Surveillance Data Analysis of Road Traffic Accident - Ethiopia, 2014 to 2017

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Abstract: Background: Road traffic accident is an event led to personal injury or damage to property that has taken place in an area intended for public transport or generally used for transport and in which at least one of the involved parties has been a moving vehicle. It accounts for 1.25 million deaths per year globally. Ethiopia is among most affected countries. Three years (2014 - 2017) eHMIS surveillance data of Road traffic accident was analyzed to describe the trends of morbidity and mortality based on sex, age, place and time.

Methodology: eHMIS Road Traffic accident data was reviewed retrospectively for the last three years; proportions, ratios, tables and graphs were used based on person, place and time variables and interpreted. Analysis was done by Microsoft Excel.

Result: Trend of RTA in Ethiopia increased from 58,000 to 90,000 over last three years. Male and adult age group has higher chance of being affected (contributed to 63.64% and 80.6% of total cases respectively). Oromiya region was affected most in 2014/15 and 2015/16 but SNNPR came on top in 2016/17. Harari region had highest incidence of injury; more than 2000 cases per 100000. Cases reached their peak during dry season of region. Conclusion and recommendation: Ethiopia’s burden of RTA was increasing against it’s plan. Being male and adult has greater risk of RTA. SNNPR, Afar, Somali, and Gambella region showed steep increment of trend. Harari region and Dire Dawa has much higher incidence than national level. High level political commitment, immediate decisions and actions are needed to halt problem.

Keywords: Road Traffic Accident; Ethiopia; eHMIS; trend

1. Introduction

Road traffic accident is one of leading cause of morbidity and mortality worldwide. According to WHO it accounts for 1.25 million death annually. As the number of vehicle increases the accident also increases. It results from a combination of factors related to the components of the system comprising roads, the environment, vehicles and road users, and the way they interact [1].

Road traffic crashes are a global and increasing public health concern. Road safety performance has traditionally been measured by the reduction of fatalities but road traffic crashes also cause very large numbers of nonfatal injuries, leading to huge economic and human costs to society [3].

The burden of the problem is higher in low and Middle income countries. It accounts about 80% of total global mortality and morbidity despite of lower proportion of vehicles available. It is increasing in recent years especially in sub-Saharan countries. It could be secondary to newer tradition of vehicle usage, poor infrastructure design, substance driving, lack of strict rule and regulation, lack of sufficient knowledge of rule and regulation and unboundedness to it [3].

The main risk factors for road traffic injuries can be classified as: Factors influencing exposure to risk, risk factors influencing crash involvement, risk factors influencing crash severity, risk factors influencing post-crash outcome of injuries [5]. According to the WHO’s 2009 global status report on road safety, the road crash fatality rate in Ethiopia was at least 114 deaths per 10,000 vehicles per year, compared to only 10 in the UK and Ireland and 60 across 39 sub-Saharan African countries. In addition, the number of people injured or killed in one crash in Ethiopia is about 30 times higher than...
that in the US [2]. According to WHO’s regression estimation Ethiopia accounts about 23,837 (CI
18528 to 29146) deaths each year.

It is great public health problem which is progressively increasing year to year. It requires detail
investigation in to the problem to identify risks, who are most affected and formulate a solution. To
help, this assessment is aimed to analyze three years (2007 E.C to 2009 E.C) eHMIS surveillance data
of Road traffic accident in Ethiopia as general to see pattern and trend of the accident.

2. Methods and Materials

Study Area: Analysis of road traffic accident data was done for Ethiopia as a whole.
Study Period: Data of RTA from July 2007 - July2009 E.C was collected, analyzed and interpreted
from June 20 to August 30/2017.
Study Design: retrospective record review of secondary data was conducted. .
Source population: Total population of Ethiopia who exposed to accident during study years.
Study Population: all Ethiopian population during 2007 to 2009 EFY.

Data Collection Procedure: Secondary data of RTA for consecutive three years from eHMIS
database was accessed and record was reviewed retrospectively for three years (2007 – 2009EFY) at
FMOH. Check lists on local database was used to access by Disease, Age category, Sex, Morbidity,
Mortality, Zone, Region, Nation, Month, and Year.

Case Definitions:
• Road Traffic Accident: is an event having led to personal injury or damage to
  property that has taken place in an area intended for public transport or generally
  used for transport and in which at least one of the involved parties has been a moving
  vehicle.
• eHMIS: is electronic database that contains health and health related services.
• EFY (Ethiopian Fiscal year) unique calendar system which start New Year from
  September, and lags 7/8 years behind G.C.

Data Analysis Procedure: The data were entered, cleaned and analyzed using Microsoft Excel
2010 in respect to important variables. Descriptive statistics including Proportion, percentage, ratios,
frequency tables and figures, were used for presenting the findings.

Data Variables: During data collection and analysis variables such as age category, and sex with
respect to time and place were considered accordingly.

