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Road Traffic Crash Cost Human Capital Approach: A Case Study of Kailali District

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Abstract

Road traffic crashes continue to impose substantial economic and social burdens, particularly in developing countries such as Nepal, where resources for road safety are limited. This study employs the Human Capital Approach to estimate the costs of road traffic crashes in Kailali District for the fiscal years 2022–23 and 2023–24. The costs associated with crashes were categorized into six main components: lost productivity, quality of life losses, medical expenses, property damage, damage-only crashes, and administrative costs. Using secondary data obtained from traffic police records, hospitals, insurance companies, and other relevant sources, the study found that the average age of fatality was 38 years in 2022–23 and 37 years in 2023–24. Between 2022–23 and 2023–24, the total economic cost of road crashes rose by 38.93%, reflecting a growing financial and social burden. Among the cost components, lost productivity remained the largest contributor, followed by quality of life losses. Although medical expenses, property damage, administrative costs, and damage-only crashes accounted for smaller proportions of the total cost, they showed a noticeable upward trend. These findings highlight the pressing need for comprehensive and effective road safety measures in Kailali District to mitigate both the human and economic impacts of traffic crashes.

Keywords: Crash Cost; developing country; Fatalities; Human Capital Approach; Road traffic crashes.

1. Introduction

Traffic crashes are a pressing global concern, imposing significant economic and social burdens. Each year, most countries lose more than 3% of their GDP due to road traffic crashes, with the main contributors being medical expenses, lost productivity from injuries and fatalities, and damage to vehicles and infrastructure (WHO, 2018). The impact is particularly severe in low- and middle-income countries, which, despite possessing only 60% of the world's motor vehicles, account for 92% of all road traffic fatalities. This imbalance exacerbates economic hardship, especially for low-income families who are often ill-prepared to cover sudden medical bills or funeral expenses (World Bank, 2024).

The Human Capital Approach (HCA), which takes into account both direct costs (such as medical bills, property damage, and administrative fees) and indirect costs (such as lost productivity, pain, and suffering), is frequently used to estimate the costs of traffic crashes. According to studies, crashes in underdeveloped countries may go unreported, which could result in an underestimating of their actual economic impact (Mofadal and Kanitpong, 2016).

The working-age population (18–59 years old) is disproportionately affected by fatal traffic crashes, which has long-term financial consequences for both households and entire countries. Families may become exhaust and their dependent ratios may rise as a result of losing their principal provider, thereby taxing social welfare systems (World Bank, 2024).

Road traffic crashes in Nepal have been increasing steadily over the past decade, posing serious economic and social challenges. According to national data, the number of crashes rose from 8,484 in FY 2012/13 to 24,537 in FY 2021/22, while fatalities increased from 1,816 to 2,883 during the same period. These figures reflect a worrying upward trend, highlighting the growing burden of road crash on individuals, families, and society. Although Nepal has formulated a National Road Safety Action Plan (2021–2030) and set clear targets to reduce fatalities, implementation has been limited, with less than half of the planned interventions under the "safer roads and

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mobility" pillar completed. The causes of crashes are multifaceted, involving human error, vehicle issues, and road and environmental conditions. While only a small proportion of crashes are directly due to roadway factors, the inclusion of roadside conditions raises this contribution to nearly one-third, emphasizing the critical role of road design and maintenance in preventing crashes (Tiwari, H. and Luitel, S., 2023).

Within this national context, Sudurpashchim Province emerges as one of the least prioritized regions for road safety initiatives. Limited infrastructure, and low public awareness contribute to a higher risk of crashes. These challenges underscore the urgent need for targeted measures to improve road conditions and promote road safety education.

Karnali Province, characterized by mountainous terrain and challenging road conditions, faces a similarly critical situation. Between 2018 and 2024, the province recorded over 3,000 vehicle crashes, resulting in nearly 800 fatalities and more than 6,000 injuries. The combination of difficult terrain, adverse weather, and insufficient road safety measures makes travel in Karnali particularly hazardous. Efforts are ongoing to improve infrastructure and implement road safety programs, but the region continues to demand focused attention to reduce the human and economic costs of traffic crashes (Khadka, R., Tiwari, B., Acharya, U.P., BC, U.B., Adhikari, R. and Thapa, K., 2024).

