iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** IV **Month of publication:** April 2018

DOI: http://doi.org/10.22214/ijraset.2018.4177

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

Road Safety Status in Top 20 Economies of the World

Amit Vashisth[1], Devender[2], Shashank Sharma[3]
[1, 2, 3,] *Assistant professor, Department of Civil Engineering, Panipat Institute of Engineering and Technology, Samalkha, Panipat, India*

Abstract: ***Almost 3400 person dies every day in the world. Fatalities due to road accidents will be in the third place among top ten causes of deaths in the world by 2020. Major road development program has been introduced in the past to make transport faster but the road safety issues are not tackled satisfactorily by the nations. This article is based on the global status report on road safety 2015 by W.H.O. Road safety scenario is compared of the top 20 economies of the world on the basis of different parameters such as fatalities among different road users, vehicle standards, road safety funding, implementation of road safety laws, and fatalities by alcohol. It is found that middle-income economies have 82% contribution to fatalities. High-income economies have a number of fatalities by Drink and Drive and are more dangerous for 4-wheeler road users. Middle-income economies are more dangerous for 2-wheelers and pedestrians.***
Keyword: Fatalities, Economies, Road safety, High-Income, Middle-Income

I. INTRODUCTION

As per the global status report on road safety (2015), annually 1.25 million people killed and 50 million injured in road crashes. Accidents cost more than US$ 500 Billion every year across the world, which is on an average 1%-3% of the GDP, this may be increased for lower and middle-income countries 1.8%-3% of the GDP and for high–income countries it is 2.2% to 4.6% according to Wijnen (2013). This shows the direct impact on the economy. It is quite difficult to measure road safety as it is an intersection of various parameters such as no. of fatalities, no. of a person injured, loss of property and other associated negative consequences (Van Wee et al. 2013). Also, (Road safety annual report 2015) by IRTAD suggest that, it is very difficult to compare the road accident data due to complications in comparison process among different nations because of incomplete and inaccurate data collection at the time of accident happens. Due to above limitations, we try to compare only top 20 economies of the world for road safety parameters. According to Wegman et al. (2015), crash data are collected and analyzed and measures to reduce accidents are suggested, this approach is known as a data-driven approach. Data analyzed in this article is based on the global status report on road safety which was presented by World Health Organization (WHO) in 2015. Bishai et al. (2003), found that Low-income and middle-income countries have more than 85% of all fatalities from road traffic injuries globally also it is revealed by national analysis that at all levels of government; Low-income countries have extremely low budgetary expenditure on road safety. Jacobs et al. (2000) estimated that costs of the road crash in Africa, Asia, Latin America and Caribbean, Middle-East, and Central and Eastern Europe sum up to $64.7 Billion. High-income countries account for 60% of motorized four-wheeler occupants in road crashes, on the other hand, Middle-income countries account for 40% and low-income countries have 34% of four-wheeler occupants involved in road crashes. Naci (2009) found that Public buses and trucks are majorly responsible for deaths of motorized four-wheeler occupants in low-income and middle-income countries. Also, WHO found that there is a decline in a number of fatalities in past years around the globe, but Koptis and Cropper (2005) suggests require detailed analysis in this area would be beneficial.

II. METHODOLOGY

Data were obtained from the latest global status report on road safety presented by W.H.O. it is observed that, even in same country there are different criteria for four wheeler motorized vehicle such as buses and trucks and cars as different road user categories but some sources took it as single road user category also different methods for reporting road traffic crashes are used. According to W.H.O report, in almost every country police force is the major authority for collection of road traffic accident data but underreporting is the major cause of inaccuracy in the data collection due to inadequate training and skill in these authorities. The main objective of the study is to analyze road safety scenario of top 20 economies of the world by comparing different parameters such as fatalities among different road users, road safety funding, implementation road safety laws, vehicle standards, fatalities by alcohol as an attribute, among top 20 economies of the world.

