

The Cost of Road Accidents in Athens

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ABSTRACT

Road traffic accidents are a contemporary matter of our society as they can have dire physical, mental and socioeconomic consequences. The purpose of this report is to highlight the cost of road accidents that occur in Greece, treated in General hospital of Athens "G. Gennimatas" from 22/01/2018 until 20/03/2018. During this period of time our Emergency Department treated 135 victims of road accidents, 81 males 54 females. Due to the fact that our institution treats only adult patients, no patients under the age of 15 were included in the study. 57% of the victims, 77 patients needed hospitalization, 3 people were dead at the time of arrival and 55 patients were discharged home after the examination. There were 82 motor accidents, 4 cyclist drifting, 9 pedestrian drifting and 40 car accidents. The minimum immediate cost of a road accident victim is calculated at 38.99 euros, in cases where the patient had no severe injury and was discharged home. On the contrary, the cost of a polytrauma patient requiring hospitalization starts at 400 euros and can rise in extreme cases into the hundreds of thousands of euros. The immediate cost of a road traffic accident cannot be compared to the total physical, emotional and economic cost, which is associated with a prolonged recovery, disability or even loss of life. Consequently, preventive measures and constant vigilance in improving trauma care are essential in minimizing the socioeconomic impact of road traffic accidents in Greek society.

KEY WORDS: road accidents, cost, polytrauma patient, road safety

Introduction

Road traffic accidents are a major international health hazard with nearly 1.3 million people dying on road crashes each year, that is, on average, 3,287 deaths a day [1]. In addition 20-50 million people are injured and disabled every year resulting in an increase of costs of hospitalization, rehabilitation and living. The affected groups are children, pedestrians, cyclists and senior citizens and over 90% of all road fatalities occur in low and middle-income countries, which have less than half of the world's

vehicles [2]. Consequently, modification of driving behavior, proper equipment and suitable road surface can lead to a substantial decrease in both the death toll and injury burden related to RTAs [3] [4] [5] [6].

Our study is a cross sectional observational study from 22/01/2018 until 20/03/2018. The data include all victims of road accidents such as car accidents, motor accidents and pedestrian drifting. We calculated all costs from the time that the patient presents at our Emergency department until home

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discharge or death.

Material and Methods

During this period of time our Emergency Department received 135 victims of road accidents, 90 ambulatory and 45 non- ambulatory, 81 males and 54 females. Due to the fact that it is an adult trauma hospital no patients younger than 16 years old were included. Most of the victims, 77 patients needed hospitalization, 3 people were dead at the time of arriving and 55 patients were discharged after the examination. There were 82 motor accidents registered, 4 cyclist drafting, 9 pedestrian drafting and 40 car accidents.

The primary survey aims to identify and immediately treat life-threatening injuries and is based on the ATLS resuscitation protocol. Ambulatory patients without obvious injuries, GSC 15/15 normal SpO₂ and normal Blood Pressure underwent the first hemoglobin measurement on arrival, a chest x-ray, a FAST ultrasound examination, a two- hour observation at the emergency department and a repetitive hemoglobin measurement before they were discharged. Patients with thoracic, spinal or limb pain, open injuries or alteration of sensation underwent additional clinical exams, and imaging of the injured area.

The Patients were continuously being evaluated from the time they were presented in the emergency room, according to the international triage system; green for walking patients, yellow for urgent patients who were unable to walk, red for patients who needed immediate care and black for dead people. Patients transferred by ambulance and the patients unable to walk, after the ATLS protocol were categorized in yellow or red color according to international triage system. The yellow and red category patients underwent vein catheter insertion, Haemoglobin measurement, biochemical measurements (Glucose, Creatinine, Urea, Sodium, Potassium, Serum Glutamic Oxaloacetic Transaminase, Serum Glutamic Pyruvic Transaminase, Lactic Acid) blood cross test, chest x ray, U/S FAST and x-rays of the injured areas. Computed tomography scans were necessary in cases as craniocerebral injuries, chest and sternum trauma, multiple broken

ribs, respiratory insufficiency, abdomen pain with suspicion of hemorrhage. Furthermore, skeletal injuries including spine trauma and joint fractures required CT scan. In Greece each X-ray costs 4,05 euros, U/S FAST costs 29,18 euros for male and 35,49 euros for female patients, the CT of each area costs 71,11 euros.

