should be given high priority in any road safety remedial programme.

4.7. Environmental conditions and road accidents.

Environmental details such as the light and the weather conditions were rarely mentioned in police accident reports. However, in 2 sets of data, one from Islamabad and Rawalpindi 1974 to 1978, and the other from the Punjab 1972, it was possible to analyse the accidents distribution by light condition. In both, 70 per cent of the accidents occurred in day light. Also, in the Punjab, pedestrian accidents were more likely to happen in day light than were other types of accident (80 per cent compared to 64 per cent).

It was difficult to determine whether the risk of being involved in an accident changes with light conditions as the relevant vehicle flow data were not available. However, from figure 6, which shows the accident distribution by time of day, it would appear that the risk is somewhat less at night as the

first and last pairs of points(those approximating to the period of darkness) on the accident distribution curves fall below those on the traffic distribution curve.

As regards the day of the week in which the accident occurred, there would appear to be no consistant pattern in which one day had more or less accidents than another (Table 15). It is perhaps surprising that there were not less accidents on the day set aside as a holiday (Sunday prior to 1978 thereafter Friday) but traffic flow data for the N-5 indicated that traffic volumes were as high on the holiday as on the other days.

Only in the Punjab, 1972 data were the weather and road conditions mentioned and even in these records the information was provided in only 39 per cent of the cases. In 96 per cent of the latter, the weather was referred to as clear and in 94 per cent the roads were classified as dry.

Pakistan, at least in the north, has two distinctive rainy periods one from December to March and the other in July and August. The accident distribution by months of the years in Sind and in the Punjab from 1979 to 1981 do not show any marked increase in these wet months compared to others (see Figure 7). However, in the NWFP, there was an increase in the summer months which could be attributed to wet roads. There was also a peak of accidents in March but it is not clear why there should have been more accidents in this one month. As the NWFP consists largely of mountainous terrain it is perhaps not surprising that climatic conditions were more likely to have effected accidents there than in other provinces.

To examine whether Ramazan the month of fasting, had any effect on accidents, the number of accidents happening in that period were compared with the number of accidents happening in the same month in two different years. This analysis was carried out for 1979, 1980 and 1981 in three provinces and the results are shown in Table 16. The result did not support the hypothesis the road accidents increase during Ramazan. Indeed, it is doubtful whether Ramazan had any effect on accidents as the trends were not in the same direction in each of the three years studied in either the NWFP or in Sind.

4.3. Causes of road accidents

In most cases the police who report road accidents in Pakistan have not had any training traffic policing let alone in accident investigation. As a result, causes are rarely identified and those that are must be interpreted with some caution.

Only in one set of data, that from the district of Bahawalpur, was it possible to break down the causes into 3 factors:- 1) the road user, 2) the road and environment and (3) the vehicle. The percentage of accidents attributed to faults in these three categories are compared with results from the U.K. in Table 17.

As in the UK, road user error was found to be the main cause in the majority of accidents (90 per cent). The figure for 'road and environment' is considerably less in Pakistan than in the U.K. However, this does not necessarily mean that the road and the environment are less of problem in Pakistan than in the U.K. The contribution made by the road and the environment

may have been under-estimated by the police in Pakistan as they have not been trained to look for engineering or environmental problems. Similarly, the part played by vehicle faults in road accidents in Pakistan may also have been under-estimated.

A detailed break down of road user faults has been given in Table 18. The classifications used in the two sets of data were obviously different. However, 'lack of care' and 'driving too fast' accounted for about the same percentage of the accidents (49 and 42 per cent, respectively) in both sets and they probably represented a similar category in which no specific fault was identified.

The next largest group of faults was 'improper overtaking' in one set of data and 'driving on the wrong side of the road' in the other set (each was identified in 20 per cent of the accidents). No explanation was given for vehicles being on the wrong side of the road but it would seem likely that in most cases vehicles were overtaking. From this fault data, along with the information on head on collisions (see Table 5) it is evident that overtaking accidents represented an exceptionally large share of the total accident problem in Pakistan and therefore some priority should be given to remedial measures which could make overtaking safer.

5. CONCLUSIONS

The accident data reviewed in this report indicate that Pakistan has a very serious road accident problem in relation to other countries. For example, the fatality rate per 100 million

vehicle kilometres in the Punjab (1980) was 16 times higher than that of the U.K. Also Pakistan had the fourth highest fatality rate per 10,000 vehicles registered of 29 devdloping countries for which data was available and it had the highest severity index. By regression techniques it was estimated that Pakistan had 10 per cent more fatal accidents than was expected if Pakistan had been typical of developing countries overall.

Although the fatality rates were high in Pakistan, they have dropped consistantly in the last 5 years. However, the severity index has changed little and in the last 2 years it was higher than at any time in last 7 years. The latter may reflect a lack of any improvement in medical and emergency services for road accident victims.

In the Punjab Province 32 per cent of the vehicles involved in accidents were buses and this figure was 14 per cent higher than would have been expected from their share of the traffic. Also the fatal accident rate (per 10 million kilometres operated) of the Punjab Urban Transport Corporation was found to be 10 times higher than that of London Transport in the U.K. Clearly the poor safety record of buses in Pakistan should be the cause of some concern.