III. RESULTS AND DISCUSSIONS

A. Total Fatalities among top 20 economies by all Road users

It is observed that middle-income economies among top 20 in the world such as China, India, Brazil and Indonesia are more vulnerable to road accident fatalities and contribute more 80% (refer Figure 1) of the total fatalities among the list. It is also analyzed from the Figure 2, which High-income economies are more vulnerable for deaths among 4-wheeler road users but are safer for cyclists and pedestrians, despite the fact that these countries have the high standard of vehicle safety and score almost 7 out of 7, standardized around the world. On the other hand, middle-income economies are not safe for the pedestrians and cyclists and are more likely to be hit by other vehicle and poor vehicle standard and have the average score of not more than 3(refer figure 2 for vehicle safety standard score indicated by the country). Countries like India, China, Indonesia, Brazil, and Italy have topped the list with most no. of 2-3 wheeler road user fatalities, almost 25% of the total road deaths among 2-3 wheeler road users are there in top 20 economies of the world. It was also found that these countries have the most number of 2- Wheeler & 3-wheeler registered in the world. Surprisingly Countries like Korea, Japan, and Russia with the high level of vehicle safety standards which scores 7 out of 7, are not at all safe for the pedestrians as compare to other economies in the world. In a survey conducted by Japan Automobile Federation (JAF) it was found that 90% of road users in Japan do not stop at the crosswalks. (Vehicle standards mentioned above are as follows: Frontal impact, Side impact, Electric stability control, Pedestrian protection standard, Seatbelts and seatbelt anchorage and Child restraint regulations).