At the district level, Kailali mirrors this broader pattern, with traffic crashes causing substantial economic and social impacts. A comprehensive assessment of costs including lost productivity, quality of life losses, medical expenses, property damage, damage-only crashes, and administrative costs is vital for grasping the local consequences of road crashes and for designing interventions that are both targeted and effective.

1. Research Objective

The primary objective of this research is to estimates the total economic burden due to road traffic crashes in the Kailali District, applying the Human Capital Approach.

2. Literature Review

A study by (Azmi, A.A., Ram, S. 2024) reviewed various methods for calculating the costs of road crashes, including the Human Capital Approach (HCA), the Willingness-to-Pay method and others. The researchers found that the HCA is particularly well-suited for developing countries, as it captures key factors like lost productivity and medical expenses while remaining practical even when detailed economic data is scarce. Based on these findings, the study recommends using the HCA to estimate road crash costs. (Chin, H. C., Hague, M. M., and Jean, Y. H., 2006) attempt to update the cost estimates of road traffic crashes studied by the Asian Development Bank (ADB) that has shown the annual cost of road traffic crashes in 2001 was US$699.36 million which was 0.5% of the annual GDP. More precise methods of computing the human cost, lost output and property damage are adopted which grew in an annual cost of US$610.3 million or 0.338% of the annual GDP in 2003. A more conservative estimate of U$878,000 for fatal crash is also obtained, compared to the earlier figure of US$1.4 million. This study has shown that it is necessary to update the annual traffic crash costs regularly, as the figures vary with the number of crash which change with time.

(Samikshya Rizal, Hemant Tiwari, 2023) This paper study estimate the total road crash cost of Kathmandu Valley, which shares 7.8 % to 9.2% of fatalities and 52.5% to 60.5% of crashes of Nepal; based on the crash database for the fiscal year 2007 to 2020. The detailed road crash database was collected from Traffic police. The primary data regarding vehicle damage cost and medical cost was obtained from purposive convenient sampling, whereas insurance data was collected from sampled companies. Human Capital Approach was used for calculation of crash costing. The average age of fatalities was found to be 34 years, which is an economically active age group. The total cost of road crashes in Kathmandu Valley for the fiscal year 2020 was calculated a NRs. 1827.67 million. Among various components of crash cost, the total cost of lost output share 46.28 %, Vehicle damage cost shares 36.27 %, Medical cost shares 2.16 %, Administrative cost shares 6.01 % and Quality of life shares 9.25 % respectively.

3. Methodology

The research was conducted as shown in Figure 1 The research begins with literature review of past study on crash cost component followed by selection of study area.

