

DISABILITIES AND ROAD TRAFFIC INCIDENT IN ETHIOPIA

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ABSTRACT

In Ethiopia one out of seven people has a disability. In 2018 from total population around 16 million were living with a disability. Disability probably caused by road traffic accidents. This study will also show that road traffic accidents are a cause of disability. Qualitative and quantitative data, growth, inflation and death rate, life expectancy used as input to define the number of serious road traffic injuries, total cost and the number of disabled person due to road traffic serious injuries. In the past fifty-one years from 1967-2018; the number of disabilities due to serious road traffic injuries were 73,433. It suggests that from 200 disabled people in Ethiopia in the 2018, one of them was disabled due to a road traffic accident. Based on the death rate in the past fifty-one years the study indicates that around 2581 peoples were died. So, in the 2018 fiscal year in Ethiopia it was expected that around 70,852 people were living with disability due to road traffic accidents. The dependency ratio in Ethiopia was 1:5. Due to disabilities caused by road traffic accidents more than 440,598 personnel were economically affected in the past fifty-one years.

Keywords: *Death Rate; Disability; Growth Rate; Inflation Rate; Serious Injuries*

1. INTRODUCTION

Disability is a physical, mental, cognitive, or developmental condition that impairs, interferes with, or limits a person's ability to engage in certain tasks or action or participate in typical daily activities and interactions [1]. Disability is complex, dynamic, multidimensional, and contested [2]. Disability is part of the human condition. Almost everyone will be temporarily or permanently impaired at some point in life [2]. Disability can be caused by factors related to general human activity. In most developing countries disability is viewed with a lack of consideration due to cultural influences, traditional bad practice, economic incapability and other related issues that bring social isolation and undermine the overall activity of the disabled. Ethiopia is one of the developing countries in which the effect of such practice on disabled was perceptible. The goal of this study is to define the impact of disability resulting from road traffic accidents on the economy, society and individuals in Ethiopia.

The report on disability by the World Bank and World Health Organization in 2011 estimated that 17.6% of the Ethiopian populations have a disability [3]. In Ethiopia, disability is generally considered to be a curse, so families as well as communities discriminate against people with disabilities [4]. In Ethiopia; one out of seven people has a disability [4]. This show that in 2018; from an estimated total population of 109,224,414 [5]; around 15,603,489 of the population was living with a disability. Like the overall population, more than 84% of the disabled are assumed to live in rural areas and therefore have limited access to basic services. The Ethiopian National Plan of Action of Persons with Disabilities (2012-2021) estimates that 95% of persons with disabilities in Ethiopia are living below the poverty line where the international poverty line is 1.9\$. Rehabilitation services in the country are also limited and concentrated in urban centers [6].

Road transport is an essential means of carrying people and goods but can have high costs in terms of adverse effects on health and welfare that cause a huge number of disabilities in this world [7]. Road accidents are mostly monitored through mortality and injury rates. Most traffic accidents rated as causing serious or heavy injuries are marked as a probable cause for traffic accident disabilities. More than 93% of road traffic deaths occur in low and middle-income countries [8]. Road traffic injury death rates are highest on the African continent [9]. Like other cause of human disability road injury cause a number of disabilities in this world. This shows that road traffic accidents have an adverse effect for the occurrences of disability in this world.

Ethiopia is one of the low income countries with a high traffic accident rate and a low level of motorized traffic compared to other parts of the world. In the 2017/18 fiscal year Ethiopia faced 20647 traffic accidents; from those 7754 were registered as causing serious or heavy injuries, that accounted for 38% of total road traffic accidents [10]. From the 2007/08 to the 2017/18 fiscal year in Ethiopia, in the past eleven years, the growth of road traffic accidents was 9.16% annually, on average [10]. Respectively; the growth rate of road traffic serious injuries in Ethiopia is on average, 11.39% annually for the past eleven years. This has an alarming impact on the increase of the number of disabled people in the country.

In India Up to 30% road traffic accident cases (survivors) suffer a disability either partial or complete [11]. In Stanford it was admitted that up to 24% of all patients who had been involved in a road traffic accident developed a disability. From the total number of disabled in Stanford only 28% of patients with a residual disability were admitted to hospital [12]. On reflective cohort study in Ethiopia on traffic accident in 2019; from 322 road traffic injured patients the overall recovery rate was 258 (80.1%). From 258 recovered road traffic injured patients, 134 (51.9%) of them had a permanent disability [13].

