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Fatal Road Accidents in Kerala (India): Characteristics, Causes and Remedial Measures

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ABSTRACT

This paper presents a brief overview of current fatal road accidents statistics in Kerala for the period from 2010-2013. It is found that each year at least 3881 major fatal accidents are occurred causing at least 4160 deaths and 41278 injuries in the state. Fatal accidents which occurred on Kerala are likely to involve heavy vehicles, especially buses, and likely to involve multi vehicle accidents. Excessive speeding and road & roadside hazardous conditions accelerate the severity of accident. This study specially assesses the contributory factors responsible for the occurrence of accidents at the most frequent locations. Improving safety of the road environment is now a great concern which emphasizes on wider application of proven road engineering measure at locations identified by systematic accident investigation and research.

KEYWORDS Fatal accidents, Road safety, Road Users, Countermeasures

INTRODUCTION

In Kerala, road transport has to bear solely the major part of passenger and freight movements. For this, it is now the most important mode of transport but ironically deaths from road traffic accidents (RTA) have been now characterized in this state as a hidden epidemic which affects all sectors of society. It is found that, of all total reported accidents, 13 percent are fatal and a considerable number of fatal accidents are occurring every year in which a large number of road users lose their lives in each accident. This paper assess prevalence of these fatal road traffic accidents (FRTAs) reporting to the newspapers, electronic media etc. and an analysis of the factors in relation to victims, vehicles and sites of impacts, accident pattern etc. Besides, this paper makes an attempt to prescribe some effective countermeasures pertaining to hosts (road users), the agents (vehicles) and the road environmental conditions.

CHARACTERISTICS OF FATAL ACCIDENTS IN KERALA

This section summarizes the findings of the fatal accident characteristics:

Accident Statistics

In total, there were 15525 reported fatal accidents over the period 2010-2013 which claims 16639 lives and injured at least 165115 people (Table 1). On average at least 3881 fatal accidents are occurred in each year resulting 1.06 fatalities and 10.64 casualties per accident.

TABLE – 1
FATAL ACCIDENTS IN KERALA

Year	Fatal Accidents	Persons Killed	Persons Injured	Fatalities/ accident	Injuries/ accident
2010	3644	3950	41473	1.08	11.38
2011	3896	4145	41379	1.06	10.62
2012	4013	4286	41915	1.06	10.44
2013	3972	4258	40346	1.07	10.15
Total	15525	16639	165115	1.06	10.64

Most Frequent Accident Types

Australian model guidelines (Andreassen, 1994) are used to describe the movements of the road users and vehicles involved in the accident event where different types of accidents are expressed by different codes. It is found that Head on type accidents which accounts for 44% of total accidents dominating the others. This is followed by Lost Control 23%, Hit object on/off road 19%. Rear end 11%.These four accidents types accounted for 97% of the total accidents.

Vehicle Involvement

Over involvement of Buses and Trucks: Of the total vehicles involved, 20 percent are buses, 12 percent are trucks and 20 percent are cars/taxi/ tempo. Heavy vehicles i.e., Buses and Trucks are involved in 32% of all fatal accidents. Each accident in which buses are involved claims 11.0 casualties (1.12 fatalities and 9.88 injuries) whereas for trucks each accident claims 7.0 casualties (1.09 fatalities and 5.91 injuries).

Single and Multi vehicle Accident: The study reveals that around 31% accidents are single vehicle and 69% are multi vehicle types for all over the states. Of the total multi vehicle involvement in accidents, 45 percent are occurred between the bus and others except truck (Fig 1). From Critical observation, it can be seen that most of the single vehicle accidents are Hit object on/off road and Lost control.

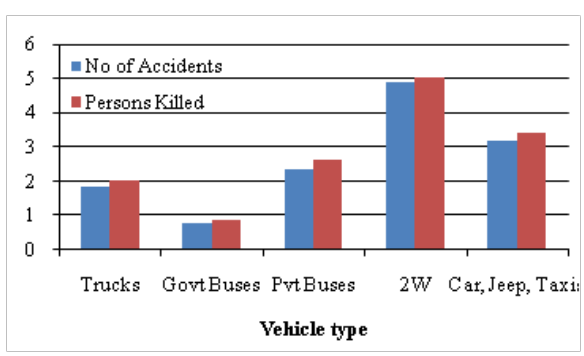


Figure 1: Vehicles involvement in Accidents

DISTRIBUTION OF FATAL ACCIDENTS

Accident by Routes

It is found that out of 15525 reported fatal accidents; 33% of fatal accidents are occurred in National Highways (NH47), (NH17), (NH49), (NH47A), (NH208), (NH212), (NH213), (NH220). It is followed, 21% of fatal accidents are occurred in state highways. In general, 46% of fatal accidents are occurred in other roads. In terms of blackspots, the fatal accidents occurring on Thadapadi-Edapally Highway (NH17) and

Kollam-Kumuli (NH220) are found to be most dangerous highways as at least 5.3 persons killed per accident.