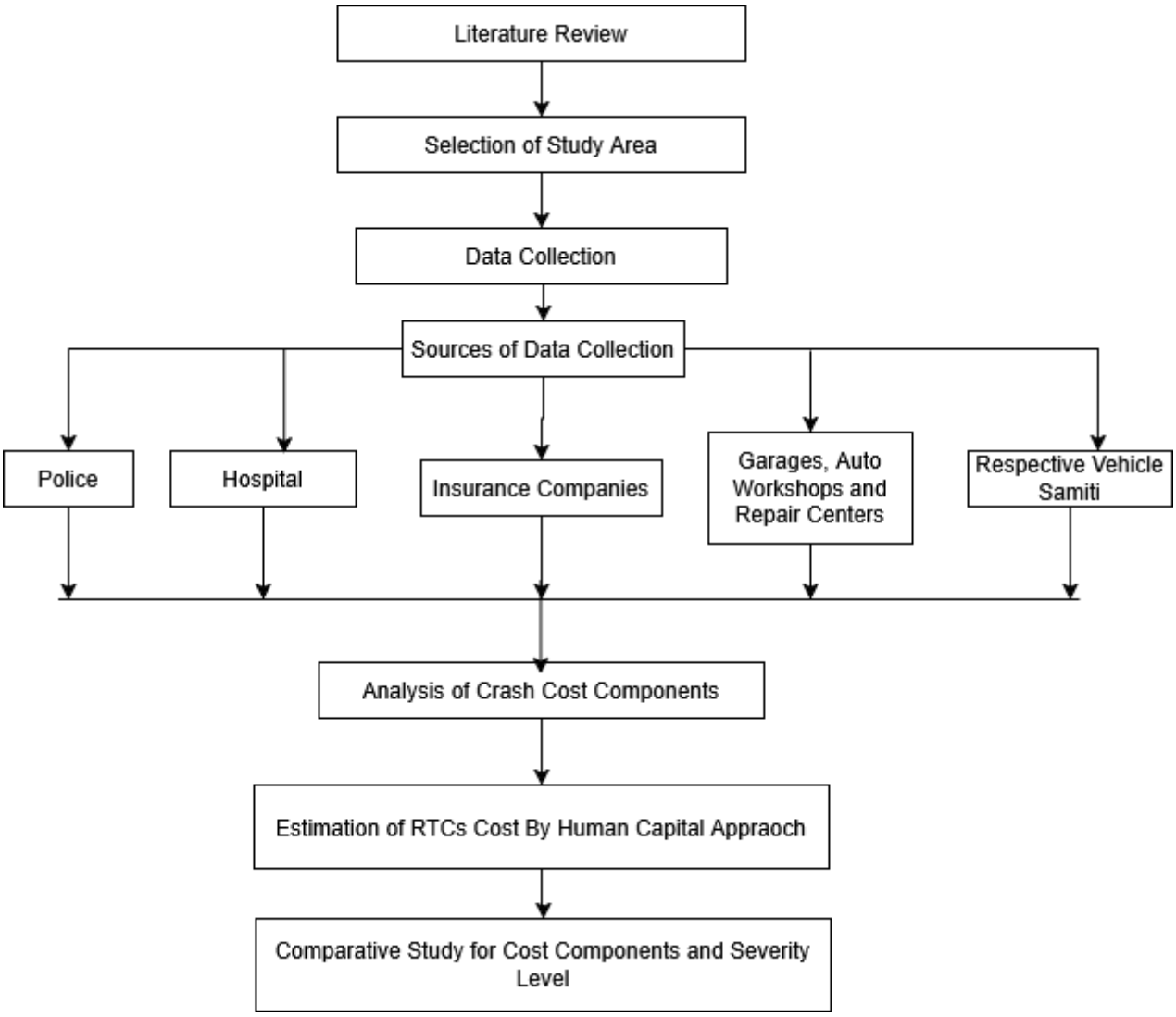

Figure 1: Flow Chart of Methodology

The crash data of FY2022-2023 to 2023-2024 were collected from the District Traffic Police, kailali. The number of crashes and their severity level were necessary data for the calculation of total crash cost. Collected crash data were shorted as per number of crashes, severity of the crash, type of vehicle involved, and age of victims. The data collection includes the data from secondary source: Police, Hospitals, Insurance company, Auto Workshop and respective vehicle operator committee. Questionnaire survey was done while collecting data from vehicle operator committee and Auto workshop for damage only crash. The age of person involved in fatal crash was calculated from police data and wage rate from Kailali district rate to calculate loss output, for medical cost data were obtained from the record maintained by hospital in software. Vehicle damage cost data are obtained from three non- life insurance company. The purposive convenient sampling technique was adopted. Three non-life insurance company were chosen for this study. The claim amount for vehicle damage of different types of vehicles was collected for the year FY 2022/2023 and FY2023/2024 from those three insurance companies. And the number of

damage only crash was obtained by questionnaire with Traffic police regarding the number of vehicles with damage only crash and most common type of damage and from Auto Repair Center the question regarding number and type of vehicle that visit to repair center involving in damage only crash, time taken to repair the vehicle and average cost of vehicle. The quality of life cost was calculated using Net output method and administrative cost was calculated as percentage basis suggested by Sillock and TRL.

