

New Law Enforcement Impact on the Prevention of Road Accidents in Kosovo

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Abstract

The strengthening of law enforcement is one aspect of traffic accident prevention initiatives that is not to be overlooked. Studies have shown that increasing law enforcement can have an impact of up to 8% (a case study in Sweden). Since the Law on Traffic Safety was replaced in 2016 with the Law on Traffic Regulations, we have been examining the Kosovo instance to determine the effects of stepping up law enforcement. The impact will be measured using statistical data from prior years and the time frame after the new law's implementation. Only those traffic fines that were directly related to the causes of accidents were used in the analysis, which compared the increase and decline of these numbers over time. The objective is to determine the ultimate actions or modifications that will have the greatest impact by measuring the impact in real values. Given that the trend of accidents by causes may be tracked for all kinds of road accidents, the high number of traffic fines classified according to the causes of accidents is a new development in the field of studies on the relationship between measures and the number of accidents.

Keywords: Road Traffic; Road Accidents; Accident Analysis; Legislation; Law Enforcement; Statistical Analysis.

1. Introduction

Nowadays, there are a lot of traffic accidents throughout all of Europe. Their number is high in most countries, and in certain instances, it is growing. A plan to reduce the number of accidents has been carried out, and certain steps have been taken in that direction. Introducing new laws or updating existing ones is one of the strategies. The high rate of road accidents and their deadly consequences are a major worry in Kosovo, a developing European nation. The goal of ongoing legislative improvements is to lower the number of traffic accidents. The current Traffic Law has undergone revisions and modifications in recent years, including in 2016. In this paper, we have examined the extent to which these modifications have helped to lower the number of traffic accidents. To determine whether legislative actions can be effective and help reduce the number of traffic accidents, data from the Police Registry has been gathered, examined, and evaluated.

Due to societal shifts, Kosovo's legal framework for traffic safety has changed. The Basics of Road Traffic Safety Law (No. 50/88) governed this topic from 1999 to 2008 [1]. The Law on Road Safety (NO. 02/L-70) has been in effect since 2008. The Law on Road Traffic Rules (05/L-088) [2], which superseded the earlier ones, went into effect in 2016. When the current law was being implemented, it was found that certain penalties for breaking the laws that could have

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led to accidents were relatively "soft" (for example, exceeding the speed limit in residential zones). Additionally, the delays in the competent courts' determination of the appropriate punishment contributed to a decline in road vehicle drivers' adherence to traffic laws [3], which in turn increased the frequency of accidents and their aftermath. The paper will discuss the effects of new laws and legislative changes on traffic accidents, as well as the outcomes that followed. Charts and tables will be used to display the data and findings.

2. Literature Review

Castillo-Manzano et al. (2019) [4] examine how stepping up law enforcement affects preventing accidents in Spain by using tighter driving laws that are linked to higher road safety. They announce that the courts will be enforcing harsher fines, ex. speeding. The effects of modifications to the Penal Code outweigh those of penalty points; radar speed checks seem to be a useful tool for reducing fatalities; alcohol-related DUI offenses are strongly linked to traffic deaths; and traffic police officers play a crucial role in both preventing violations and enhancing road safety. Borsati et al. (2019) [5] investigated the change in the number of fatal accidents on the ASPI toll highways (Italy) after the installation of a speed monitoring system. This changed driver behavior, resulting in a reduction in the total number of accidents and fatalities on the monitored toll roadways. Also, during the development of highway coverage with the speed monitoring system, they determined the ratio of coverage increase to accident reduction (3.9% for every 10% increase in coverage), but the effect of fatal accidents was not determined in the causal aspect.

Bates et al. (2012) [6] discuss the role of policing - law enforcement in reducing traffic accidents through police actions, technology installation, and penalty enforcement. In summary, it is considered that the presence of the police is essential for both law enforcement and the decrease of road accidents. Feng et al. (2020) [7] investigate the impact of increased law enforcement by establishing a link between the frequency of accidents and police activity. They conclude that in areas with a high number of accidents but a low number of penalties, there is a lack of law enforcement, whereas in areas with a low number of accidents but a high number of penalties, there is a strengthening of law enforcement (Figure 1).

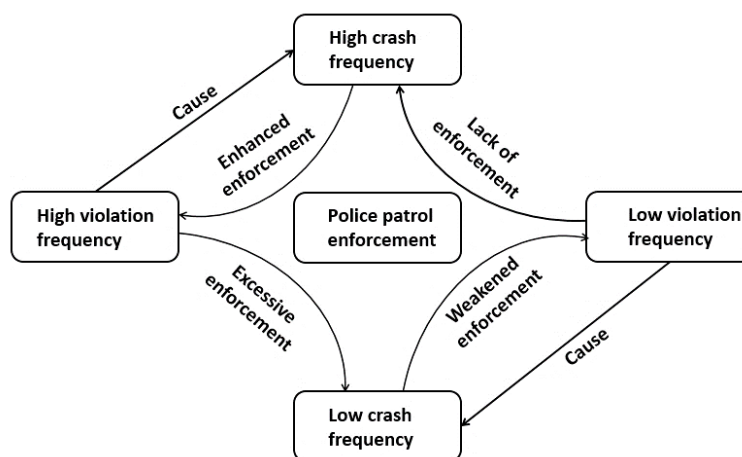


Figure 1. Relation between law enforcement and traffic accidents [7]