Accident by Month and Time of Day
Effect of monthly variation in relation to number of accidents display that May month recorded maximum number 1476 cases (9.50%) followed by April (1443 cases, 9.46%) and December (1404 cases, 9.03%). Moreover from the frequency distribution of accidents for the various times of the day depict that the peak time of accident occurrence for fatal accidents is 06:00-06:59 p.m. (8 percent). Approx. one-fifth of the accidents are occurred between 7:00-8:59 a.m. (16 percent). Other time periods in which relatively high numbers of accidents occurrence are 2:00-2:59 p.m. (6.3 percent), 5.00- 5:59 a.m.(6.1 percent), 10:00-10:59 a.m. (5.3 percent), 9:00-9:59 a.m. (5.1 percent).

ROAD USERS INVOLVED IN ACCIDENT
The study observes that most economically active and productive people (25-44 years age groups) are the main victims of road accidents which are more than 50 percent of all victims. The other significant road accident victims groups are 20-24 years group (9 percent), 45-49 years group (4 percent). Children who are aged fewer than 18 represent a significant proportion (11 percent) of road accident casualties.

MAJOR ROAD ACCIDENT CAUSATIONS
Accidents constitute a complex phenomenon of multiple causation. The etiological factors are classified into human and environmental factors (Norman LG. 1962). In present era, population explosion, urbanization, tremendous growth of motorized as well as non-motorized and para-transit vehicles, solitary dominancy of road transport sector over other modes (viz. rail and water) are catalyzing factors for a number of accidents in Kerala.

Out of 15525 fatal accidents, 76 percent of accidents involved a human factor with 20 percent involving a road factor and just 4 percent involved a vehicle factor. The most frequently recorded factor is excessive speeding (57 per cent) which includes both ''speed in excess of the speed limit" and ''inappropriate speed for the conditions" and this is followed by overloading/ passenger carrying on bus roof or truck (12 percent) and careless/thoughtless/reckless driving (7 per cent).

IMPROVING ROAD SAFETY: DEVELOPMENT OF COUNTERMEASURES
Below is a summary of countermeasures which have the potential to reduce the number and severity of accidents. These summarized countermeasures are divided into two categories; Direct countermeasures which are directly related to road aspects and indirect countermeasures- which relates road safety indirectly.

Direct Countermeasures
Improvement of shoulders: Running-off-road and head on type collisions can be significantly reduced by shoulder widening and sealing.

Installation of median: The placement of road medians with flaring openings, provision of pedestrian refuge island will ensure pedestrian safety as well as will reduce the frequency and severity of accidents. Provision of median is a long term solution and has particular importance on reducing head- on collisions on national highways in Kerala.

Provision of NMT facilities: In addition to the installation of road signs, markings etc. construction of parallel service roads on both sides of a highway, protective raised walking and crossing facilities as well as installation of street lighting facilities should be provided in the locations where pedestrian and NMV activities are high.

Provision of delineation: Providing additional delineation as well as advance warning signs with advisory speed through sharp horizontal curves. It must be ensured that proper superelevation has been provided on horizontal curves and no shoulder drop-off problem has been created.

Road safety audit: Systematic examination of roadway elements for safety. A formal road safety audit process would focus on explicit safety implications and recommend desirable changes or modifications in highway design and operational aspects appropriate to the local safety needs/standards.

Indirect Countermeasures
- Road Users especially heavy vehicles drivers can be properly trained by authorized centers.
- Special provision on improving access to adequate pre-hospital and hospital trauma care for road crash victims must be set up on an emergency basis. There must have traffic aid posts at suitable distances on the highways to assist injured in case of accidents and quick transport of injured.
- Controlling speed as well as controlling errant behaviour of drivers appears to be the most effective ways to reduce accidents in Kerala and this can be ensured by addressing police enforcement system strictly. A change in driving behaviour ,regarding speed limit as well drunk driving, overtaking and overloading ,brought by legislation have led to large reduction in accidents.

CONCLUSIONS
This paper has mainly highlighted the general characteristics of fatal accidents and makes an attempt to establish the most common types of fatal accidents and the causal factors. It is found that Head on collision is the dominating type of fatal accident which clearly emphasizes on the provision of centre median or dividing strip in highways. Effective road safety countermeasures in accordance with accident pattern have been defined in this paper so that it could enable transport and road safety personnel to apply those countermeasures quickly and fruitfully in accident prone areas as well as to develop more comprehensive preventative actions on the basis of these analyses to combat the accidents in future.

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