The calculation of road crash cost using Human Capital Approach include estimation of loss of productivity, quality of life cost, medical cost, property damage cost, damage only crash cost and administrative cost as explained in following section.

3.1 Loss of Productivity

The economic loss resulting from a person's inability to work due to injury or fatality caused by a crash. It includes lost wages as explained in (Adam I.A. Mofadal, 2016) -

Fatality loss of output= [No. fatalities] * [foregoing income per year using i=0nW1+rn where, (1) W = average year per capita GDP, r = discount/interest rate, n = average number of years of lost productivity per crash fatality

Major Injury loss of output= [No. of serious injuries] * [No. of days in hospital +No. of follow up days] * [average wage per day]

Minor Injury loss of output= [No. 0f minor injuries]*[No. of days in hospital] +No. of follow up days] * [average wage per day]

Lost output of care taker= [No. of injuries by severity] * [No. of day to take care] *[average wage per day] *No. of career to injury =1:1

3.2 Quality of Life cost

The economic valuation of the loss of well-being and life satisfaction due to a fatal crash. It represents the non-economic burden on the victim's family and society, including emotional distress, grief, and the irreversible loss of life. Quality of life cost is equal to difference in amount he/she can earn if alive and amount he/she consumes during life time. The amount that would have been earned is represented by the lost productivity of fatalities. The amount consumed was obtained from the Nepal Living Standards Survey from 1995 to 2023 conducted by National Statistical data. According to national statistical data, the average annual nominal consumption per capita was estimated at NRs. 156,330. This value was calculated as the mean consumption of the top 20% richest households and the bottom 20% poorest households.

3.3 Medical costs

For calculating medical cost firstly administrative department of each hospital was visited and emergency register of the patient were obtained. The RTC cases were filtered out and the date of crash, age and gender with date of admission of patient was verified. The matched detail of patient, along with IPD number were noted and made available to IT section. Using that IPD number, the details about patient, regarding date of admission, date of discharge, Emergency cost, Medicine cost and total cost excluding the emergency and medical cost were obtained. Data was obtained from all selected hospital. Data was collected for out patients only.

The expenses incurred for the treatment of crash victims, including emergency care, hospitalization, medication, and follow-up treatments. The medical cost is calculated for injury crash only and the cost is categorized as emergency cost, medicine cost and total cost excluding EC and MC and calculated as mentioned below (database of hospital):-

Major and Minor Injury Emergency cost (EC) per fatal crash =Total Emergency cost from software maintained by hospital divided by numbers of major and minor injury for fatal crash.

Major and Minor Injury Medicine cost (MC) per fatal crash = Total Medicine cost from software maintained

by hospital divided by numbers of major and minor injury for fatal crash.

Major and Minor Injury total cost excluding EC and MC per fatal crash = Total cost exclusive of EC and MC from software maintained by hospital divided by numbers of major and minor injury for fatal crash.

Major and Minor Injury Emergency cost (EC) per Injury crash =Total Emergency cost from software maintained by hospital divided by numbers of major and minor injury for injury crash.

Major and Minor Injury Medicine cost (MC) per Injury crash =Total Medical cost from software maintained by hospital divided by numbers of major and minor injury for injury crash.

Major and Minor Injury total cost excluding EC and MC per Injury crash =Total Emergency cost from software maintained by hospital divided by numbers of major and minor injury for injury crash.

3.4 Property Damage Costs

The financial loss due to damage to vehicles. This includes repair or replacement costs for vehicles, and revenue lost due to vehicle being out of work. It was calculated as explained below:

Vehicle Damage cost = [No. of total vehicles damaged] * [average vehicle damage *costs]*.