DeAngelo et al. (2014) [8] investigated the impact of law enforcement on the prevention of traffic accidents, depending on police presence on roadways and penalties. In this way, they assess the preventive effect of the police predicted by Becker's economic model of crime more directly than many earlier studies in this area. Celicious et al. (2023) [9] investigate the impact of traffic law enforcement on the adoption of pedestrian safety standards in Dipolog City, Philippines. They used a quantitative, descriptive-correlational research approach and collected information from 304 drivers and 92 pedestrians. The survey discovered that drivers and pedestrians were both highly perceived in terms of enforcing traffic laws.

SWOV Institute for Road Safety Research Hague (2019) [10] presented traffic enforcement solutions in their case study for Estonia, tasked with the implementation of state policy and development, management responsibilities, and the supervision and enforcement of traffic safety. They also demonstrate the use of ICT technology for traffic enforcement. Castillo-Manzano et al. (2019) [11] describe safety policies developed in the United States to control speeds and speed limits. They conducted a meta-analysis of a series of econometric studies on the effects of increasing speed limits on traffic fatalities in the United States. They conclude that climbing legal speed limits could reduce state-wide fatality rates in relative terms, though the effect would be minor.

Primanto et al. (2022) [12] describe the outcomes of the new law implementation in Indonesia in 2009 concerning Road Traffic and Transportation. They find that the Traffic and Road Transport Law Policy's Effectiveness in Reducing

the Violation Rate of Highway Users has not been adequately implemented. Many violations are still committed by two-wheeled and four-wheeled motorcyclists. du Plessis et al. (2020) [13] use the South African road safety situation as a case study to investigate parts of the interactions between formal institutions, law enforcement, and informal institutions. They conclude that improved legal enforcement alone will not fix the problem and that additional improvements to the informal organizations that shape road users' behavior are required.

Dodiawan et al. (2021) [14] investigate the implementation of Electronic Traffic Law Enforcement (ETLE) and the challenges in adopting ETLE in the context of traffic law enforcement at the Blora Police Traffic Unit in Indonesia. The technique of approach utilized is sociological juridical, descriptive analytical research specifications, types, and sources of data utilizing primary and secondary data. Methods for gathering data are field studies and literature studies, and data analysis is done using qualitative analysis. The findings revealed that ETLE implementation occurs in stages, beginning with CCTV installation, data recording of offenders, identification of the Smart Resident Center (SRC), mailing letters to violators, confirmation, and ticket issuance. Basili et al. (2015) [15] present the impact of hybrid penalties in traffic, i.e., the use of both monetary and non-monetary fines, and indicate that one possible motivation for this type of sanction is to target group-specific deterrence. Their findings suggest that when repeated offenses are involved, well-designed hybrid punishments, such as the penalty point system used in traffic law enforcement, may indeed boost overall deterrence.

Based on the studies reviewed, the writers assess law enforcement's role in accident prevention in several ways. The writers concentrate on the outcomes of accidents and some of the causes in order to assess the impact. Apart from the consequences split by the cause of the accidents, they are compared in this study with the drivers who were punished for the same reason and thus have a predominance in causing the accident. This method of analysis, in addition to the connection that exists between them, can help law enforcement agencies direct resources and conduct specific measures for each of the causes. Overall, they believe that the new Traffic Law enforcement didn't improve everything that was expected, but it did lead to a reduction in traffic accidents.

This research contributes to the methodology of traffic accident analysis by focusing on the causes of traffic accidents and the outcomes of each of them following the adoption of the new Law. As a result, not all causes of accidents have decreased, and not all measures have had the intended outcomes, but the majority of the findings are encouraging.

3. Research Methodology

The statistical and comparative approach of the specific reports of the Kosovo Police was used to identify the influence of the new law implementation on the decrease in road accidents. This is done on an annual basis. The paper includes qualitative and quantitative analysis in the form of tables and graphs. The figures used span three years: the year before the new law went into effect (2015), the year of implementation (2016), and the following year (2017). Figure 2 shows the flowchart of the research methodology through which the objectives of this study were achieved.