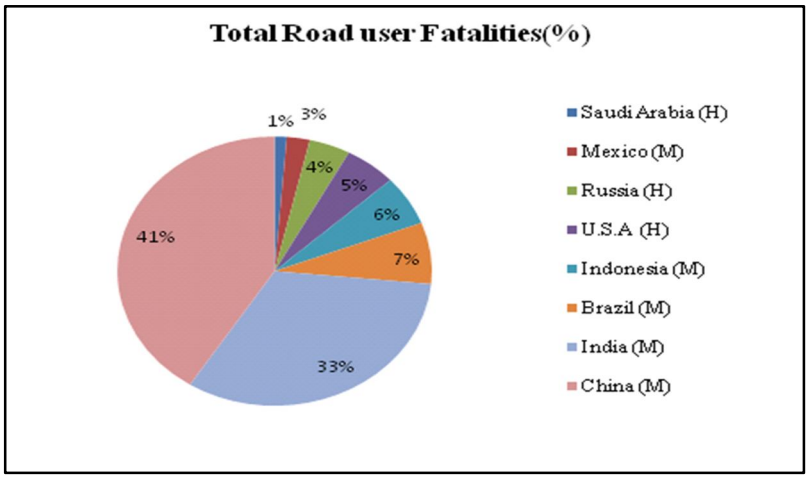


Fig. 1 Total Road accident fatalities

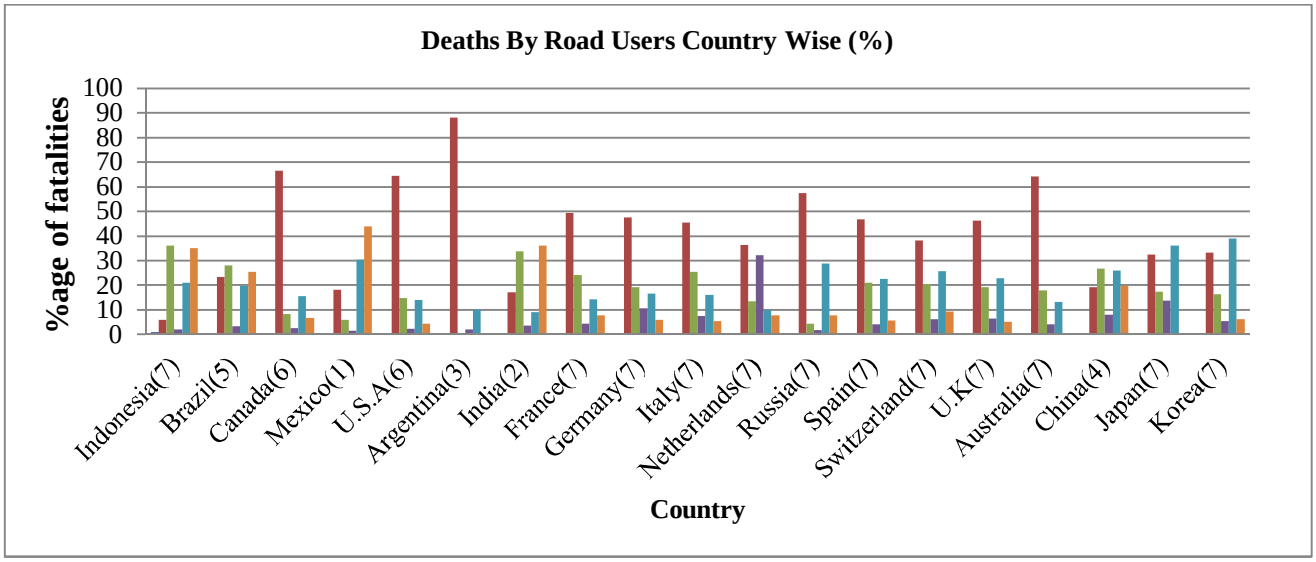


Fig. 2 Total Deaths by all Road Users

If we talk about of road fatalities per 100,000 road users (refer figure 3) then it represents quite same picture as in Figure 1, and shows Brazil, Russia, China, and India along with Saudi Arab. Saudi Arab has no vehicle standards and score 0 out of 7 and no data available for individual categories of different types of road user fatalities.

B. Fatalities attributed to alcohol country wise

Being the countries with the maximum score for vehicle safety standards, Canada, U.S.A, Australia, France, Italy, these countries are at the top of the list in fatalities due to alcohol as an attribute. China, India, and Mexico which contribute most to the death numbers among top 20 economies in the world are at lowest level in the list of deaths by alcohol by road users (Refer Figure 4). Countries shown in Figure 4 are indicated by (Y or N) which shows the countries have the stringent law for Drink and Drive or not i.e. Yes or No.

