SEAT BELTS: THEIR USE AMONG DRIVERS KILLED IN FATAL CRASHES IN VIRGINIA

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ABSTRACT

SR300 Accident Report forms and corresponding Medical Examiner's reports were examined for fatal crashes which occurred during fiscal year 1973. The status of seat belt usage was noted for drivers whose deaths were directly related to the accidents and in whose cars seat belts were installed. In addition, data on 32 other variables available in these reports were collected for all of the fatally injured seat belt users and for a 20% sample of the nonusers.

In the 317 cases examined, 26 drivers (8.2%) were found to have been wearing seat belts at the time of the accident while 291 (91.8)%) were not. One would expect that seat belt users would be represented among fatalities in the same proportions as they are represented among the general driving population. To determine if this were true, the seat belt usage rate among fatally injured drivers (8.2%) was compared to the usage rate for drivers in Virginia (24.04%) and to two estimates of usage among the general driving population in other states. These differences were found to be statistically significant ($p < .001$), meaning that only one time in 1000 would differences this great be due to chance factors alone. Thus, it was concluded that belt users were underrepresented among Virginia fatalities. Since no other differences existed between the two groups when demographic and accident related variables were examined, it was also concluded that this underrepresentation was due to the use of seat belts and that seat belts have saved lives in Virginia.

SUMMARY OF FINDINGS AND CONCLUSIONS

(1) For the 317 cases examined for fiscal year 1973 the majority of drivers killed in fatal crashes were not wearing seat belts at the time of the accident. Of the total number of drivers involved in this study, 26 (8.2%) wore seat belts, while 291 (91.8%) did not. These figures are supported by data collected among Ohio fatalities and among interstate carriers. In 1972, 93.5% of all Ohio fatalities were not protected by seat belts at the time of the crash. During the first nine months of 1973, 92% were nonusers. Mandatory seat belt legislation covering all interstate carriers went into effect July 1, 1971. During the first seven months of 1973, 80% of the accidents among commercial carriers involved seat belt users and 20% involved nonusers. This small nonuser group constituted over half (51.2%) of all interstate carrier fatalities. Among this group of professional drivers, belt users were underrepresented in fatal accidents.

(2) Seat belt users are also underrepresented among Virginia fatalities. Figures on usage among the fatally injured were compared to three estimates of usage among the population at risk. Council placed usage within the general population in North Carolina at 32.9% during 1968. [4] In Ohio, belt usage was placed at 28% of the population at large during 1973, as noted by teams of observers. [7] Stoke surveyed belt usage among drivers in four areas of Virginia in January of 1974 and placed usage rates at 24%. [9] The differences between these figures and those concerning Virginia fatalities were statistically significant.

(3) The seat belt user and nonuser groups were compared on 32 demographic and accident related variables to determine what other factors might influence this underrepresentation. There were no significant differences between these two groups besides use of seat belts.

(4) Since the user group was underrepresented among fatalities, and since there were no other differences between the two groups, this underrepresentation must be due to the use of seat belts. Thus, it was concluded that the use of seat belts reduced the incidence of fatal injuries during fiscal 1973 in Virginia.

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BACKGROUND

Since 1955, various industrial and governmental agencies have encouraged the installation and utilization of seat belts. (1) Their value has been intuitively recognized for a much longer period of time and recent research has proved them to be "the public's biggest single safeguard against serious injury or death". (2) However, 19 years after this support began (and after the investment of millions of dollars in research, manufacturing and public education programs), seat belts are still an issue of public health controversy. Although the benefits derived from wearing seat belts and the risks involved in not wearing them are apparent, the majority of Americans do not use these restraints. Legislation requiring even their limited use has not been forthcoming. Why are seat belts the center of continuing controversy? The problems tend to revolve around three main questions as set forth below.

(1) Is it legal to require mandatory use of seat belts? Briefly, criticisms in this area involve the issues of due process, equal protection and the right to privacy. These criticisms have been negated in recent research, most notably in a paper by W. A. Ames, entitled "The Constitutionality of Mandatory Seat Belt Use Legislation". (1)

(2) Will legislation actually increase seat belt usage? This question is best dealt with by presenting case histories. Australia's experience with mandatory seat belt legislation has been widely publicized. Since the law went into effect in 1972, the states of Victoria and New South Wales have noted a 25-75% increase in usage of restraint systems. In Victoria, where the law has been in effect since 1970, 80% of urban drivers and 67% of rural drivers use seat belts. (3)