*Vehicle Detention cost = Total numbers of vehicle repaired * Average vehicles repaired period *average revenue generated per day.*

3.5 Damage only crash cost

The cost associated with crashes that result in property damage but do not involve injuries or fatalities. The above crash cost component contribute to the total cost resulting from causality crashes. However, there are also a significant number of road-crashes which do not involve any causalities but vehicle damage or damage only road traffic crash. The cost for those vehicles having the minor type of damage which generally involved in road traffic crash but not reported were obtained from the inquiry with the Traffic Police according to which generally 40% total crash were damage only crash. Then the weighted average unit cost for the vehicles involved in damage only road traffic crash was determined with the percentage of involvement of vehicle in a road traffic crash was calculated. Finally, the total cost of damage only road traffic cost was calculated as the product of the number of vehicles involved in damage only crashes with the weighted average unit cost of vehicles.

3.6 Administrative cost

Police, court, and insurance costs are all included in administrative costs. First, the total resource cost was determined as recommended by the Transport Research Laboratory due to the challenge of measuring the administrative cost. The total resources cost was calculated by adding the costs of lost productivity, medical cost and property damage cost. For fatal crashes, the administrative cost was calculated to be 0.2% of the total resource cost. According to Silcock and Transport Research Laboratory (2003), the administration cost for major injury was calculated to be 4% of the total resource cost, whereas the administrative cost for minor crashes was calculated to be 14% of the total resource cost and 10% of damage-only crashes.

Total Cost of Road Crash=Total Causality Cost+ Total Damage Only Cost

4. Result and Discussion

4.1 Human Cost

4.1.1 Lost productivity

The average age of fatality was 38 and 37 years for respective fiscal year. The retirement age is 58 years. And the year lost for respective fiscal year was obtained by subtracting fatality age from retirement age which was found to be 20 and 21 years respectively.

The average rate was NRs. 1016 per day and NRs. 1065 per day for FY 2022-23 and FY 2023-24 respectively. The yearly wage rate per fatality was found to be NRs. 370,680 and NRs. 388563 respectively. As per 2017 RTI costing study in Nepal the total length of hospitalization was 7 days and follow-up days were 20. So, the total lost days for major injury was 27 days and 3 days for minor injury (Tiwari, H., Adhikari, A., & Bhatt, M. (2023)].

Table 1 Average lost output per Road Traffic Crashes

Lost output	Time	Cost/unit	Cost
Fatality			
F/Y 2022/23	20 years	NRs. 3,70,680 discounted @ 3%/yr.	NRs. 58,85,464
F/Y 2023/24	21 years	NRs. 3,88,563 discounted @ 3%/yr.	NRs. 63,78,264
Major			
F/Y 2022/23	27 days	NRs. 1016/day x 27	NRs.27,432
F/Y 2023/24	27 days	NRs. 1065/day x 27	NRs.28,755
Minor			
F/Y 2022/23	3 days	NRs. 1016/day x 3	NRs.3,048
F/Y 2023/24	3 days	NRs. 1065/day x 3	NRs.3,195

The average lost output per fatality, major injury and minor injury was found to be NRs.58,85,464, NRs. 27,432 and NRs. 3,048 respectively for FY 2022-23. For FY 2023-24 average lost output per fatality, major injury and minor injury was found to be NRs.63,78,264, NRs. 28,755 and NRs. 3,195 respectively.

Table 2 Total Cost of Lost Output of Road Traffic Crashes

Casualty	**Fatal Crash**					
	Cost per casualty (NRs.)		**No of casualty involved**		**Cost (NRs.)**	
F/Y	2022/23	2023/24	2022/23	2023/24	2022/23	2023/24
Fatality	5885464	6378264	1	1.02	5885464	6474905
Major	27432	28755	0.42	0.47	11472	13506
Minor	3048	3195	0.87	0.52	2660	1646
Care taker lost cost						
Major	27432	28755	0.42	0.47	11472	13506
Minor	3048	3195	0.87	0.52	2660	1646
Cost of lost output per fatal crash					5913728	6505209
Total cost of lost output for fatal crashes			55	66	325255027	429343787
Casualty	**Injury Crash**					
	Cost per casualty (NRs.)		**No of casualty involved**		**Cost (NRs.)**	
	2022/23	2023/24	2022/23	2023/24	2022/23	2023/24
Fatality	-	-	-	-	-	-
Major	27432	28755	1.32	1.14	36119	32666
Minor	3048	3195	0.78	0.69	2388	2198
Care taker lost cost						

