EFFECTS OF SPEED LIMITS DECREASE IN 1996 ON INCIDENCE AND SEVERITY OF INJURIES SUSTAINED IN TRAFFIC ACCIDENTS IN THE CITY OF ZAGREB

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1. INTRODUCTION

Injuries sustained in traffic accidents are virtualy accurately explained by plain physical laws, where delivered and absorbed energies are well determined, therefore predicting the severity of injury.[4,5,6,17] By those simple laws, the energy should be defined by the moving masses and their relative velocity, as well as by the time and the path of deceleration. Since the velocity presents itself as a most significant factor in kinetic energy equation, the obvious means to reduce the possible injury in traffic accident could be the reduction of traffic speed, reducing the energy delivered in an automobile crush.[3,7,12,14] Other means were determined to the absorption of accepted energy, and included strengthening of construction of the vehicle and other instruments, as were different types of seat belts and airbags introduced to protect the occupants in the vehicle.[1,2,8,10] Refinements of traffic areas with strict and physical dividing of walkway from the motorway are intended for the protection of pedestrians. Education of drivers and pedestrians should be the most significant part of accident prevention, but unfortunately, it was well established that the legislative and adomistration meassures, in conjunction with possibility of significant castigation lead to coccmprehensibly better results[13].

Although all of these tactics were tested and their efficacy had been well documented, the reduction of traffic speed was always the cheapest and most easily applicable means to reduce the severity of sustained injuries and therefore diminish the morbidity and mortality resulting from traffic trauma.

It was our intention to check the efficacy of new traffic speed limitation law, brought by Croatian Parliament in may 1996. on the incidence and severity of injuries sustained in traffic accidents in Zagreb metropolitan area and to challenge it's long term results.

2. MATERIAL AND METHOD

Statistical data about the incidence of traffic injuries which took place in Zagreb metropolitan area, were collected from Traffic Department of Municipal Police Zagreb, and correlated a for the severity of sustained injuries with data from University Clinic for Traumatology Zagreb, which serves as a primary trauma center for whole Zagreb metropolitan area. We covered 1996. year trying to find any difference in the incidence or severity of sustained injuries in the period before and after the introduction of speed limitation on 50 km/h.

The overall incidence of traffic accidents was 17650 in 1995. and 17281 in 1996. Since during the late spring and summer 1995. there were significant war activities which limited the amount of traffic in the whole country, we found it impossible to correlate the incidence of injuries by years, so we explored the incidence of accidents and their consequences by months, in order to see if there was any significant drawback in incidence and severity score after the implementation of a new, lower speed limit.

3. RESULTS

Analysis of incidence and severity of injuries sustained in traffic injuries before and after the implementation of speed limit legislation, had not shown any decrease in the incidence of traffic accidents. There was, in fact, increase in the incidence of traffic accidents after a one month delay. General count of injuries sustained was not changed, and followed the trend of the count of accidents. The amount of the most severe injuries with mortal injuries was not changed as well. These injuries happened mostly on the city speedways, where speed limit is higher then in metropolitan area, and where the exceeds of even this higher limit are rather the rule than the exception. Excesive drivers alcochol consumption was the other main cause of accidents in most of these cases.(Fig.2.)

When we analyzed the severity of sustained injuries, we found significantly decreased number of severe injuries.(Fig.1.) For the purpose of study, we divided injuries into those demanding hospitalization, and those in which a home care was sufficient way of treatment. After the implementation of speed limit legislation the number of injuries demanding stationary hospital treatment was significantly lower.(Fig.3.) This division showed even more obvious increment of light injuries, relieving a great deal of hospital facilities and staff.

4. DISCUSSION

Big cities are experiencing an exponential growth of incidence of injuries sustained in traffic accidents[15]. This situation led to various approaches intending to decrease as well the number of casualties as the severity of sustained injuries[11]. Although the accurate reconstruction of impact forces is difficult, and sometimes even impossible[9]. there are well documents reports suggesting that the increase, or decrease of speed limit has an impact on the incidence and severity of injuries in traffic accidents.[3,4,5,7,12,13,14,16]

Our results showed that the decrease of speed limit lead only to the temporary, limited decrease in the incidence of traffic accidents. That could be understood, for the traffic speed is only one of many factors leading to the traffic accident. Other factors, as are the condition of vehicle, drivers performance, weather and other circumstances are sometimes equally important. Being unable to act upon all levels of traffic safety (e.g. car construction, road construction) it is seemingly easier and cheaper to introduce a legislative regulation where possible. In our case it was the speed limit.

Although the accident incidence returned to previous values in the very short time interval, it was obvious that the injury severity remained lower than before the lowering the speed limit. Actually, severe injuries were swapped for light injuries with minimal permanent functional consequences. By our opinion this was not achieved exclusively by decrease of speed limit, but was, as a mater of fact result of many interconnected factors, as were better condition of vehicles, better control of technical security, routine use of safety seatbelts and reduced traffic speed as one of main factors. There remains the question of the effective impact of the legislation, for the traffic control gradually slackened few months after the implementation. Our results showed that the decrease of speed limit in urban area had a positive impact on injury severity, reducing mortality and morbidity resulting from those injuries, reducing absence from work and finally diminishing the possible permanent consequences and invalidity. Hospital capacities were significantly relieved from ever increasing amount of patients suffering from moderate injuries from traffic accidents, and have been able to provide better care for severely injures people, whose number unfortunately remained in same values as before. Therefore, we can conclude that with due regards to the shortness of observed time interval, a speed limitation bill had an overall positive impact on traffic safety in our circumstances.