There are two American analogies to the Australian experience. Among interstate commercial carriers a mandatory seat belt usage law became effective in July 1971. Since then more than 93.5% of the drivers inspected by enforcement teams have been found to be using seat belts. (4) In 1966, a citywide mandatory seat belt law was enacted in Brooklyn, Ohio, where the usage rate for drivers involved in collisions is between 44 and 57%, a high rate for subjects involved in traffic crashes. (3)

(3) Will increased seat belt usage result in a decrease in the number of serious injuries and fatalities in highway crashes ? Again, the safety benefits of seat belts are most clearly shown by decreases found in Australia after enactment of mandatory use legislation. During the first nine months after the legislation was passed, Victoria reported a 17.7% drop in fatalities and a 14.8% drop in serious injuries. New South Wales experienced a 16.3% drop in fatalities. Injuries, as reported by incidence of hospitalization, have been 34% less severe and eye injuries have dropped 72%. (3)

While it is known that mandatory seat belt usage legislation has worked in other countries, it has not yet been proven that it will work as well in Virginia.

PURPOSE

The purpose of this report is to examine evidence concerning fatal accidents and the present use of seat belts by fatal accident victims in Virginia over a 12-month period, and to determine the effects of seat belts on the incidence of fatal injuries.

METHODOLOGY

SR300 Accident Report forms and corresponding Medical Examiner's reports for fatal crashes occurring between July 1, 1972, and June 30, 1973, were reviewed and information collected on the variables therein. Only those fatally injured drivers for whom some notation as to seat belt usage was made (and in whose cars the belts were installed) were included in the experimental population. Cases in which the cause of death was not directly related to the accident were omitted. Verification of seat belt usage or absence of such usage was noted for each of 317 cases, and the resulting figures compared to usage rates among the general population in Virginia and two other states. Comparisons were also made between the entire population of those Virginia drivers killed wearing seat belts and a 20% sample of those fatally injured drivers who were not wearing the belts.

Variables examined in these comparisons included the driver's age, sex, race, driving experience, injuries sustained, size and model year of the automobile driven, amount and estimated cost of damage to the auto, number of autos involved in the crash, estimated speed at which the accident occurred, the actions and defects attributed to the driver (including whether he had been drinking), the defects attributed to the vehicle, the angle of impact, the weather, lighting and surface conditions of the accident area, type of locality, and alignment of the surface involved.

ANALYSIS

During the 12 months for which data were examined, there were a total of 317 qualifying fatalities. Of these, only 26 of the drivers were noted to have been wearing seat belts, while 291 were not. Thus 91.8% of these fatally injured drivers were not protected by seat belts at the time of the crash. On a monthly basis, non-belted drivers made up between 86.6% and 100% of all studied fatalities. In contrast, belted drivers were not even represented among those fatally injured during some months (see Table 1).

TABLE 1

SEAT BELT USAGE AMONG FATALLY INJURED DRIVERS BY MONTH

Month	Number of Victims	Drivers Using Seat Belts		Drivers Not Using Seat Belts	
		No.	%	No.	%
July 1972	24	3	12.5	21	87.5
August	23	0	0.0	23	100.0
September	19	0	0.0	19	100.0
October	29	1	3.4	28	96.6
November	32	3	9.4	29	90.6
December	29	3	10.3	26	89.7
January 1973	15	1	6.7	14	93.3
February	25	3	12.0	22	88.0
March	25	3	12.0	22	88.0
April	29	3	10.3	26	89.7
May	29	1	3.4	28	96.6
June	38	5	13.2	33	86.8
TOTAL	317	26	8.2	291	91.8

These figures are supported by studies conducted among all fatally injured drivers in Ohio and among all interstate carriers operating in the United States (see Table 2). In 1972, 93.5% of all Ohio fatalities were not protected by seat belts during their accidents, while only 6.5% were protected. (5) During the first nine months of 1973, approximately 92% of Ohio fatalities were not wearing seat belts. (6) For commercial vehicles, a mandatory seat belt law went into effect on July 1, 1971. This law covered all drivers operating motor vehicles used in interstate commerce — about four million drivers employed by 160,000 firms and operating over three million vehicles. During the first seven months of 1973, there were a total of 17,369 accidents involving interstate carriers. Of these, 13,959 (80%) involved drivers wearing seat belts and 3,410 (20%) involved unprotected drivers. Among accidents involving seat belt users, there were 108 fatalities; among nonusers, there were 113. Thus 0.8% of the accidents among seat belt users resulted in a fatality, while 3.3% of the accidents in which drivers were not protected involved a fatal injury. In addition, while nonprotected drivers accounted for only 20% of the accidents, they accounted for 51.2% of fatalities. (4) Therefore, among interstate carriers, nonusers were significantly overrepresented in the fatally injured group.