Road traffic accidents can result in a wide range of injuries. But, other injuries may leave road users disabled [14]. There are three types of disabilities that often result from road traffic accidents:

Temporary disabilities: - it is the most common disability caused by road traffic accidents. Minor injuries can impair you for a short time, but you can typically recover completely from them [14] [15].

Partial disabilities: - Injuries that result in long term disabilities. It hinders work and affects personal life but do not completely prevent engagement in regular activities. Partial disabilities may improve with treatment but typically don't result in a full recovery [14] [16].

Permanent disabilities: - severe and lifelong. Regardless of the severity, permanent disabilities often require significant life changes to accommodate them. In these cases, fair car accident settlements should reflect lifelong needs, both for loss of income and necessary ongoing medical care [14] [17].

As a result this study considers road traffic accident that result in slight injuries to be a temporary disability whereas; serious (heavy) injuries are classified as partial or permanent injuries. To define the goal of the study all serious injuries caused by road traffic accident were considered as causes for disabilities in Ethiopia due to road traffic accident.

1.1.Road Traffic Accident Victim Age in Ethiopia

Researchers agree that road traffic accidents and the risk of injuries depending on the age of victim in the Ethiopian road transport system. According to Abegaz et al. (2019), approximately half (47.1%) of the casualties were 15 to 29 age [18]. Whereas Mohammed

Seid et al. (2015) agree that the road traffic accident victims age ranged from 14-80 [19]. Damen Hailemariam also stated that deaths due to road traffic accident highest among the most economical active population of 15-59 years old [20]. Road traffic accident in the city mostly affected age categories 18-30, start declining after age of 31 [21]. A Persson also agree that most road traffic injuries occurred in the young and productive age group of 10-39 years old [22]. As a result; most researchers agree that traffic accident was mostly occurred at the working age of 15-64. So, the study considers 15 years as age line for the occurrences and victims for traffic accident in Ethiopia.

2. MATERIAL AND METHODS

This study uses both qualitative and quantitative data, and an analysis approach to develop meaningful output. The study uses traffic accident and disability data from secondary source like literature reviews and others. The study uses analysis traffic accident cost due to serious injuries, number of disability due to traffic accident in Ethiopia. The study also considers the growth rate, inflation rate, life expectancy and death rate in Ethiopia to define the number of road traffic serious injuries, total cost of serious injuries and the number of disabled person due to road traffic accident in the past fifty-one (51) years from 1967-2018. The study considers the 66 year as an average life expectancy of 2018 as a governing age of the study. Based on literature review on road traffic accident the victim age shown on table 1; the study considers 15 year being age base line to be victim. As a result; the past 51 years was considered to analysis the number of serious injuries, total cost of serious injuries, number of disabilities and others relating issues caused by road traffic accident in Ethiopia. The study considers serious injuries caused by road traffic accident as a source of disabilities in Ethiopia. Detail of analysis was discussed as shown below;

2.1.Growth rate (GR)

According to Bob Parker (2002); the percent change from one period to another period. It was calculated from the formula [23]

$GR = \left(\frac{V_{present} - V_{past}}{V_{past}} \right) * 100$	(1)
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To analysis the past road traffic serious injuries (V_{past}) the study uses;

$V_{past} = \frac{V_{present}}{(1+GR)}$	(2)
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Where: - GR - Percent Rate, $V_{present}$ - Present or Future Value, V_{past} - Past or Present Value

2.2.Accident Cost

To analyse the cost of road traffic accidents the study uses accident cost developed by [24] incorporating changes due to inflation which is accounted 10 percent per annum, average increase in wages or real changes in GDP for the past fifty-one (51) years from 1967-2018). As a result the study considers Accident Cost (AC) those causes disability or the severity injuries in consideration. Thus, Annual Average Accident Cost (ACa) is expressed in terms of Birr/year or \$/year, which is calculated using the following formula [25].

$ACa(SI) = \frac{A(SI)*MCA(SI)}{t}$	(3)
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Where: A_{Ca} - Annual Average Accident Cost, A - Number of accident Serious Injuries, MCA - Mean cost per accident and, t - Period of time under review, SI – Serious Injuries

Murad Mohammed identified the traffic accident cost for Ethiopia using Human Capital Method. The result of his analysis is presented in the table below and the result of the study depicted that fatalities have the highest costing while property damage has the lowest costing [24].