The most common two vehicle accidents in the provinces were 'head on' collisions (18 to 24 per cent). In urban areas, 48 per cent of the accidents at intersections involved vehicles joining or crossing another road and 28 per cent were 'rear end'collisions. Data from an NTRC Study[11] indicated that driver behaviour was poor

at intersections and for example 75 to 100 per cent of drivers failed to stop at Stop Signs. Away from intersections, overtaking and head on accidents were again the most common (51 per cent of accidents) and collisions with parked vehicles accounted for a surprisingly high percentage of accidents (10 per cent). The latter may have been due to dangerous practices such as abandoning broken down vehicles in the middle of the carriageway or parking vehicles without lights on unlit streets at night.

Between 37 to 42 per cent of the accidents studied involved pedestrians. In Karachi 23 per cent of the pedestrian fatalities were children under 13 years of age and, although child accidents are obviously one of the major road safety problems of urban areas in Pakistan it was less serious than might have been expected from the population statistics (37 per cent of the population were children under 13).

Unlike in the UK, crossing the road was not the only common action of pedestrians involved in road accidents in Pakistan. 24 per cent of pedestrians casualties in the Punjab were hit while they were walking along the road. The comparative lack of footpaths and poor pedestrian behaviour such as walking with the back to the approaching traffic were likely to have been the main reasons for the high percentage.

Cycle accidents were also a serious problem in some urban areas of Pakistan (21 per cent of accidents in Islamabad and Rawalpindi involved cyclists). In many cases cyclists were struck from behind (64 per cent) and, as many cycles have

neither working lights nor reflectors, it is possible that a lack of conspicuity was a major contributory factor.

Little information was available on the location of accidents. However, data from Sind Province indicated that at least half of the fatal accident occurred in urban areas as 49 per cant of them occurred in Karachi alone. In addition, it would appear that a high proportion of accidents occur on the major intercity trunk roads as, in a large area of the Punjab, it was found that 27 per cent of the fatal accidents occurred on the National Highway, N-5.

Information on environmental conditions was also rarely given. However, according to 2 sets of police reports, 70 per cent of accidents occurred in day light and very few accidents occurred in the wet (4 per cent). The monthly statistics also provided no indication of climatic effects on accident except in the NWFP, where the rainy months had the highest numbers of accidents. Ramazan, the month of fasting, was found to have no effect on the frequency of accidents.

According to the police identification of causes, road accidents were blamed on road user error in 90 per cent of the accidents, on the environment and road condition in 6 per cent and on vehicle defects in 4 per cent. Caution is needed when interpreting these results as the police in Pakistan have had no training in accident investigation. In particular they were likely to have under-estimated the contribution of the environment, road condition and the vehicle in road accidents. However, there is little doubt that poor road user behaviour was a factor

in the majority of accidents and the analysis of faults highlighted the need for improvements in overtaking behaviour in particular, as dangerous overtaking accounted for 20 per cent of the accidents.

Although the information given in accident reports was often incomplete it has been possible to identify some major problems areas for road safety. These are as follows:

1. Bus accidents
2. Pedestrian accidents including 'walking in the road' accidents as well as 'crossing' accidents.
3. Cycle accidents
4. Trunk road accidents
5. Overtaking accidents
6. Urban accidents, particularly intersection accidents.

It is suggested that future road safety research in Pakistan should aim to develop and evaluate low cost remedial measures to reduce accidents in each of the six groups above.

In addition, it was evident from the accident reports that information that could have been useful for diagnostic purposes was often missing. Therefore, it is also recommended that the present police accident reporting system should be examined and if necessary an improved system be devised.

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TABLE 1

Severity indices, fatality rates and vehicle ownership levels in developing countries

Name of the country	Number Injured (i)	Number Killed (ii)	Severity Index (i)÷(ii)x100	Number of vehs. in use (iii)	Fatalities per 10,000 vehs (ii)÷(iii)x10,000	Population	Vehicles per 10,000 persons
1.	2.	3.	4.	5.	6.	7.	8.
Afghanistan	1007	100	9.933	77688	12.8	15,500	50.1
Botswana	724	92	11.3	21289	43.2	766	277.9
Chile	17623	1207	6.4	570824	21.1	10,917	522.8
Colombia	17330	2355	11.6	685576	34.3	26,107	262.6
China(Taiwan)	29885	3896	15.7	379871	(102.6)	17,202	220.8
Congo	3000[1]	120	3.8	21101[1]	56.9	1,400	150.7
Ethopia	2576	847	24.7	45455	186.3	29,285	15.5
Hong Kong	19335	437	2.2	234150	18.6	4,606	508.3
Jordan	5247	415	7.3	93971	44.2	2,218	423.6
Kenya	10856	1588	12.7	243175	65.3	16,973	143.3
Lesotho	709[1]	130[1]		10733[1]	120.5	1,217	88.6
Liberia	1125[1]	145[1]	11.4	23200[1]	62.5	N.A.	N.A.
Malawi	N.A.	234[3]	N.A.	25813[3]	90.7	5,307[3]	50.5
Malaysia	24651	2561	9.4	180381	14.2	10,894	1654.9
Mauritius	3908	132	3.2	63156	20.9	9,098	694.1
Morocco	36395[2]	2372	6.1	508394[2]	46.6	17,826[2]	285.5
Niger	1296	172	11.7	28294	60.8	5,250	38.6
Nigeria	30023[1]	8000	21.03	381102[1]	209.9	166,160[1]	22.9