Major	27432	28755	1.32	1.14	36119	32666
Minor	3048	3195	0.78	0.69	2388	2198
Cost of lost output per injury crash					77013	69728
Total cost of lost output for injury crashes			60	125	4620768	8715960
Total cost of lost output of RTC					329875795	438059747

The number of causality involved as fatality, major and minor injury was found to be 1, 0.42, 0.87 respectively per fatal crash for FY 2022-23 and for FY 2023-24 it was found to be 1.02, 0.47, 0.52 respectively. And per injury crash the number of causality involved as major and minor injury was found to be 1.32 and 0.78 respectively for FY 2022-23 and for FY 2023-24 it was found to be 1.14 and 0.69 respectively. The total cost of lost output was calculated as NRs. 329,875,795 and NRs. 438,059,747 for FY 2022-23 and FY 2023-24 respectively.

5.1.2 Quality of life costs

The amount earned is equal to lost productivity of fatalities and amount consumed was obtained from the study survey of Nepal living life standard from 1995 to 2023 conducted by National Statistical data found to be Nrs.156330 per year. Therefore, the cost of quality of life was found as NRs.151,721,047 and NRs.207366302 respectively for FY 2022-23 and FY2023-24.

5.1.3 Medical costs

The medical costs associated with road traffic crashes (RTC) in Kailali District for the fiscal years 2022–23 and 2023–24, broken down by crash type (fatal and injury) and severity (major and minor). For fatal crashes, the medical costs per casualty are highest for major injuries, with emergency costs (EC), medicine costs (MC), and other medical expenses totaling 177,405 NRs per casualty in 2022–23 and 181,590 NRs in 2023–24. Minor casualties in fatal crashes incur lower costs, with total costs per casualty around 26,727 NRs in 2022–23 and 27,850 NRs in 2023–24. The total medical cost of fatal crashes increased from approximately 4.26 million NRs in 2022–23 to 5.25 million NRs in 2023–24.

For injury crashes, major casualties also have the highest cost per casualty, averaging over 177,405 NRs in 2022–23 and 181,590 NRs in 2023–24, while minor casualties have significantly lower costs. The total medical cost of injury crashes rose sharply from around 12.2 million NRs in 2022–23 to 22.5 million NRs in 2023–24, reflecting both an increase in the number of casualties and higher treatment costs. Overall, the total medical cost of all road traffic crashes increased from about 20.63 million NRs in 2022–23 to 34.79 million NRs in 2023–24, indicating a substantial rise in the economic burden of traffic-related injuries and fatalities over the two-year period.

5.2 Property Damage Costs

5.2.1 Vehicle Damage Costs

The vehicle damage cost data has been analyze based on data obtained from insurance data and workshop data. From the insurance records, the amount paid for damage due to crash was obtained for each category of vehicles and same was also obtained from Workshop. The overall mean value was calculated. Thus, the overall mean value cost of Commercial vehicles, Private cars, and Motorcycles for FY2022-23 was NRs. 1,95,970, NRs. 2,16,500 and NRs. 71,261 respectively and similarly the overall mean value cost of Commercial vehicles, Private cars, and Motorcycles for FY2023-24 was NRs. 229,632, NRs.181,392 and NRs. 1,55,830 respectively.