As far as the blood analyses were concerned, blood testing with full blood count costs 2,88 euros while biochemical tests 22,86 euros, and the blood cross matching test costs 5,22 euros. We must also take under consideration expenses attributed to consumables, like intravenous serums, antibiotics, painkillers, urine and rinogastric catheters that was found to have a great variance in our study group.

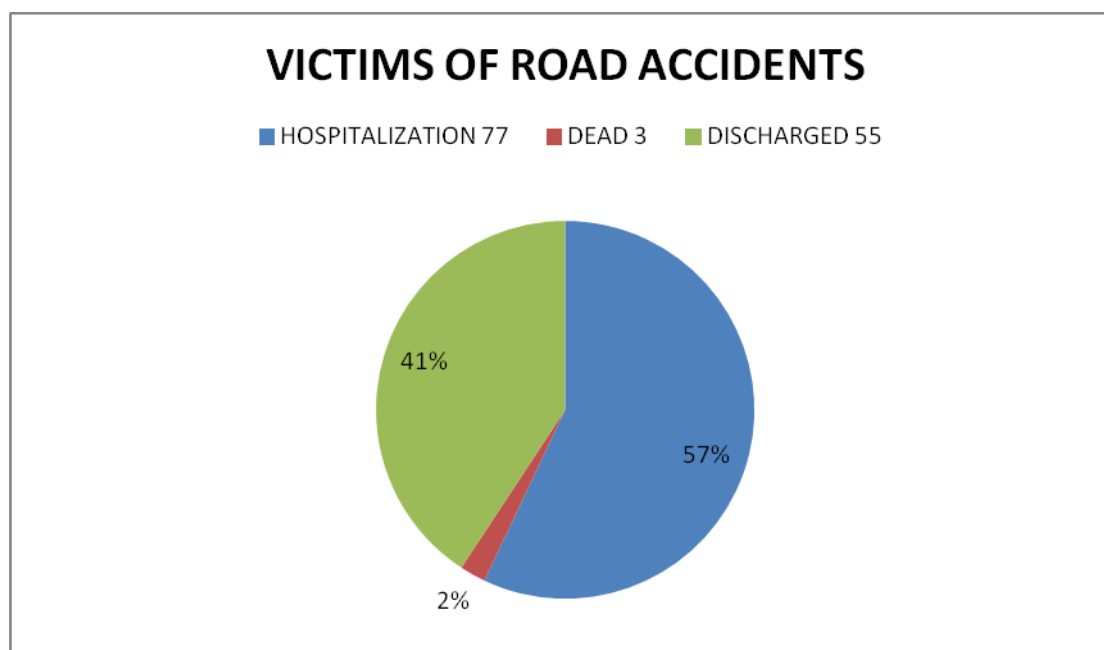
Results

According to our findings, the minimum cost per road accident victim was 38,99 euros, for a patient that had no severe injuries and was deemed safe to go home. In contrast the cost of a polytrauma patient who needs hospitalization starts at 400 euros including chest and pelvis x-rays, CT scan, blood tests, painkillers, Normal or Ringer's solution serums etc. In our study the distribution of injuries was: soft tissues injuries amounted to 88 (65.2%), 45 (33%) persons had head injuries, 26 (19%) had facial bones injuries, 63 (46%) persons had thoracic cage injuries, abdominal injuries were diagnosed in 13 patients (9%), long bone fractures amounted to 70 cases (51%) and 19 (14%) had spinal injuries.

Consequently, the majority of victims of road accidents suffer from either a minor or severe skeletal injury. Analyzing the skeletal injuries of the road accidents people had bony injuries, upper limb 22 (24%), lower limbs 27 (30%), pelvic ring fractures 14 (0.15%), 17 (19%) had spinal fracture while 9 (10%) had multiple fractures. According to our data 39 patients were treated operatively, 30 required conservative therapy and hospitalization, and 20 were discharged home without hospitalization. Specifically, the majority of long bones injuries required operative treatment, all pelvic ring fractures needed at least one day hospitalization and ten spinal fractures hospitalized. Due to the great number of skeletal injuries, most of patients of road accidents are

TABLE 1.