TABLE 1 (Continued)

1.	2.	3.	4.	5.	6.	7.	8.
Pakistan	6531	3725	36.3	355514	104.8	75620	47.0
Panama	5710[1]	273	4.6	91661	29.8	N.A.	N.A.
Senegal	2810	273	8.8	78677	34.7	N.A.	N.A.
Sierra Leone	2356	156	6.2	35309	44.1	3251	108.6
Sri Lanka	7341	891	10.8	190190	46.8	14183	134.0
Swaziland	781[1]	140[1]	15.2	15818[1]	88.5	508	311.4
Thailand	10568	3952	27.7	1472976	26.8	45221	325.7
Togo	1951	202	9.3	50002	40.4	2416	206.9
Tunisia	7272	63	10.3	214904	39.0	6037	355.9
Turkey	31372	5753	15.5	1080148	53.3	43144	250.3
Upper Volta	830	131	13.6	31486	41.6	5500	57.2
Av.of 10 developed countries	553252	11350	2.93	31863024	3.902	110812	4211.9

1 = 1977 2 = 1976 3 = 1975

TABLE 2

Vehicles involved in reported accidents in the Punjab

		Buses	Trucks	Cars and Jeeps	Wagons and M.buses	Tractors	M/cycles and M/cycle Rickshaws	Total
1979	No.	1625	852	644	636	530	1232	5519
	%age	29	15	12	11	10	22	100
1980	No.	1438	814	897	757	354	1092	5352
	%age	27	15	17	14	7	20	100
1981	No.	1467	903	902	631	902	270	4645
	%age	32	19	19	14	10	6	100

TABLE 3

The 'Main' Vehicle involved in reported accidents in Sind & NWFP

		Buses	Trucks	Cars and Jeeps	Wagon and M.buses	Tractors	M/ cycles	M/ cycle R/shaws	Other (An. Drawn and Bicycles	Total
SIND (1980)	No.	635	927	588	511	93	380	160	517	3811
	%age	17	24	15	13	3	10	4	14	100
NWFP (1980)	No.	249	213	184	389	68	100	79	74	1356
	%age	18	16	14	29	5	7	6	5	100

Table 4

Vehicles involved in reported accidents at 'black spots' on the N-5 between Rawalpindi and Attock, 1979 - 1981

Vehicle Types	Vehicles Involved		Percentage of Motor Vehicle Traffic, 1981
	Number	Percentage of motor vehicles	
Government bus	10	25	16
Private bus	58		
Truck	82	30	40
Car	73	39	41
Transit Wagon	34		
Motor Cycle	16	6	3
Cycle	9		
Tonga	1		
Other	1		
Total	284	100	100

TABLE 5

The Percentage of accident types occurring in 4 areas of Pakistan

	Accident* types								
	Ran over pedestrian	Rear end collision	Head-on collision	Side swipe	Veh. left road	Pass. fell from veh.	Other	Total	Number of Accidents
Bahawalpur 1976-77	37	45			10	6	2	100	236
Punjab 1972	38	13	18	6	5	4	11	100	1302
Sind 1981	8	6	24	11	4	3	44	100	3565
Islamabad & Rawalpindi 1974 to Sept. 1978	42	21	6	24	3	3	1	100	1224

*All reported accidents.

TABLE 6

Severity indices for different types of accident reported in the Punjab 1972

Type of Accident	No.of dead per 100 accidents*	No.of casualties per 100 accidents*	Severity Index **
Passenger fell from moving vehicle	72	102	72
Vehicle ran over pedestrian	72	105	68
Head on collision	77	252	30
Rear and collision	48	168	29
Side swipe	57	216	26
Overturned in roadway	79	407	19
Vehiclelleft road	70	441	16

* Accidents = accidents of the same type

** Percentage of casualties that died.

TABLE 7

Percentage of 'main' vehicles involved in each accident type in the Punjab 1972

Main Veh. involved	Accident Type: Pedes-trian	Rear End	Head on	Fell from moving vehicle	Other	Total	Number of Accidents
Bus	35	19	16	5	25	100	627
Truck	39	19	24	3	24	100	341
Car	56	17	14	0	13	100	246
M/Cycle	65	13	13	0	9	100	23
Farm tractor	33	10	12	20	25	100	60

TABLE 8

Vehicle manoeuvres before intersection accidents in Islamabad and Rawalpindi 1974 - September, 1978

		Number of Accidents*	% age of accidents
Manoeuvres of vehicles on different roads			
	Vehicles crossing	22	13
or	right turn into path of vehicle	28	16
or	Left turn into path of other vehicle	26	15
	Both vehicles turning	6	4
Manoeuvres of vehicles on same road			
	Rear end	47	28
	Head on	19	11
	Right turn into path of on-coming vehicle	9	5
	Both turning	5	3
or	Turned in path of vehicle travelling in same direction	9	5
TOTAL		171	100

*Excluding accidents involving cyclists and pedestrians

TABLE 9

Types of accidents * occurring between intersections in Islamabad and Rawalpindi, 1974 to September, 1978

Accident Type	No. of Accidents	Percentage
Overtaking	85	35
Head on (not overtaking?)	37	16
Vehicle left road	32	13
Collided with parked vehicle	29	12
Collided with parked vehicle	24	10
Collided with vehicle emerging from drive-way	15	6
Collided with vehicle moving off from parking place	12	5
U-Turn	5	2
Collided with animal or object on road	3	1
Total	242	100

* Excluding accidents involving pedestrians, cyclists and occupants falling from vehicles

TABLE 10

The involvement of pedestrians and cyclists in accidents.