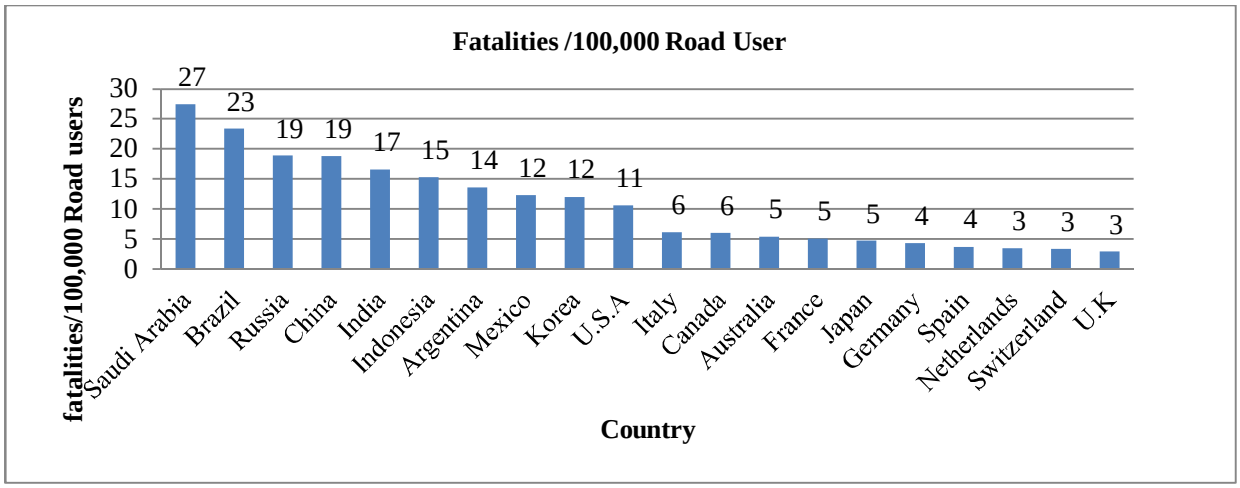


Fig. 3 Fatalities per 100,000 road users latest year

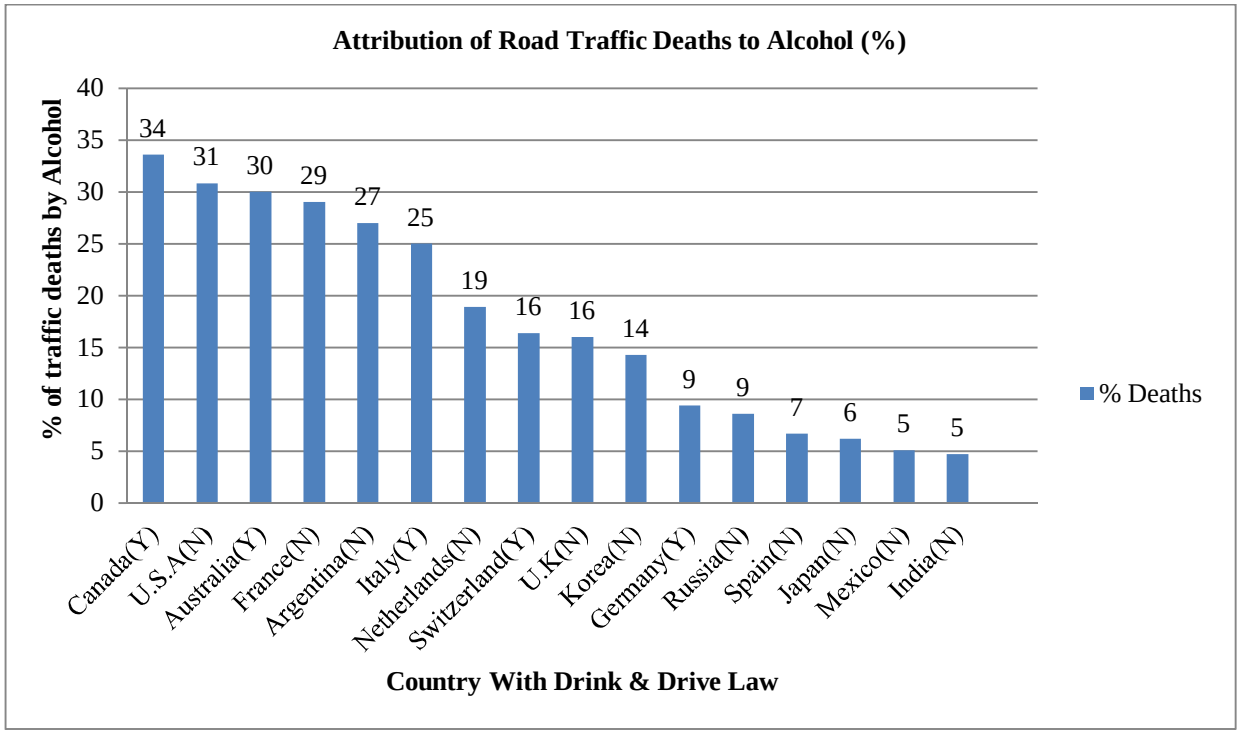


Fig. 4 Fatalities due alcohol by road users

C. Availability of Road Safety Funding and Stringent Laws

Only 7 out top 20 economies of the world have fully funded national road safety strategies and others have partial funding for road safety programmes except for Australia which has no funds allocated for road safety. Road safety funding criteria are not fixed for the countries and keep on fluctuating time to time-based on the priority. If we talk about traffic safety laws, only 7 out of 20 economies comply to the safe limit of Blood Alcohol Concentration (BAC) i.e. 0.04% for adult drivers and less than or equal to 0.02% for young drivers, same is the case with speed limits only 7 economies have the safe limit of 50km/hr as an urban maximum speed limit. Other 8-9 economies on the list have strict laws meet best practice and standard for helmets and child restraint (restrict children under a certain age from sitting in the front seat). Laws for seat belt are strictly followed by almost every country in the list, as seat belts are proved to be effective steps to be taken for reducing fatalities in road accidents. (Note: The entire standards including vehicle standards are suggested by United Nations World Forum for harmonization of vehicles regulations).