Victims of Road accidents and Hospitalization



hospitalized in orthopedic department. It is therefore extremely significant to analyze the cost of day care in the clinic as well as the cost of each orthopedic procedure.

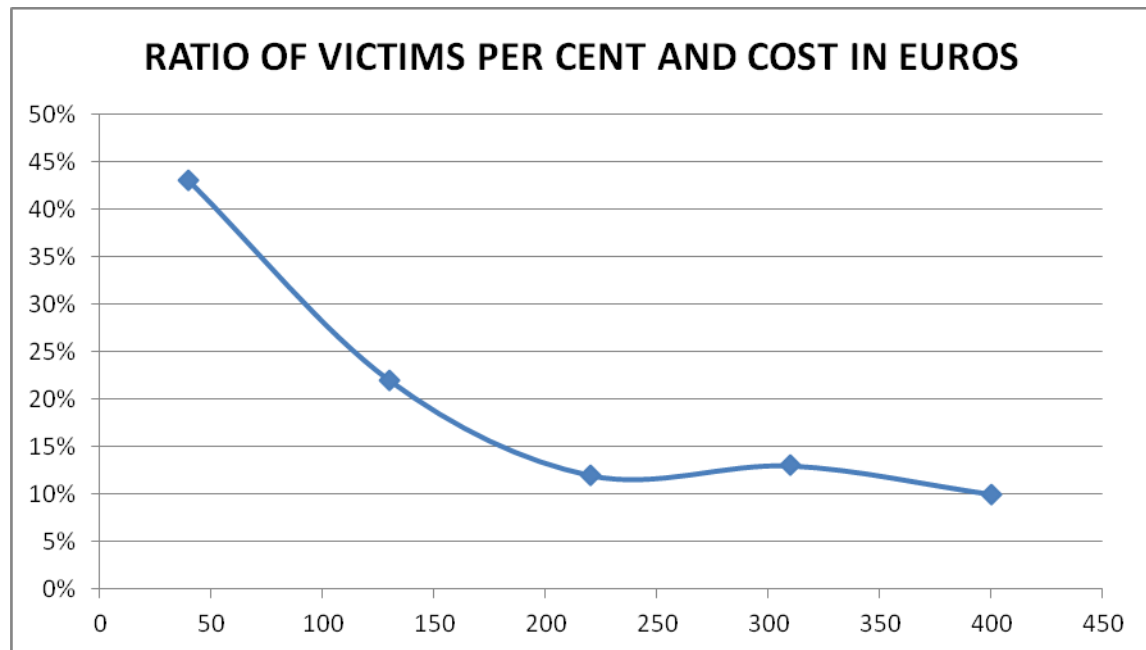
Injuries such as ligament sprains, non-displaced fractures and fractures not necessitating surgical treatment, are usually treated with a splint or a cast that costs on average 2 euros in case it is made of plaster or 6 euros if it is made of synthetic material. Radiographic imaging including a minimum of two views before and after the cast placement is also required, with a total cost calculated on average to be in the range of 14-18 euros. In our department during the study period 17 intramedullary nailing procedures were recorded due to proximal femoral, femoral shaft or tibial shaft fractures. The average implant cost is 700 euros, so in total 11,900 euros were spent for these treatments. Moreover 5 bipolar hemiarthroplasties were performed with a cost of 500 euros each, and a total of 2500 euros. Finally, 5 lower limb fractures were treated with osteosynthesis utilizing special plates with a total cost of 1500 euros. Concerning the upper limb injuries, most

cases were humeral shaft fractures and were treated non-operatively, with a cast or a sling costing on average 3 to 5 euros. Two proximal humeral fractures, however required a hemiarthroplasty costing around 600 euros each and ten fractures were fixed with osteosynthesis using plates with total cost of 6500 euros. Summarizing, in our orthopedic department during these months 39 patients required operative treatments with an average 3-day hospitalization and 30 patients who underwent conservative treatment but needed on average a two-day hospitalization.