Table 1:- Accident Costing (million birr) in Ethiopia, Year 2009/10

Accident Cost in Ethiopia (Million Birr)			
Fatality	Series Injuries	Light Injuries	Property Damage
0.27	0.15	0.055	0.017

Source: Murad Muhammed (2011)

Table 2:- Road traffic Serious Injuries and it's Cost from 2008-2018 in Birr

Fiscal Year	Serious Injuries	Cost of Serious Injuries In Million Birr	Total Cost of Serious Injuries In Million Birr
2008	2156	0.122	263.03
2009	2276	0.135	307.26
2010	3494	0.150	524.10
2011	3545	0.165	584.93
2012	4333	0.182	788.61
2013	5042	0.200	1008.40
2014	6039	0.220	1328.58
2015	5918	0.242	1432.16
2016	6886	0.266	1831.68
2017	7288	0.292	2128.10
2018	7754	0.322	2496.79
Grand Sum	54731		12693.62

Source: Debela Deme (2019)

3. RESULT AND DISCUSSION

In this section, the study utilized to reach the outcomes findings in terms of number, cost, disabilities, and its impacts on economy and social welfare happen due to serious injuries caused by road traffic accident in Ethiopia in the past fifty-one year. In order to address the study specified objective the result was analyzed as shown below;

3.1.Road Traffic Serious Injuries in Ethiopia from 1967-2018:

Table 3 shown below indicates that yearly serious road traffic accident with a growth rate of 11.39% road traffic accident in Ethiopia from 1967-2018. This is based on the average life expectancy in Ethiopia in 2018 was 66 year. Different studies agree that those vulnerable to road traffic serious injuries were at an age of 15 and above. So, the study takes into consideration fifty one year in line with life expectancy of 2018 in determining the number of serious injuries in country.

Table 3:-Road Traffic Serious Injuries in Ethiopia from 1967-2018 fiscal year

FY	SI	CU	FY	SI	CU	FY	SI	CU
2018	7754	73433	2000	910	8669	1982	131	1049
2017	7288	65679	1999	817	7759	1981	117	919

2016	6886	58391	1998	733	6943	1980	105	802
2015	5918	51505	1997	658	6210	1979	94	696
2014	6039	45587	1996	591	5551	1978	85	602
2013	5042	39548	1995	530	4961	1977	76	517
2012	4333	34506	1994	476	4430	1976	68	441
2011	3545	30173	1993	428	3954	1975	61	373
2010	3494	26628	1992	384	3526	1974	55	311
2009	2276	23134	1991	345	3143	1973	49	256
2008	2156	20858	1990	309	2798	1972	44	207
2007	1936	18702	1989	278	2489	1971	40	163
2006	1738	16766	1988	249	2211	1970	36	123
2005	1560	15029	1987	224	1962	1969	32	87
2004	1400	13469	1986	201	1738	1968	29	55
2003	1257	12068	1985	180	1537	1967	26	26
2002	1129	10811	1984	162	1357	Grand Sum = 73,433		
2001	1013	9682	1983	145	1195			

Source: Debela Deme (2019) and Own calculation (2020)

Where; FY-Fiscal Year, SI-Serious Injuries, CU- Cumulative

The above table 3 shows that in Ethiopia in the past fifty one year from 1967-2018; the numbers of serious road traffic injuries were 73,433. It indicates; in Ethiopia it was expected that more than 73,433 disabled personnel was registered as being due to road traffic accidents.

3.2.Road traffic Serious Injuries Cost in Ethiopia from 1967-2018

In order to analyse total cost of road traffic injuries the study uses accident cost rate as shown in table 4 below;

Table 4:- Cost of Road Traffic Serious Injuries in Ethiopia (1953-2018 fiscal years) in Million Birr