Table 1. National safety funding and Road safety laws

			Presence of stringent laws				
S.No.	Country	Funding for National road safety strategy	Drink &Drive	Speed	Child Restraint	Helmet	Seatbelt
1	Argentina	Fully	No	No	yes	yes	Yes
2	Brazil	Fully	yes	No	yes	yes	Yes
3	U.S.A	Fully	No	No	No	No	No
4	Indonesia	Fully	No	No	No	No	No
5	Spain	Fully	No	Yes	yes	No	Yes
6	Saudi Arabia	Fully	yes	No	No	No	Yes
7	Japan	Fully	No	No	No	yes	Yes
8	Australia	Not funded	yes	Yes	yes	yes	Yes
9	Canada	Partially	yes	Yes	No	yes	Yes
10	Mexico	Partially	No	No	No	No	No
11	India	Partially	No	No	No	No	Yes
12	France	Partially	No	Yes	yes	yes	Yes
13	Germany	Partially	yes	Yes	yes	No	Yes
14	Italy	Partially	yes	Yes	No	yes	Yes
15	Netherlands	Partially	yes	No	yes	No	Yes
16	Russia	Partially	No	No	yes	yes	Yes
17	Switzerland	Partially	yes	No	No	No	Yes
18	U.K	Partially	No	Yes	yes	yes	Yes
19	China	Partially	yes	No	No	No	Yes
20	Korea	Partially	No	No	No	No	Yes