TABLE 2

SEAT BELT USAGE AMONG SELECTED GROUPS OF FATALLY INJURED DRIVERS

	Number of Cases	Number Using Seat Belts		Number Not Using Seat Belts	
		No.	%	No.	%
Fatally injured drivers in Virginia - FY 1973	317	26	8.2	291	91.8
Fatally injured drivers in Ohio 1972 (4)	1202	78	6.5	1124	93.5
Fatally injured drivers in Ohio - Jan.-Sept., 1973 (5)	1734	139	8.0	1595	92.0
Fatalities among interstate carriers - Jan.-July, 1973 (10)	221	108	48.8	113	51.2
— Accidents among interstate carriers - Jan. - July, 1973 (11)	17,369	13,959	80.0	3410	20.0
— Percentage of accidents resulting in a fatality among interstate carriers	1.2	-	0.8	-	3.3

There is reason to believe that all nonusers, not just those driving interstate carriers, are overrepresented among fatalities. To prove this, the data on belt usage among Virginia fatalities were compared to the recorded usage among the population at risk, i.e., living Virginia drivers. To determine this figure, 3,440 drivers were sampled in four urban and semi-urban areas of the state. Seat belt usage among the driving population in Virginia was found to be 24.04%. [7] If seat belts did not influence the incidence of fatal injuries, then the rate of usage among fatalities would approximate the rate among the general public. There was however, statistically less seat belt usage within the fatally injured group. This difference was significant at the .001 level (see Table 3). These findings mean that only one time in 1,000 would differences this great be due to chance factors alone. One can conclude from these findings that belt users were underrepresented among fatalities and that seat belts were associated with increased protection against fatal injury.

TABLE 3

SEAT BELT USAGE AMONG FATALLY INJURED DRIVERS AS COMPARED TO ESTIMATES OF USAGE AMONG THE POPULATION AT RISK

	Number of Cases	Number Using Seat Belts		Number Not Using Seat Belts		Chi-Square (Z for Percentages)
		No.	%	No.	%	
Fatally injured drivers in Virginia- FY 1973	317	26	8.2	291	91.8	
Population at risk Virginia - 1974 [9]	3440	827	24.04	2613	75.96	41.49 (6.44)
Population at risk North Carolina - (1968) [4]	481	158	32.9	323	67.1	65.42 (8.11)
Population at risk Ohio - (1973)	25,000	7,000	28.0	18,000	720.0	61.19 (7.83)

$p < .001$ for all cases

These findings were supported when two other estimates, representing out-of state usage rates, were used. The first estimate was drawn from a study conducted during 1968 among rural North Carolina drivers under normal conditions.[8] Subjects included in-state drivers and their passengers riding in automobiles in which seat belts were installed. This study places usage at 32.9% of the population at large. The second set of figures was drawn from 25,000 observations among drivers in Ohio during 1973.[9] This study estimates usage among the general population at 28.0%. In both cases, these differences were found to be quite significant. The difference in utilization rates between the general driving population of North Carolina in 1968 and the driving population of Ohio during 1973 as compared with that among fatally injured drivers in Virginia was significant at the .001 level. Again this difference is greater than would be expected by chance. Thus, the fact that seat belt users are underrepresented among fatally injured Virginia drivers is supported by data from other states.

The Virginia fatally injured group was broken down to users and nonusers and then compared on 32 different variables on the SR300 Accident Report form to determine if some other variable could account for the difference in usage between the two subgroups. Previous studies have found that users and nonusers differed on such variables as driver's age, race, sex, the age of the vehicle, the speed at which the accident occured, the number of vehicles involved, and whether the driver had been drinking.[8,10,11] In this study, however, no significant differences existed between the two subgroups. Thus, the two subgroups were similar in terms of all demographic and accident related variables, with the exception of seat belt usage.

CONCLUSIONS

As a result of this examination of seat belt usage among drivers fatally injured in Virginia one can conclude:

(1) That seat belt users are significantly underrepresented in the population of fatally injured drivers in Virginia;

(2) That belt users and nonusers did not differ significantly on any of 32 relevant demographic and accident related variables;

(3) That barring the existence of other unexamined relevant variables, one may consider that the over-or underrepresentations demonstrated here are due to seat belt usage; and

(4) That seat belt utilization reduced the incidence of fatal injuries among Virginia drivers during fiscal year 1973.

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