FY	CSI	TCSI	CU	FY	CSI	TCS	CU	FY	CSI	TCS	CU
201	0.32	2496.7	13895.0	200	0.05	52.6	286.2	1982	0.01	1.36	7.1
201	0.29	2133.4	11398.2	199	0.05	43.0	233.5	1981	0.00	1.11	5.7
201	0.26	1832.4	9264.83	199	0.04	35.0	190.5	1980	0.00	0.91	4.6
201	0.24	1431.7	7432.36	199	0.04	28.6	155.4	1979	0.00	0.74	3.7
201	0.22	1328.1	6000.65	199	0.04	23.3	126.8	1978	0.00	0.60	2.9
201	0.20	1008.0	4672.49	199	0.03	19.0	103.4	1977	0.00	0.49	2.3
201	0.18	787.57	3664.41	199	0.03	15.5	84.38	1976	0.00	0.40	1.8
201	0.16	585.76	2876.85	199	0.03	12.7	68.81	1975	0.00	0.33	1.4
201	0.15	524.85	2291.08	199	0.02	10.3	56.11	1974	0.00	0.27	1.1
200	0.13	310.81	1766.23	199	0.02	8.46	45.74	1973	0.00	0.22	0.9
200	0.12	267.66	1455.42	199	0.02	6.91	37.27	1972	0.00	0.18	0.6
200	0.11	218.44	1187.76	198	0.02	5.64	30.37	1971	0.00	0.15	0.5
200	0.10	178.28	969.32	198	0.01	4.60	24.73	1970	0.00	0.12	0.3
200	0.09	145.50	791.04	198	0.01	3.75	20.13	1969	0.00	0.10	0.2
200	0.08	118.75	645.54	198	0.01	3.06	16.37	1968	0.00	0.08	0.1
200	0.07	96.91	526.79	198	0.01	2.50	13.31	1967	0.00	0.06	0.0
200	0.07	79.09	429.88	198	0.01	2.04	10.81	Grand Sum = 13895.01			
200	0.06	64.55	350.79	198	0.01	1.67	8.77				

Source: Murad Muhammad (2011) & Debela Deme (2019)

Where; FY-Fiscal Year, CSI-Cost of Serious Injuries, TCSI-Total Cost of Serious Injuries, CU-Cumulative

Table 4 shown above shows that in the past fifty one years from 1967-2018; in Ethiopia more than 14 billion birr was lost due to road traffic serious injuries. This shows that the country loses huge resources due to its road traffic accident rate.

3.3.Road Traffic Serious Injuries and Death Rate from 1953-2018

The study use the past fifty-one year data from 1967-2018 death rate to define the net number of Disable person due to road traffic serious injuries in the 2018. The death rate was taken from [26].

Table 5:- Death Rate and Road Traffic Serious Injuries in Ethiopia (1967-2018 fiscal year)

FY	SI	DR %	ND	FY	SI	DR %	ND	FY	SI	DR %	N
201	775	-2.61	-202	2000	910	-2.51	-23	1982	131	-1.83	-2
201	728	-2.68	-195	1999	817	-2.56	-21	1981	117	-1.86	-2
201	688	-3.28	-226	1998	733	-2.64	-19	1980	105	-1.90	-2
201	591	-3.39	-201	1997	658	-2.70	-18	1979	94	-1.94	-2
201	603	-3.51	-212	1996	591	-0.12	-1	1978	85	-1.97	-2
201	504	-3.63	-183	1995	530	-0.12	-1	1977	76	-2.42	-2
201	433	-3.77	-163	1994	476	-0.12	-1	1976	68	-2.48	-2
201	354	-4.86	-172	1993	428	-0.12	-1	1975	61	-2.55	-2
201	349	-5.10	-178	1992	384	-0.64	-2	1974	55	-2.12	-1
200	227	-5.37	-122	1991	345	-0.63	-2	1973	49	-2.16	-1
200	215	-5.68	-122	1990	309	-0.64	-2	1972	44	-2.21	-1
200	193	-6.03	-117	1989	278	-0.63	-2	1971	40	-2.26	-1
200	173	-4.22	-73	1988	249	-0.63	-2	1970	36	-2.31	-1
200	156	-4.42	-69	1987	224	-2.30	-5	1969	32	-2.37	-1
200	140	-4.61	-65	1986	201	-2.35	-5	1968	29	-2.36	-1
200	125	-4.84	-61	1985	180	-2.41	-4	1967	26	-2.42	-1
200	112	-5.08	-57	1984	162	-2.46	-4				
200	101	-2.44	-25	1983	145	-2.53	-4				
Sum		-2444				-115				-22	
Grand						-2581					

Source: UN Projection Macrotrends (2020), Debela Deme (2019) and Own Calculation (2020)

Where; FY-Fiscal Year, SI-Serious Injuries, DR%-Death Rate in Percent, ND-Number of Death, Negative Sign (-) reduction due to normal life experience fatality.