We must also take under serious consideration the cost of the anesthesia, blood transfusion in some cases, antibiotics and painkillers. It would be of great interest at this point to indicate a report of Cost Benefit Analysis of Strategy for Road Safety in Ireland, in which the Hospital in-patient cost is being recorded. "Hospital in-patient costs refer to the costs of keeping a patient in hospital and providing them with treatment for their injuries. In the BTE report, these costs were assumed to be directly proportional to the length of time in hospital. Approximate-

TABLE 2.

Range of Victims per cent and cost in euros



ly a third of fatally injured crash participants (681 out of 1,970) died after admission to hospital. These fatally injured crash participants were estimated to have been in hospital for six days. The average stay in hospital for patients with serious injuries was 8.3 days. A small proportion of crash participants with minor injuries was treated at hospital and their stay in hospital was estimated as one day. The estimated costs per crash participant given in the BTE report were \$1,373 for a fatality, \$5,493 for a serious injury, and \$28 for a minor injury. It can be seen that the total cost is over ten million dollars.”[2].

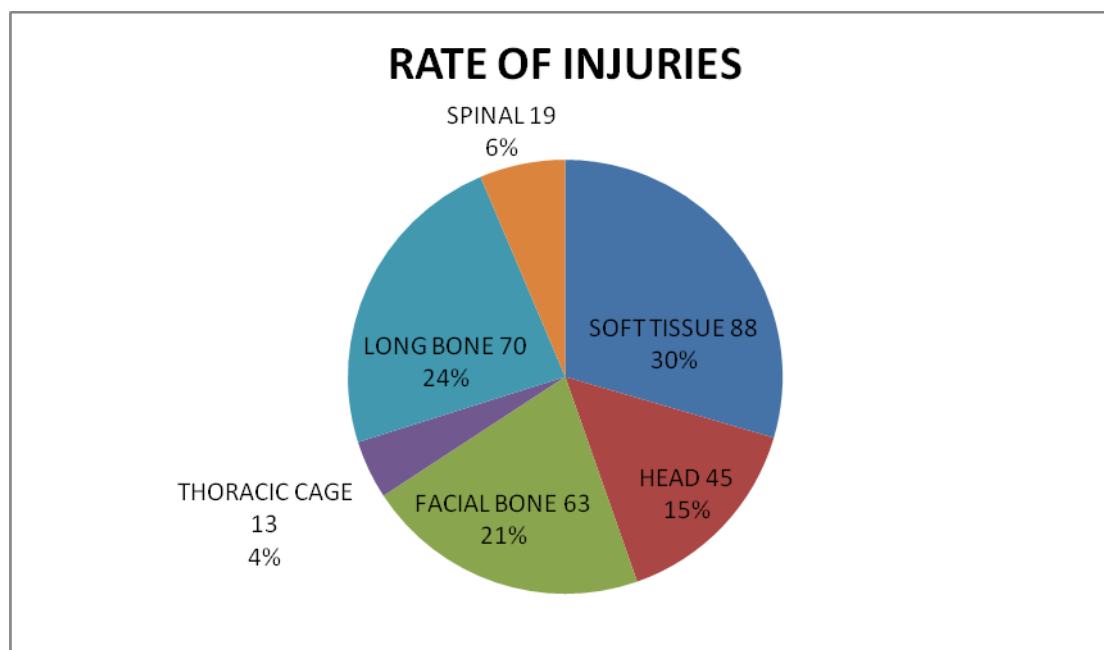
Discussion

Road traffic accidents carry a lot of additional costs for our welfare state system because they are the principal reason of disability. Minor injuries such as strains require at least 3-day recovery leave and follow up visits of the patient, while severe injuries need at least one to three months recovery leave, physiotherapy sessions and a plead of re-examination appointments. Therefore, RTAs result in substantial mortality and years of potential life lost,

provoke permanent or impermanent damage to the patient and reduce directly or indirectly lead to loss of work hours especially among the younger more productive patients [7] [8] [9]. Consequently, RTAs have a negative effect not only on the victims’ personal lives but also the economy of each country. Moreover, in many cases road accidents result in court proceedings. The study of CDC about morbidity and mortality, in US in 2012, shows that the nonfatal injury burden is also high. For each motor vehicle occupant killed in a crash in 2012, eight were hospitalized, and 100 were treated and released from the ED. “The estimated lifetime medical cost of nonfatal crash injuries is similar to other serious, but perhaps more well-known, public health problems. For example, the estimated lifetime medical cost of crash injuries is approximately 50% higher than the estimated \$12.6 billion cost for human immunodeficiency virus (HIV) in the United States [4] [10]. On average, each crash-related ED visit costs \$3,362, and each hospitalization costs \$56,674. These nonfatal crash injury costs can create both an immediate and lifelong burden for individuals

TABLE 3.