Table 3 Average vehicle damage cost

Source	**Average Cost (NRs.)**					
	Commercial		**Private Car**		**Motorcycle**	
	22/23	**23/24**	**22/23**	**23/24**	**22/23**	**23/24**
Sagarmatha Insurance	134,623	272,419	168,139	165,330	168,879	364,781

NLG Insurance	201,189	279,575	197,528	370,400	26,827	111,250
IGI PRUDENTIAL INSURANCE LIMITED	166,150	219,571	198,833	71,200	38,750	90,000
Auto Repair Workshop	281,917	146,961	301,498	118,636	50,587	57,289
Overall average	195,970	229,632	216,500	181,392	71,261	155,830

Table 4 Net vehicle damage cost

Vehicle Type	F/Y	Repair Cost (NRs.)	Duty (25%) and Vat (13%) on spare parts (NRs.)	Estimated Salvage Value (NRs.)	Survey Fee (NRs.)	Net Vehicle Damage Cost (NRs.)
Commercial	22-23	195,970	49,646	19,597	12,000	138,727
	23-24	229,632	58,173	22,963	12,000	160,495
Private Car	22-23	216,500	54,847	21,650	10,000	150,003
	23-24	181,392	45,953	18,139	10,000	127,300
Motorcycle	22-23	71,261	18,053	7,126	9000	55,082
	23-24	155,830	39,477	15,583	9000	109,770

The net vehicle damage cost was calculated adding a survey fee to calculated overall mean value with deduction of salvage value and duties and a value-added tax of the spare parts. In this study, the cost of spare parts was assumed as 2/3 of the cost of repair with including 25% duty and 13% VAT as per 2007 RTC cost study. The salvage value was taken as 10% as per inquiry with insurance companies and also surveyor fee was obtained by consulting with insurance companies. Therefore, net vehicle damage cost for FY2022-23 for commercial vehicles, private cars and motorcycles was calculated as NRs. 138,727, NRs. 150,003 and NRs. 55,082 respectively and NRs. 160,495, NRs. 127,300 and NRs. 109,770 respectively for FY2023-24.

The vehicle damage cost per fatal crash was calculated as NRs.129,190 and NRs.191,007 per injury crash for FY2022-23 and for FY2023-24 vehicle damage cost per fatal crash was calculated as NRs.144,569 and NRs.196,132 per injury crash. Similarly, the total vehicle damage cost for fatal crashes was calculated as NRs.7,105,445 and NRs.9,541,566 for respective year. Also total vehicle damage cost for injury crashes was calculated as NRs.11,460,395 and NRs. 24,516,525 for respective year. The total vehicle damage cost of RTC was calculated as NRs.18,565,840 and NRs.34,058,091 for particular FY respectively.

Table 5 Total vehicle damage cost

	Fatal Crash						**Injury Crash**					
Vehicle damage cost	Average Repair cost (NRs.)		Number of vehicles involved		Cost (NRs.)		Average Repair cost		Number of vehicles involved		Cost (NRs.)	
	22-23	23-24	22-23	23-24	22-23	23-24	22-23	23-24	22-23	23-24	22-23	23-24
	114,604	132,522	1.13	1.09	129,190	144,569	114,604	132,522	1.67	1.48	191007	196,132

Total number of fatal crashes	55	66		Total number of injury crashes	60	125
Total vehicle damage cost for fatal crashes		7,105,445	9,541,566	Total vehicle damage cost for injury crashes	11460395	24,516,525
Total vehicle damage cost of RTC					**18,565,840**	**34,058,091**

5.2.2 Vehicle Detention Costs

The average vehicle detention cost per fatal crash was NRs.84,930 and NRs.46,165 respectively and per injury crash was NRs.103,393 and NRs.117,335 for respective fiscal year. For FY2022-23 the total vehicle detention cost for fatal and injury crash was NRs.4,671,162 and NRs.3,046,871 respectively. and FY2023-24 the total vehicle detention cost for fatal and injury crash was NRs.6,203,599 and NRs.14,666,912 respectively Therefore, total cost of vehicle detention was calculated as NRs.10,874,761 and NRs.17,713,782 for FY2022-23 and FY2023-24 respectively.

5.3 Damage only Crash Costs

The total numbers of damage only crash was obtained as 85 and 125 respectively for FY 2022-23 and FY 2023-24. The average repair cost for damage only crash was calculated as NRs. 20,361 and NRs. 34,000 respectively. The number of vehicle involvement per damage only crash was obtained as 1.67 and 1.49 for respective FY which was determined by dividing the value of the difference between the total number of vehicle involvement and number of vehicles involved in fatal crash with the value of the difference between total road crash and fatal road crash. The cost per damage only crash of vehicles was NRs. 33,935 and NRs.50,726 respectively for FY2022-23 and FY2023-24. And the total damage only crash cost of the vehicle was calculated as NRs.2,884,491 and NRs. 6,340,726 for respective fiscal year.

