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**Relevance of Epidemiology Data in Trauma management**

Epidemiology data in trauma management

**Abstract**

Trauma is a major cause of morbidity and mortality across the globe accounting for significant health burden. Relevance of trauma care revolves round prevention, planning and execution of safety regulations. Acquisition of the actual data regarding the type of trauma, affected age group, timings of trauma occurrence, involved part of the body constitute the initial steps in the building of the composite overview of the epidemiology of trauma. In succession, would be the measures directed towards avoidance of trauma and capacity building of trauma centres.

**Key Words:** Trauma; Epidemiology; Injury; Prevention; Triage; Registry; Artificial Intelligence

**Core Tip:** Trauma is the current global epidemic, requiring relevant steps to tackle the trauma related morbidity and mortality. The knowledge gaps and deficiency in the health care management require to be suitably addressed by the accumulated data, which can be retrieved from a robust trauma registry.

**TO THE EDITOR**

Relevance of Epidemiology Data in Trauma management

**Abstract**

Trauma is a major cause of morbidity and mortality across the globe accounting for significant health burden. Relevance of trauma care revolves round prevention, planning and execution of safety regulations. Acquisition of the actual data regarding the type of trauma, affected age group, timings of trauma occurrence, involved part of the body constitute the initial steps in the building of the composite overview of the epidemiology of trauma. In succession, would be the measures directed towards avoidance of trauma and capacity building of trauma centres.

## **Keywords**

Trauma; Epidemiology; Injury; Prevention; Triage; Registry; Artificial Intelligence

The exponential financial growth around the world has led to widespread availability of high speed motorways paving the way for increased risk of accidents. The WHO report states that the road traffic deaths lead the list among the young between 5-29 years[1]. The data collected at the trauma centres help in the right understanding of the trauma epidemiology and projects the expected future trends. Use of a trauma registry to record the data would help in estimation of financial burden due to trauma, the identification of specific problems like faulty traffic signals, lack of reserved lanes for cyclists, absence of speed limits, dense traffic zones, *etc.* This would subsequently initiate measures such as trauma prevention in the form of close scrutiny by traffic police, surveillance by closed circuit television, traffic diversions, speed breaker road blocks and improved availability of trauma care centres[2].

Trauma epidemiology consists of demographic details of the population involved, the determinants or the causative factors and the variations across several timelines. The younger population between 18-30 years remain as the vulnerable group involved in trauma more frequently as they spend most of the time outdoors, engage in various activities such as education, sports, recreation, and work, which necessitate travel by vehicles. Male gender is the most affected in trauma due to engagement in various physical activities such as construction work. Unsafe driving practices such as drunken driving, speeding beyond safety limits, long distance night driving noted commonly in men make them vulnerable to trauma, especially in developing countries. In developed countries the male female gender differences are noted to be less[3,4]. Also trends in weather indicate summer as the susceptible period for trauma because majority prefer to stay out[5]. Sports and outdoor activities generally see a significant rise in the summer season, which increases the trauma risk as evidenced by literature[6,7]

Trauma includes self falls, domestic injuries, work place accidents in addition to road traffic accidents. Recognising the different trauma types helps in anticipating the injury severity, complexity of injury, instituting suitable management and appropriate

preventive strategies. For example work place injury calls for multidisciplinary trauma team capable of handling vascular, orthopaedic and visceral injuries. Injury prevention recommendations would require the data on mechanism of injury patterns[8].

Depending on the age group, appropriate interventions can be introduced. For example, in case of elderly, change in policies like arrangement of public transport for senior citizens, especially for health care has come out as a policy recommendation to tackle trauma related morbidity involving age group above 60 years. Bright street lights, prominent safety displays, speed limits, traffic management form the general recommendations of road safety. The level I trauma centre to which the trauma victims are transported, is expected to have a prompt retrieval team, trained staff at the centre and monitoring facilities for expert management[9].

A dedicated registry for trauma would accumulate the data for evaluating time trends, injury severity, organ or system-based outcome helping in evaluating the existing trauma policies and the need for regular revision as and when required. For example, upgraded car safety features like seat belts, air bags and child safe seats become mandatory in the vehicle manufacture as indicated by the data collected from the trauma data registry. As health care costs are escalating, allocation of resources needs to be made judiciously to ensure universal coverage. The data acquired from the robust level I centres and trauma registry act as the foundation on which the strong building blocks of national health policies tend to be formulated[10].

A well-equipped level I trauma centre forms the basis of trauma management. Prehospital triage, as the rapid response team, is required as an essential part of streamlining standard delivery of health care. Overall, trauma prevention is the principal target which can be achieved by the evaluation of authentic epidemiology data recorded in the trauma registry. Ensuring road safety and child safe home are parts of the entire picture of trauma prevention[11].

Artificial Intelligence (AI) holds the key to future developments in trauma management. Machine learning has removed the unpredictability of trauma care management. For example in a given trauma centre, based on the available

epidemiological data from the registry, admission volume, patient flow and surgical requirements can be predicted to reasonable accuracy using AI. This can translate into provision of optimal man power and other resources ensuring satisfactory outcomes. Thus, the ability of achieving optimal outcomes with limited resources is possible with AI[12].

In closing, the need for relevance of epidemiology data in trauma management cannot be over emphasized. The importance of trauma registry and its link to a well-equipped trauma centre is evident. Utility of AI is vital and likely to expand in the future to ensure effective trauma management.

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