	Total Number of Reported Road accidents	Percentage of Fatalities which were pedestrians	Percentage of Fatalities which were cyclists
Karachi 1981	2276	44	8
Islamabad and Rawalpindi 1974-75	1224	42*	21*
Punjab 1972	1302	41	15**
UK 1977	232647	35	5

* = Percentage of accidents (not Fatalities)

** = Percentage of casualties (all severities) in Bahawalpur (in the Punjab) 1977-78

TABLE 11

Children's involvement in pedestrian accidents

	Percentage of Pedestrian Fatalities	percentage of non-fatal Pedestrian casualties	Percentage of of population
Karachi 1981 Children Under 13	23	18	37*
UK 1977 built-up areas Children Under 15	20	44	22

* From 1972 Census

TABLE 12

Pedestrian actions before being involved in accidents

	Percentage of pedestrian accidents		
	Islamabad and Rawalpindi 1974-78	Punjab 1972	U.K. 1977
Crossing:			
Open road, hit on rear side	28	43	65
Open road, hit on far side	13		
From behind a parked car/ obstruction	0	1	20
At an intersection	1	5	*
TOTAL CROSSING	42	49	85
Playing, working or standing in the road	26	12	8
Walking in the road: with the traffic	29	19	
against the traffic	1	5	
TOTAL WALKING IN THE ROAD	30	24	N.A.
Off the road	2	15	7
GRAND TOTAL:	100	100	100
NUMBER OF ACCIDENTS:	514	364**	71,276***

* Classification not made in the U.K.

** Actions unknown in 26 per cent of 497 accidents

*** Casualties

TABLE 13

Vehicle movements in cycle accidents in Islamabad and Rawalpindi

Vehicle movements	Number of Accidents	Percentage
Cyclist struck from behind	163	64
Cyclist struck when crossing path of vehicle	42	16
Cyclist struck by vehicle turning right	34	13
Cyclist struck when turning right	13	5
O t h e r	4	2
TOTAL	256	100

TBALE 14

Accident rates in four provinces - 1980

Provinces	Number of Vehicles registered on the road	Population (000's)	Fatalities	Vehicles per 10,000 persons	Fatalities per 10,000 vehicles	Fatalities per 10,000 persons
Baluchistan	20207*	4305	50	47	25	0.1
N.W.F.P.	59475	10685	459	55	77	0.4
Punjab	280218	47116	2153	59	77	0.5
Sind	276996	18966	1331	146	48	0.7
Total	636996	81272	3993	-	-	-

* Estimated from 1979 figure for vehicles stood registered.

TABLE 15

Accident distribution by day of the week

	Total reported Accidents	Percentage of reported accidents						
		Sat.	Sunday	Monday	Tues.	Wed.	Thurs.	Fri.
Punjab 1980 (Fatal only)	298	14	19	7	14	15	13	18
Punjab 1972	1302	13	14	18	14	15	14	12
Rawalpindi and Islamabad 1974 - 1977	1662	15	13	14	16	14	15	13
%age of traffic on highway N-5, Punjab 1982		14	15	14	14	14	15	14

TABLE 16

A comparison of accidents in Ramazan with accidents for the same month in 2 other years

	Number of Injury Accidents					
	NWFP		PUNJAB		SIND	
	Month of Ramazan	Av.for same month not Ramazan	Month of Ramazan	Av.for same month not Ramazan	Month of Ramazan	Av.for same month not Ramazan
1979 (August)	182	149	345	369	335	342
1980(July/Aug)	75	116	337	349	316	309
1981 (July)	175	199	339	345	264	292
TOTAL	432	464	1021	1063	915	943

TABLE 17

A comparison of the causes of accidents in the Punjab with those in the U.K.

Cause/Factor	Percentage of accidents in which cause/factor was identified.	
	Bahawalpur*	U.K **
Road User	90	95
Road and environment	6	28
Vehicle	4	8.5

* The Bahawalpur data was obtained from police reports. Only one main cause in each accident was identified.

** The U.K data was obtained by a TRRL Survey team carrying out an in-depth investigation of accidents. All factors contributing to each accident were identif ied and, in many, two factors were found to have contributed.