Exclusion and inclusion criterion: All data extracted from the data base was used since it is
formatted initially.

Ethical Consideration: Official letter was written from, FMOH field epidemiology coordinator
to Policy and planning Directorate to access eHMIS data base.
3. Results

**Figure 1.** Trends of road traffic accident from 2007-2009 EFY (2014 to 2017).

**Figure 2.** Magnitude of cases in each year, Ethiopia.

The problem of Road traffic accident was increasing year to year in Ethiopia. In 2007 it was about 69,882 reported cases but in 2009 year it reached to about 100,628 cases. As it was clearly indicated the burden of morbidity was progressively increasing year to year. It increased from around 5,799 higher incidence in 2007 to 12,602 in 2009 EBY (see Fig. 1 and 2).

### Distribution of cases by sex

From total of 248,492 cases 158,134 (63.64%) were males; this could probably be due to risk of exposure and lack of carefulness on road use. Females were affected less than males; only contributing to 36.6 percent of all affected (Table 1).
Table 1. Frequency of cases by sex in Ethiopia from July 2007 - July 2009.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>90358</td>
<td>36.36</td>
</tr>
<tr>
<td>M</td>
<td>158134</td>
<td>63.64</td>
</tr>
<tr>
<td>Grand Total</td>
<td>248492</td>
<td>100</td>
</tr>
</tbody>
</table>

Distribution of cases by age

As shown in table 2 below, from 248501 total cases 200210 (80.6%) were adult age group. It was more than four times of the pediatrics age groups which both contributed for 48291 (19.4%) of total accident.

Incidence of cases per 100000 population, when seen by years, it was leading in Harari and Dire Dawa in all three years (fig.3).

Table 2. Frequencies of cases by age in Ethiopia from July 2007 - July 2009 EFY.

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>9011</td>
<td>3.6</td>
</tr>
<tr>
<td>5-14</td>
<td>39280</td>
<td>15.8</td>
</tr>
<tr>
<td>&gt;14</td>
<td>200210</td>
<td>80.6</td>
</tr>
<tr>
<td>Grand Total</td>
<td>248501</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 3. Comparisons of incidence per 100,000 in regions of Ethiopia, 2007 to 2009 EFY.

4. Discussion

In Ethiopia trend of morbidity and mortality is increasing year to year in the last three years. This could be due to increased population of vehicles, increased network of roads passing through areas which are not familiar to vehicles, increased activities of trade in rural area and absence or weak rule to control substance driving. This is similar to most low and middle income (LAMIC) countries especially, in the sub-Saharan region. Similar to this, study done in Ghana show that road traffic accident is persistently increasing since 2000 [11] [15]. The increment of cases could be due to multiple factors like increment of vehicle number, increment of population, bad behaviors of road users including drivers and pedestrians, substance driving and increased road network density passing through rural that are not familiar with the vehicles [5][10]; these risk factors can be concluded as epidemiological triads of Host, Agent and Environment.

Being male and adult age groups has higher risk of being exposed than women and younger age group in Ethiopia. From total of 248501 cases 200210 (80.6%) were adult age group and 158134 (63.64%) were males. It is indicated in this study that Adult males are highly affected in Ethiopia. In study conducted in Kenya it was shown that 73% of all fatalities were among young males who are
an economic assert to the society [8]. Similar study conducted in Addis Ababa Ethiopia, shows that from total of fatal crashes happened in Addis Ababa about 91.1% was male perpetrators with Adult Age group [7]. This could be due to increased outdoor activity of adults and risk taking behavior and substance use in males.

The incidence per 100000 populations is much higher in Harari region and Dire Dawa city. They have more than 2000 and 1500 incidences respectively, while other regions are below 300 incidences. Much higher than estimated incidence of African countries which is 65.2 per 100000 [17]. There might be some association between chewing chat and exhaustively working which can result to increased incidence. It is shown that Use of Amphetamines is about 5 times the risk of someone who hasn’t [1]. Therefore it requires further study to see the association between chewing chat and exposure to accident.

Limitations:

- Age classification in eHMIS is only into three: under five, five to fourteen and above fourteen.
- Since it is secondary data all Draw backs of eHMIS will affect the result of this surveillance analysis.

5. Conclusion and Recommendation:

Road traffic accident is one of amongst high public health concern. It increased tremendously over the last three years in Ethiopia. The reason for Increment could be due to triads of Epidemiological factors: host, agent and Environmental factors. Being male and adult had higher risk of being exposed to the accident. Therefore, to halt the trend or growth of cases it is necessary to act on at Host, Agent and Environmental level. It should be worked on to change behaviors of road users, setting rules and regulations, determine type and quality of vehicles to be used and appropriately designing and timely repairing of roads would help in control of the accident.

References

17. Person A., Road traffic accidents in Ethiopia: magnitude, causes and possible interventions, Advances in Transportation Studies an international Journal Section A 15 (2008)