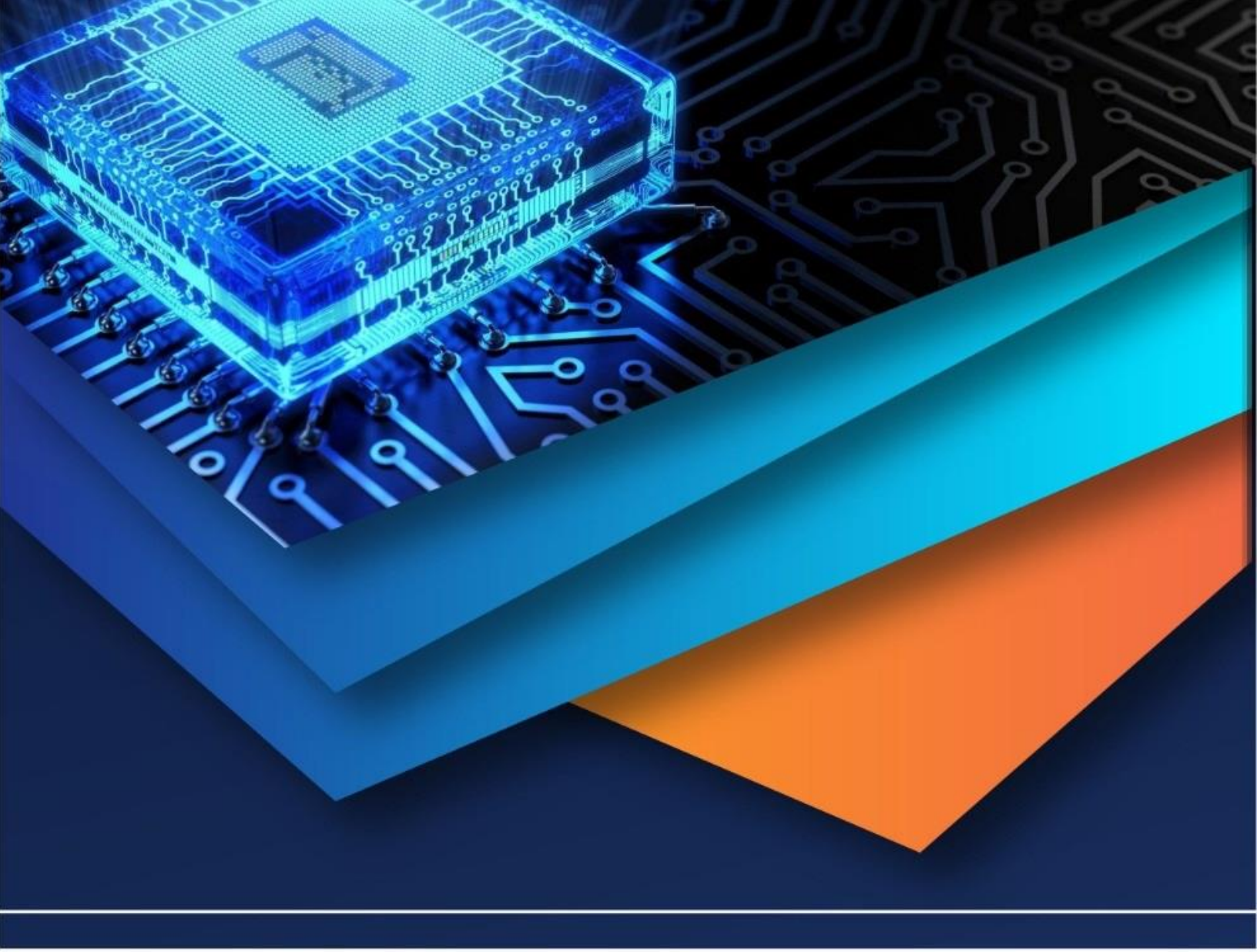
IV. CONCLUSION

Among top 20 economies of the world, middle-income countries contribute the most i.e. more than 80% of road accident fatalities. The reason may be inadequate road safety funding and improper implementation of the planning policies. It is found that high-income economies such as USA, Canada, and Australia are not at all safe for the 4-wheeler road user and have the most number of fatalities in this section despite the fact that they have high vehicle safety standards; on the other hand, middle-income economies are safer for 4-Wheelers on roads. Middle-income economies are more dangerous for 2-3 wheeler road users and have more than 30% fatalities. High-income countries are quite safe for pedestrians except for Japan and Korea and are high-income economies and topped the list with more than 35% fatalities for pedestrians, which shows the poor implementation of policy for pedestrians' safety on urban roads.

Another main reason for fatalities on roads is Drink and Drive; High-income economies have a number of registered deaths by alcohol on roads i.e. almost 30% as compare to Middle-Income countries which are as low as 5%. Fatalities on roads are directly or indirectly related to the implementation of road safety laws and strict laws can lead to decrease in the number of road accidents. Almost half of the top 20 economies do not have stringent laws for traffic safety and varies country wise except seat belt which is followed in almost every country in the list. Traffic safety funding and the policy implementation can play the key role in curbing a number of fatalities and injuries on roads, almost every except Australia has road safety funding i.e. fully or partially funded. Fatalities on roads in a country may depend upon implementation traffic laws, vehicle standards, planning of road safety policies and road safety funding but it is very difficult to derive the relationship between different causes and number of fatalities among countries as there are different methods, rules, and technologies used for accident data collection in every country. Wegman and Arts (2006) found that Safe system approach for sustainable safety is based on integral, proactive, ethical system-wide approach is responsible for reducing fatalities and injuries on roads Advances in technologies, awareness and proper implementation of traffic safety rules leads to reduction of road fatalities.

REFERENCES

[1]. World Health Organization, 2015. Global status report on road safety 2015. World Health Organization. Wijnen, W., 2013. Social costs of road traffic crashes: An international analysis'. In 16th Road Safety on Four Continents Conference (pp. 1-10).
[2]. van Wee, B., Annema, J.A. and Banister, D. eds., 2013. The transport system and transport policy: an introduction. Edward Elgar Publishing.
[3]. OECD/ITF, Road Safety Annual Report, 2015,IRTAD, Paris, 2015. Available on internet : https://www.itfoecd.org/sites/default/files/docs/15irtadannualreport_0.pdf
[4]. Wegman, F., Berg, H.Y., Cameron, I., Thompson, C., Siegrist, S. and Weijermars, W., 2015. Evidence-based and data-driven road safety management. IATSS research, 39(1), pp.19-25.
[5]. Bishai, D., Hyder, A.A., Ghaffar, A., Morrow, R.H. and Kobusingye, O., 2003. Rates of public investment for road safety in developing countries: case studies of Uganda and Pakistan. Health policy and planning, 18(2), pp.232-235.
[6]. Jacobs, G., Aeron-Thomas, A. and Astrop, A., 2000. Estimating global road fatalities. Naci, H., Chisholm, D. and Baker, T.D., 2009. Distribution of road traffic deaths by road user group: a global comparison. Injury prevention, 15(1), pp.55-59.
[7]. Kopits, E. and Cropper, M., 2005. Traffic fatalities and economic growth. Accident Analysis & Prevention, 37(1), pp.169-178.
[8]. Wegman, F. and Aarts, L., 2006. Advancing sustainable safety. Leidschendam: SWOV Institute for Road Safety Research.



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