5.4 Administrative Costs

The administrative cost per fatal crash was NRs.15,844 and NRs.18,664 for respective fiscal year and administrative cost per injury crash was NRs. 112,668 and NRs.109,593 for respective year. The administrative cost for damage only crash per crash was NRs.3,394 and NRs.5,073 for respective year. The total administrative cost for fatal crash was Nrs.871,433 and Nrs.1,231,828 for respective fiscal year and for injury crash it was NRs.6,760,076 and NRs.13,699,125 respectively for respective fiscal year. Therefore, the total administrative cost was NRs. 7,631,509 and NRs. 14,930,953 respectively for respective year.

5.5 Total Crash Costs

The total cost of casualty crashes in Kailali District for the year 2022-2023 and 2023-2024 was NRs.524,187,855 and NRs.753,262,918 respectively.

Table 6 Total crash cost and component contribution

Cost Component	**Total Cost (NRs.)**		**Percentage**	
	F/Y: 2022-23	**F/Y: 2023-24**	**F/Y: 2022-23**	**F/Y: 2023-24**
Lost Output	329,875,795	438,059,747	60.84%	58.15%
Quality of life	151,721,047	207,366,302	27.98%	27.53%
Medical Cost	20,634,412	34,793,316	3.81%	4.62%

Property damage cost	29,440,601	51,771,874	5.43%	6.87%
Damage Only Crash	2,884,491	6,340,726	0.53%	0.84%
Administrative cost	7,631,509	14,930,953	1.41%	1.98%
Total	542,187,855	753,262,918	100%	100%

The largest contribution to costs is lost output, which accounted for 60.84% in 2022–2023 and 58.15% in 2023–2024. As the quality of life lost cost was calculated using net output method it results as the second highest contributor making up 27.98% in FY2022–23 and 27.53% in FY2023–24.

In FY 2023–2024, the percentage of medical expenses increased from 3.81% in FY 2022–2023 to 4.62%. This rise implies that increasingly severe injuries requiring continuous care are placing a greater burden on the healthcare system. The cost of property damage increased significantly from 5.43% in FY 2022–2023 to 6.87% in FY 2023–2024.

Similarly administrative cost and damage only crash contribute 1.41% and 0.53% respectively for FY2022–23 and 1.98% and 0.84% respectively for FY2023–24.

5. Conclusion

Road traffic crash costing provides the basis for the allocation of sufficient financial resources to decision maker and to those concerned with road safety. Human capital approach method was used for calculating the total road crash cost.

Traffic crash costs in Kailali District was found to be increased by 38.93% from NPR 542.19 million during FY 2022–2023 to NPR 753.26 million during FY 2023–2024. The highest cost component of the road crash cost was lost productivity.

The analysis reveals that traffic crashes place a substantial financial burden on society, arising not only from serious injuries and fatalities but also from minor crashes and the administrative costs associated with them. Although damage-only and administrative expenses account for a smaller share of the total cost, their rising trend suggests that even minor crashes are becoming increasingly costly. These findings underscore the importance of implementing comprehensive strategies aimed at reducing both the frequency and severity of traffic crashes, thereby lessening their overall economic impact.

7. Recommendation and future study

The achieved results and findings of the total road traffic crash cost study in Kailali district using HC crash costing valuation method highlighted the following recommendation as below:

- It would be better to consider the costs from government and private hospitals separately rather than using just an average rate. Doing this would give a clearer and more accurate picture of crash costs.
- There are some crash cost components such as loss due to non- vehicle damage cost, long term disability cost and travel delay cost for road users, which have not been included in this study due to lack of data. These three cost component would be part future crash costing studies in Kailali District.

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