TABLE 18

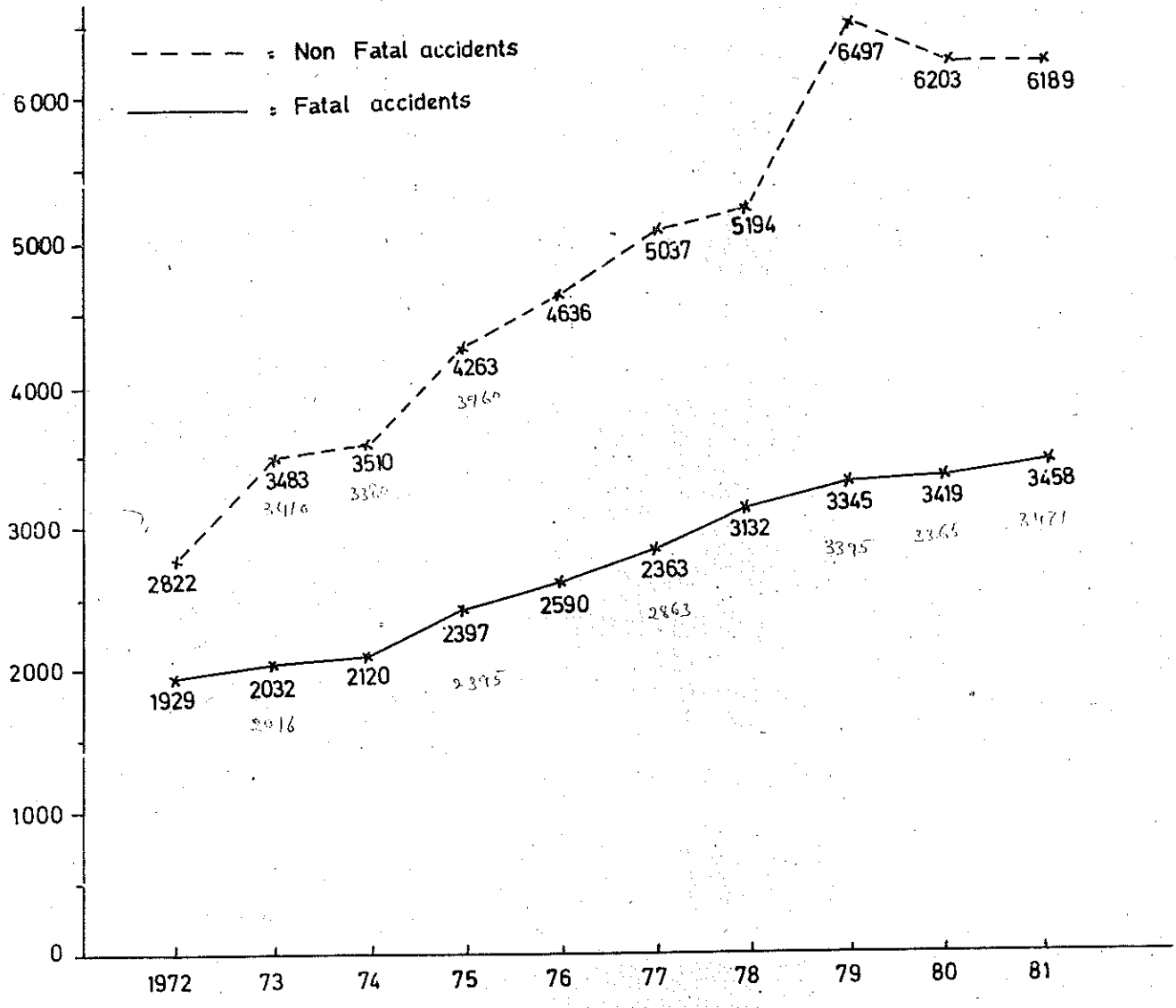
Road User Faults in Accidents in Bahawalpur & Punjab

Faults	Percentage of accidents in which fault was identified	
	Bahawalpur (1977-78)	Punjab(1972)
Lack of care by drivers	49	-
Lack of care by pedestrians	7	-
Improper overtaking	20	6
Overloading	9	-
Faulty signalling	4	-
Driving too fast	-	42
Driving on the wrong side of the road	-	20
Following too closely	-	14
People carried incorrectly	-	14
Other	11	14
Total	100	100
TOTAL ACCIDENTS	122	1154*