Rate of Injuries



and their families, as well as employers, and public and private health care payers. Although these are lifetime medical costs, the majority of medical costs (approximately 75%–90%) are estimated to occur in the first 18 months after the crash [7] [9]. In addition to the burden of medical costs, crash injuries cause a substantial lost lifetime productivity valued at \$32.9 billion.” [3] [5].

According to these results, it is evident that road accidents are part of a serious phenomenon. Distracted driving is a dangerous epidemic on Highways. According to the National Highway Traffic Safety Administration distraction plays a key role in over 3,000 road deaths and injuries each year. Distracted driving crashes are crashes in which drivers lose focus on the safe control of their vehicle due to manual, visual or cognitive distraction [1]. In contrast, Fatigue-related crashes are most common in very early morning hours and mid-afternoon. The risk increases when driving long distances or on monotonous roads. The chance of serious or fatal injuries increases due to slower driver response time [1]. Road traffic accidents as a global challenge are

on the global agenda through Sustainable Development Goals SDG 3 and 11 which aim to half the number of global deaths and injuries from road traffic accidents by 2020. Moreover to provide access to safe, affordable, accessible and sustainable transport systems by improving road safety by 2030. Most of fatal cases according to their involvement in traffic, is among drivers. Regarding contributing factors, the driver is responsible on average of 99.3% for entire period 2010-2015 whereas climatic conditions only 0.5% and technical vehicle condition 0.1%. Similar results were found in different studies, in the United Arab Emirates, driving behavior are more prevailing contributing factors, and vehicle safety is least [3] [5]. In South Africa the drivers’ behavior was the main cause of accidents (46%) [10] [11] [12]. In Taiwan, human factor is responsible up 3 to 4% for road accidents [13] [14].


Unfortunately, car accidents in Greece are caused by a combination of reasons. Number one reason is our driving behavior, followed by inadequate police supervision (which results to a loose attitude of drivers towards laws and regulations). Third

reason is the aged “car fleet” in Greece, especially when compared to the European average and the badly maintained roads and vandalized traffic signs [13] [14].

In our country this is the present situation, Greek statistics for road accidents rose by 12.3 percent in April compared to the previous year, according to the Hellenic Statistical Authority of Greece (ELSTAT). The data included road accidents that caused death or injury. The number of accidents came to 1,065 compared to 948 in April 2015 [6] [13] [14].

The Hellenic Statistical Authority (ELSTAT) announced provisional data on Road Accidents for January 2018. In particular, the road traffic accidents which occurred in Greece, resulting in death or injury, increased by 18.8% in comparison with the corresponding month of 2017 (757 road accidents in January 2018, against 637 road accidents in January 2017). The casualties of the injury-causing accidents that occurred in January 2018 were as follows: 38 deaths, 49 serious injuries and 845 slight injuries. In

contrast, in January 2017 the corresponding figures were: 54 deaths, 41 serious injuries and 747 slight injuries. Therefore, road accident casualties in January 2018 decreased by 29.6% for deaths, increased by 19.5% for serious injuries and increased by 13.1% for slight injuries [13] [14]. Data shows that most accidents occurred in Athens, whereas the north Aegean had the more serious accidents in terms of death and injuries, followed by the Ionian and the Peloponnese [13] [14]. The aforementioned numbers place Greece 28th in terms of number of accidents and last place in the European Union.

In conclusion, the implementation of policies that cover all aspects of road safety, ranging from car design and road network upgrades to enforcing safe driving behavior is vital in order to prevent and reduce the impact of road traffic accidents both in terms of human loss and disability and the substantial direct and indirect costs incurred at a national level. 

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