SUMMARY:

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PURPOSE: In July 1997. a new speed reduction bill was introduced in Croatia, imposing severe penalties for overspeeding. By new regulation a maximum speed for urban area was limited on 50 km/h. In this investigation we tried to establish the real impact of speed reduction on incidence and severity of injuries sustained in traffic accidents

METHOD: Data concerning incidence of traffic accidents obtained from Department of Traffic Security of Zagreb Police Administration were correlated with data collected from University Clinic for Traumatology in Zagreb, which was responsible for treatment of most of the victims from these accidents. Distinction was made between light, severe and fatal injuries, having in mind that severe injuries were burdened with possible residual handicap.

RESULTS: A sharp decrease in incidence and severity of injuries sustained in traffic accidents was noted during July and August 1997. Incidence of accidents subsequently increased, but the incidence of injuries, as well as their severity remained lower than before the implementation of the new bill.

CONCLUSION: A Speed Reduction Bill had a significant influence in reducing severity of injuries sustained in traffic accidents. Although the incidence of accidents gradually increased after initial drop, the average severity of injury remained lower than before it's introduction.

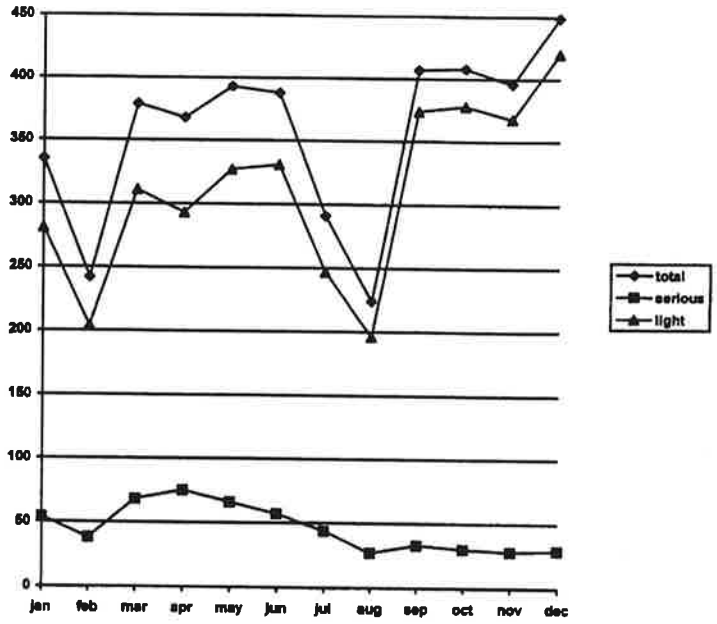

Fig.1. Injures in traffic accidents, Zagreb, 1996

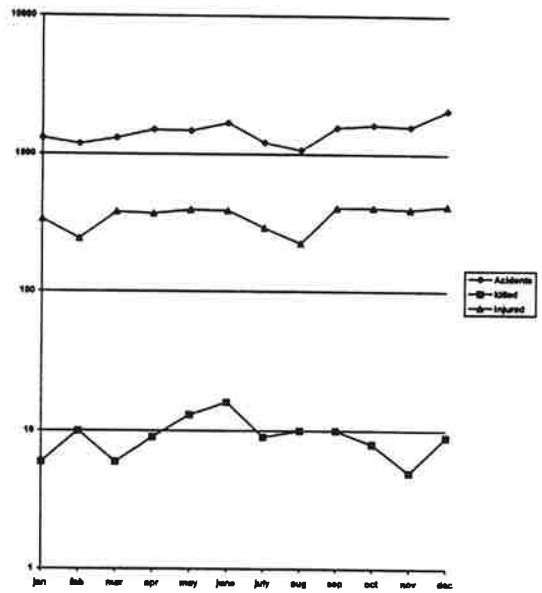

Fig.2. Injures vs. mortality in traffic accidents, Zagreb, 1996

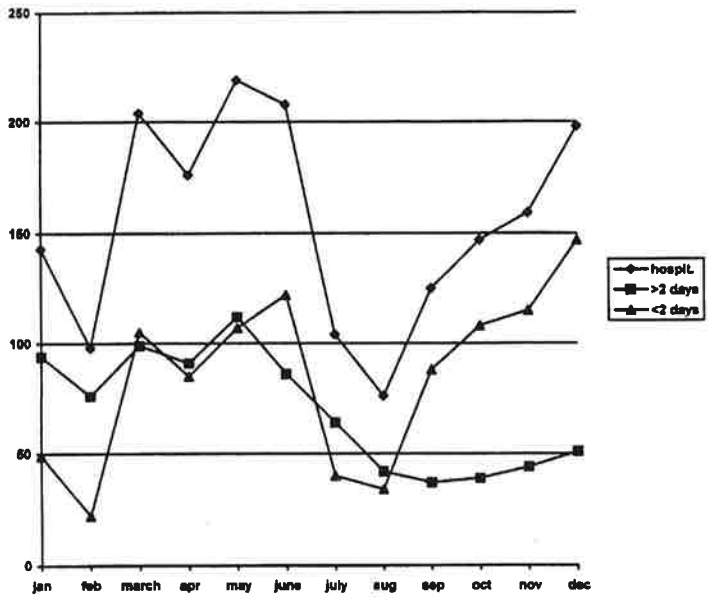

Fig.3. Hospitalization of light injures from traffic accidents, Zagreb, 1996

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