*Cause not stated in 148 additional accidents

Figure. 2

ROAD ACCIDENT TRENDS IN PAKISTAN* FROM 1972 To 81



Excluding Baluchistan

Figure - 3 -

TRENDS IN FATALITY RATES AND SEVERITY INDICES IN PAKISTAN FROM 1972 - 1981

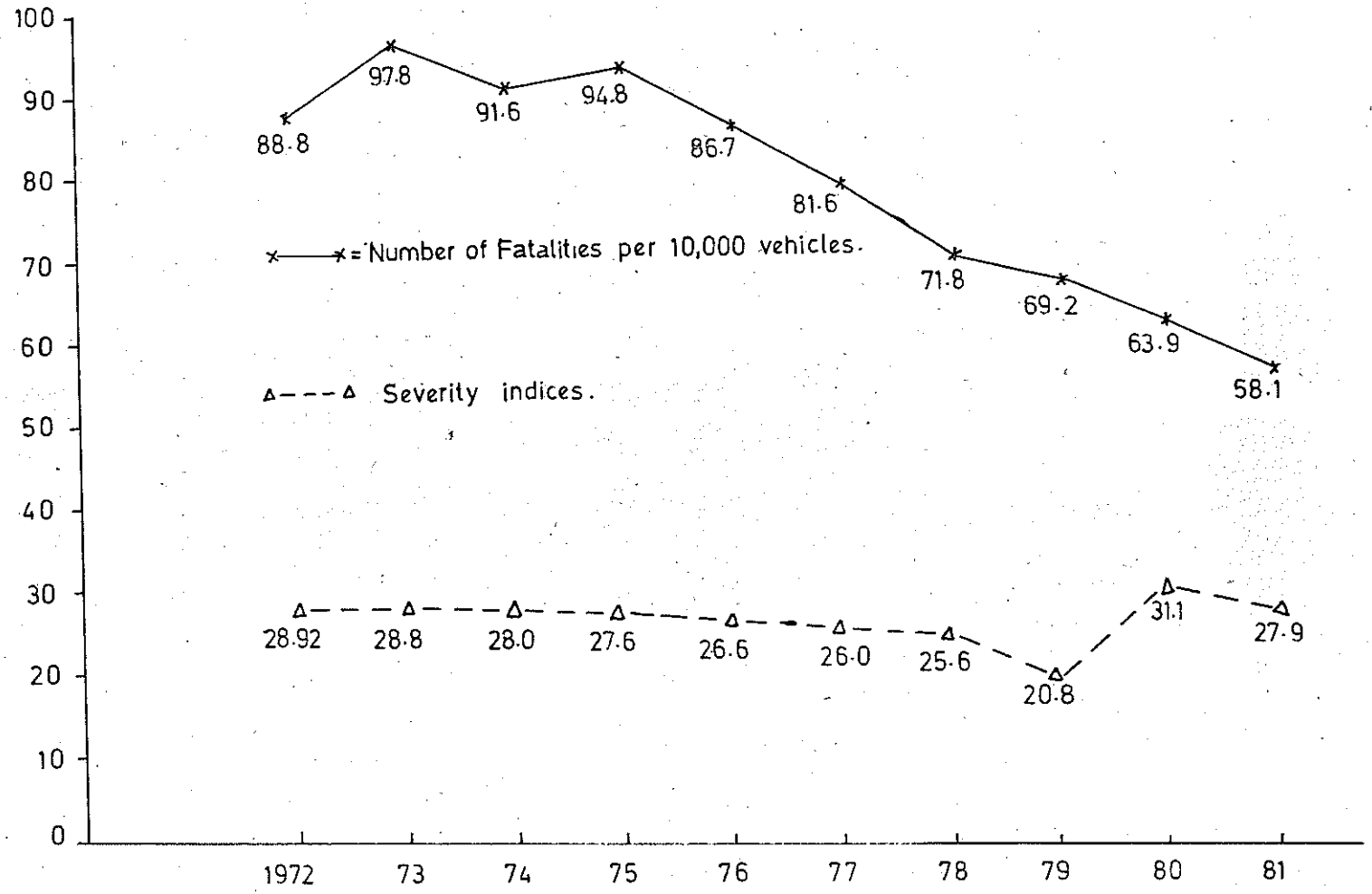


FIGURE , 4 .

A comparison between road accidents, vehicle registration and traffic flow data for different vehicle types in Punjab.