From table 5 above, the total number of serious injuries personnel due to traffic accident based on the life expectancy of 2018, the study indicates that around 2581 people died. This indicates that from the total of 73,433 seriously injured and resulting in disability in the past fifty-one (51) years from 1967-2018 in Ethiopia more than 3.6% of total serious injuries resulted in death. So, in the 2018 fiscal year in Ethiopia it was expected that around 70852 people lived with disability in Ethiopia due to road traffic accidents.

From the above overall analysis the study shows that from the total disability accounted for 15,603,489 in Ethiopia in 2018, more than 0.5% of disabilities were due to road traffic

accidents. It indicates that from 200 disabled personnel in Ethiopia in 2018 fiscal year one (1) of them was disabled due to a road traffic accident.

3.4.Economic Impact

Different researchers agree that in Ethiopia the dependency ratio was 1:5. This shows that, if a single person affected by a road traffic accident particularly faced serious injuries that caused disability, directly or indirectly five (5) people were probably affected in terms of economic mobility. As a result; based on the study the total number of people economically affected and alive in the past fifty-one year from 1967-2018 is around 440,598. In Ethiopia more than 95% of the disabled population lived below the poverty line. These shows that more than 69,762 disabled person were living in poverty due to serious injuries caused by to road traffic accidents. The poverty line in Ethiopia was 1.9\$. So, the disabled in Ethiopia have an income of below 1.9\$ per day. This may not sustain the life of those disabled people materially. So that population is mostly forced to beg from others to sustain their daily life in their day to day activities. As a result, those disabled people created by traffic accidents need additional support from non-governmental organizations, governmental agencies, and private investment (charities?) or charitable support in their daily lives.

3.5.Social Impact

In Ethiopia it was expected that from the total disabled population around 84 percent of the population was found in rural areas while the remaining 16 percent was found in urban areas. Meanwhile the study revealed that from the total population with a disability in the 2018 fiscal year in Ethiopia caused by traffic accidents around 59,516 were found in rural area, while; the remaining 11,336 were found in urban part of the country. For most people in the country due to cultural biases and tradition bad practices disability was considered as stigma for any social welfare and interaction. So the affected population is neglected and barred from daily social practices. This makes the disabled highly susceptible to other health and financial problems. As a result, the concerning body particularly the majority population must give priority to the disabled, give care, treatment and must perform the usual activities in a communal way in their everyday life.

4. CONCLUSION

This study analyses the number of disabled people in the past fifty-one years from 1967-2018 in Ethiopia with a disability caused by road traffic accident. In order to analysis the finding the study uses both qualitative and quantitative data. To reach the final outcome the study uses accident cost rate, growth rate, and inflation rate as main means to analyses the findings. Basically; the study considers the age 15 as the base line, 66 as life expectancy, and the death rate of the past fifty-one year as input to analyse the rate of road traffic serious injuries, number of disability, and the economic losses the country has faced due to road traffic accident.

The study indicates that in 2018 the number of serious injuries caused by traffic accident was 7754. As per the analysis the study also indicts that in year 1967 the number of serious injuries in Ethiopia was not more than 26 people. In the past fifty-one year more than 73,433 serious injuries were caused by road traffic accidents in Ethiopia. This indicates that in 2018; the rate of serious injuries in the country shows a multiple of 298 or whose growth rate of 29800% while compare with the 1967 fiscal year.

In line with this the study also indicates that in past fifty-one year due to serious injuries caused by road traffic accident the country has lost more than 14 billion birr. It also shows

that in 1967 Ethiopia lost not more than one million birr due to serious injuries caused by road traffic accidents. But in 2018 the country lost more than 2.5 billion birr due to serious injuries caused by road traffic accidents. This implies that economic losses of the country comparative to 1967; the rate was a multiple of 2497 in the 2018 fiscal year.

The study also indicates that 70852 people were left disabled by serious injuries caused by road traffic accident in the past fifty-one years from 1967-2018. This shows that from the total population affected by traffic accidents that caused serious injuries more than 3.5% lost their lives due to different factors. As a result; more than 96.5% of those affected by road traffic accident that caused serious injuries were left alive with their disabilities over the past fifty-one years from 1967-2018.

STATEMENT OF DECLARATION

I certify that research work titled "Disabilities and Road Traffic Incident in Ethiopia" our own work. The work has not been presented elsewhere for assessment. Material and data used in this study were available and the source has been properly acknowledged / referred.

ACKNOWLEDGMENT

It gives great pleasure to honor those who contributed their precious time in reviewing and commenting the report while conducting this research. We are very glad to thank all family members for their appreciation and consistent care towards all our efforts.

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