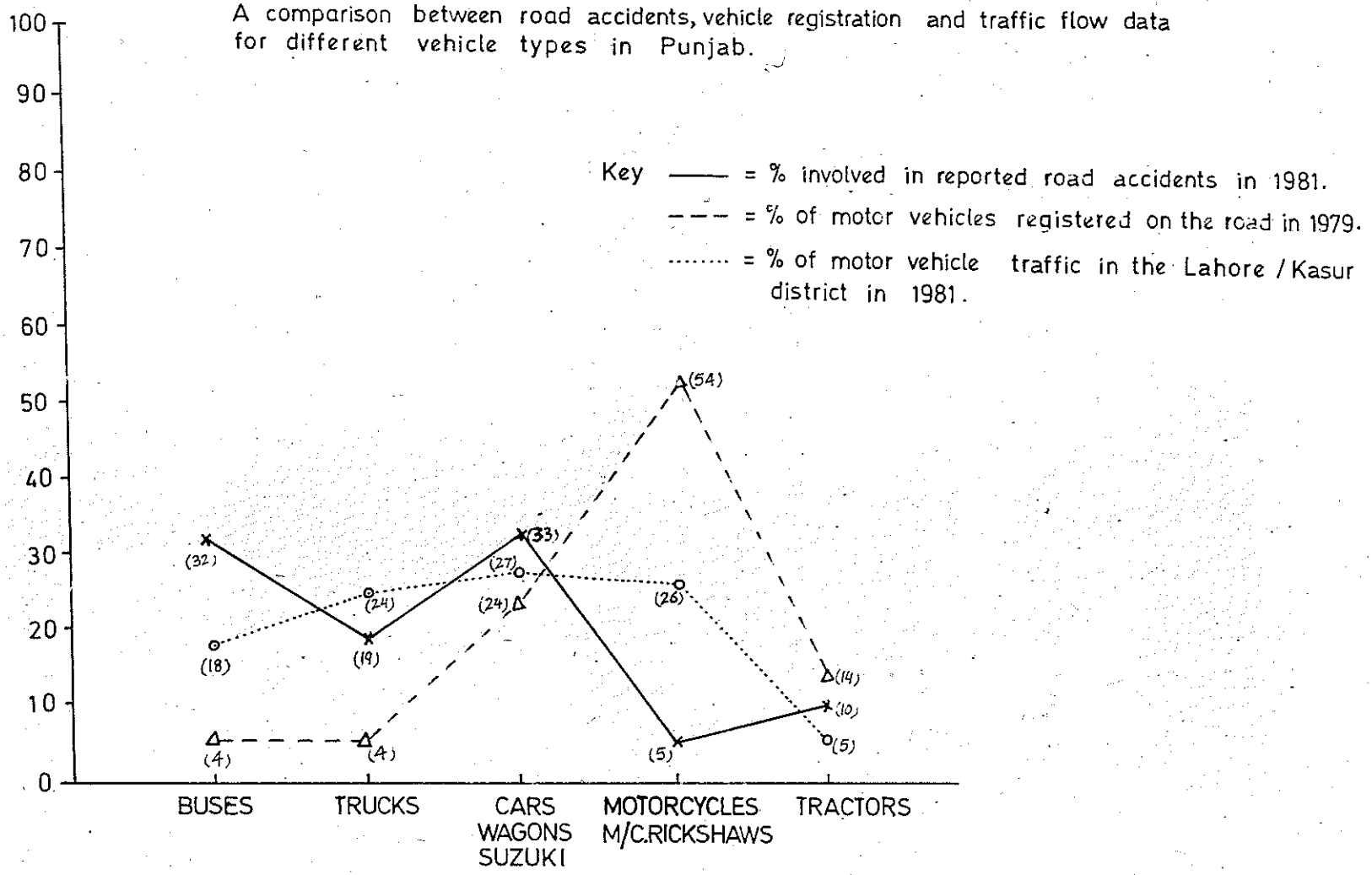


Figure - 5 -

PERCENTAGE OF ROAD ACCIDENTS IN URBAN AREAS

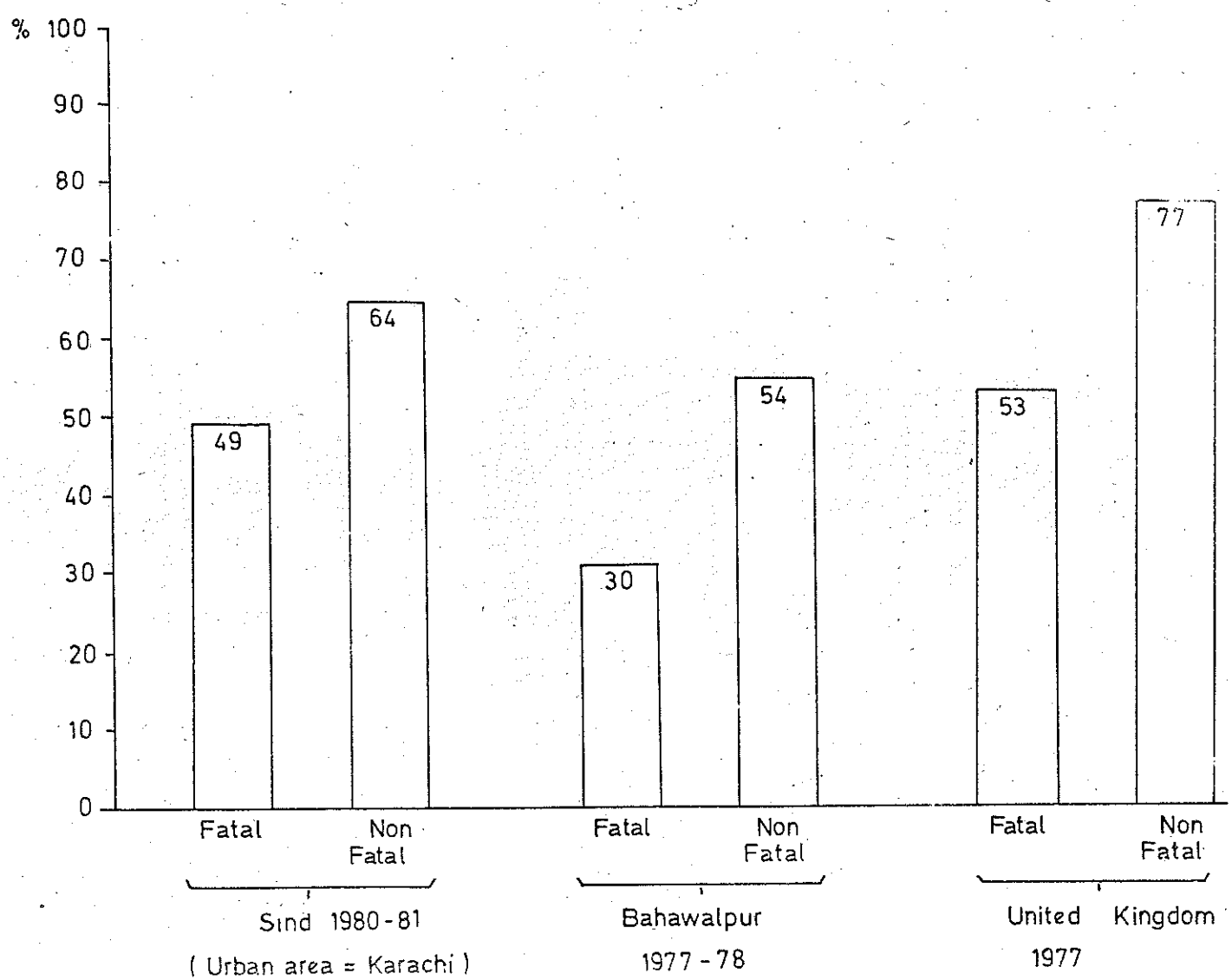
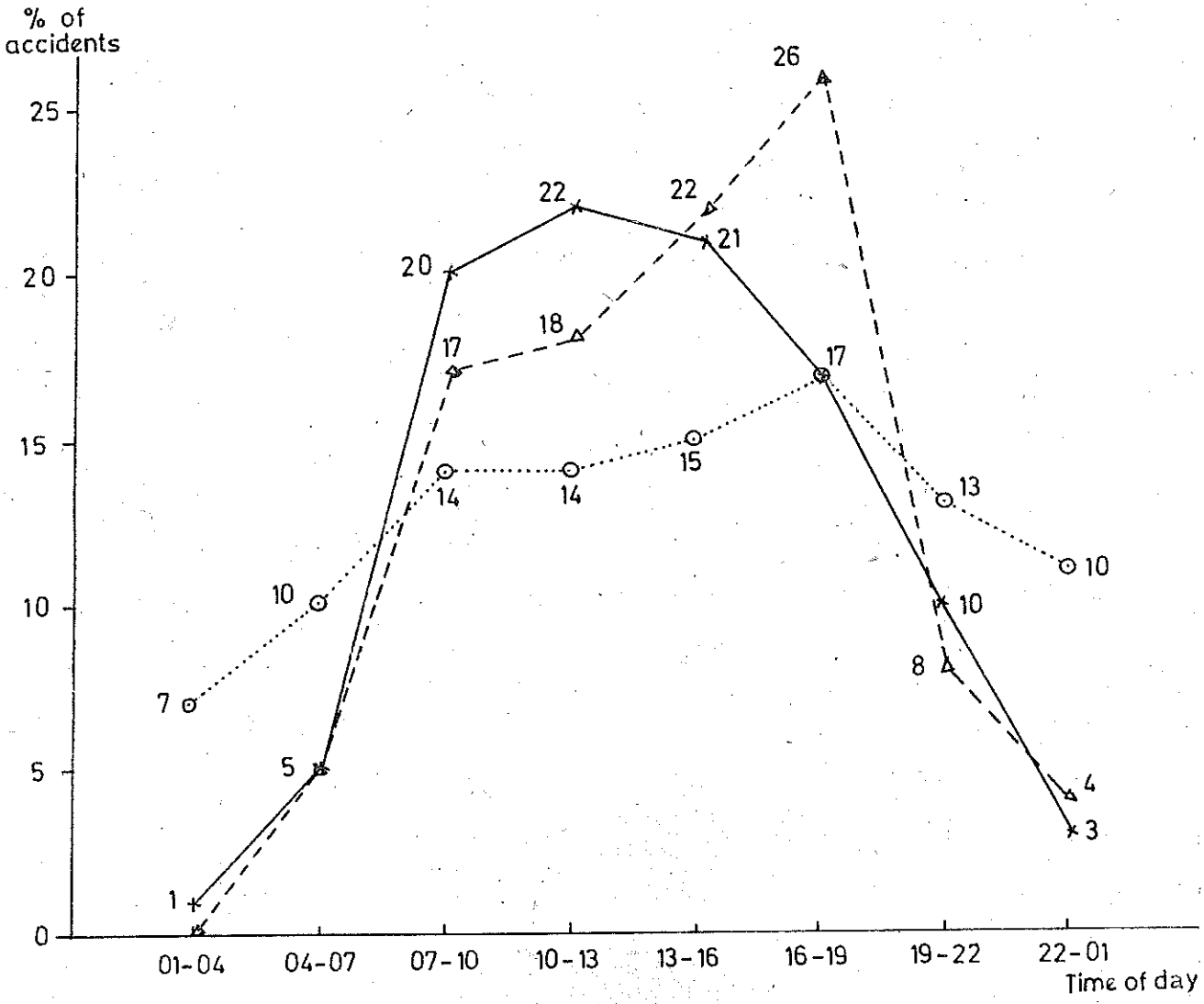


Figure - 6

ACCIDENT DISTRIBUTION BY TIME OF DAY



Key ×——× = Percentage of reported accidents in Rawalpidi and Islamaba from 1974 to September 1978.

Δ– – –Δ = Percentage of Fatal accidents (253) in the Punjab for the first quarter of 1980.

O·····O = Percentage of traffic volume for 3 hour periods at Jhelum Bridge on the N5, 1982.

Figure - 7 -

ACCIDENT DISTRIBUTION BY MONTHS OF THE YEAR IN PUNJAB, SIND AND NORTH WEST FRONTIER PROVINCES FROM 1979 To 1981