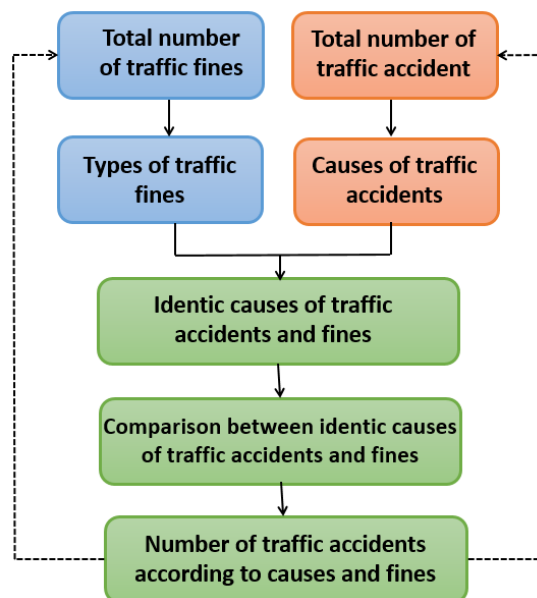


Figure 2. Flowchart of the research methodology

4. Statistics on Traffic Accidents in Kosovo

Because of the country's transition, the statistical data on road accidents has changed in terms of reporting and analysis. To estimate the impact of the law's strengthening, the data was separated into one-year periods based on the most recent legal modifications within a four-year timeframe. Data was extracted from the Traffic Department database

of the Kosovo Police. The research strategy concentrated on the number of traffic accidents, their causes, and the number of fines. The number of fines not related to accident causes was the excluded parameter.

The number of fatalities per 1 million inhabitants in Kosovo for 2022 and 2021 is 59, which is higher than the European average of 45 [16-19], and on level with Poland, but lower than Romania, Bulgaria, Lithuania, and Croatia (Figure 3). North Macedonia has the lowest number in the region of Western Balkans (56). The average number of deaths per 1 million inhabitants in Western Balkan countries is significantly higher (70) than in European countries (45) (Figure 4).

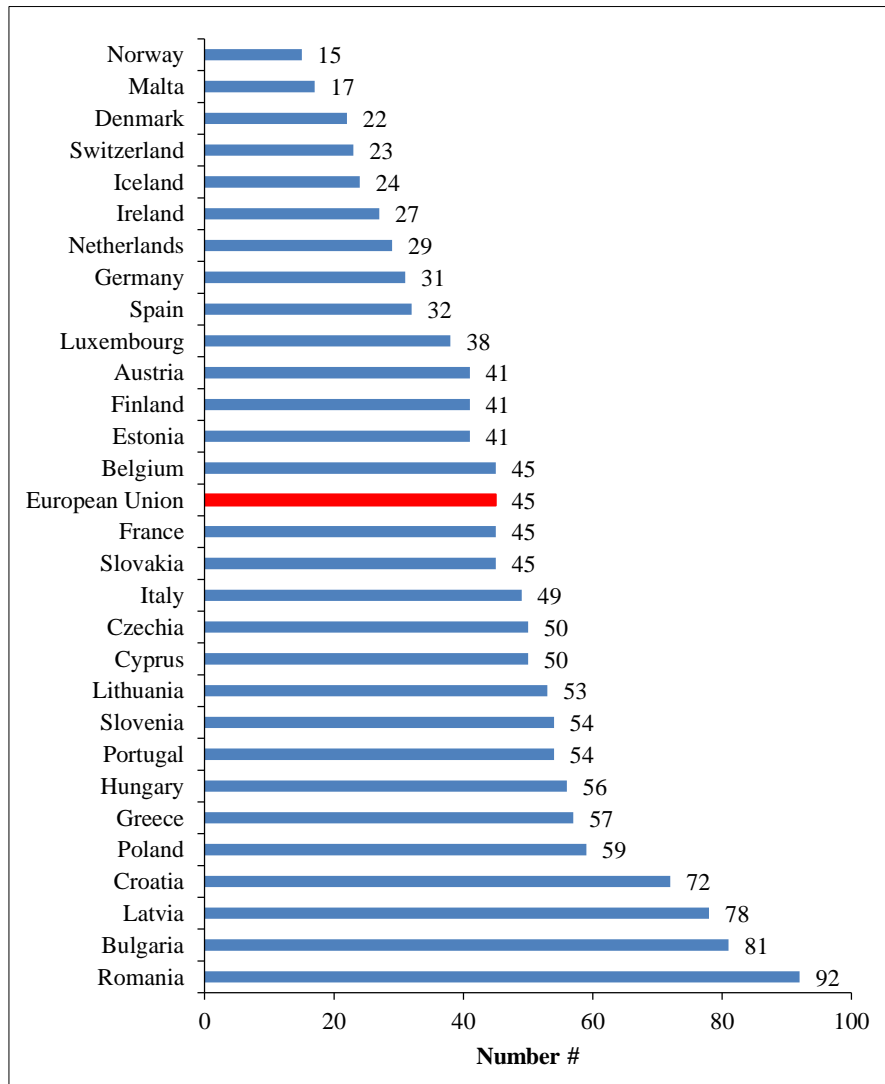


Figure 3. The number of deceased from traffic accidents per 1 million inhabitants in Europe for 2021

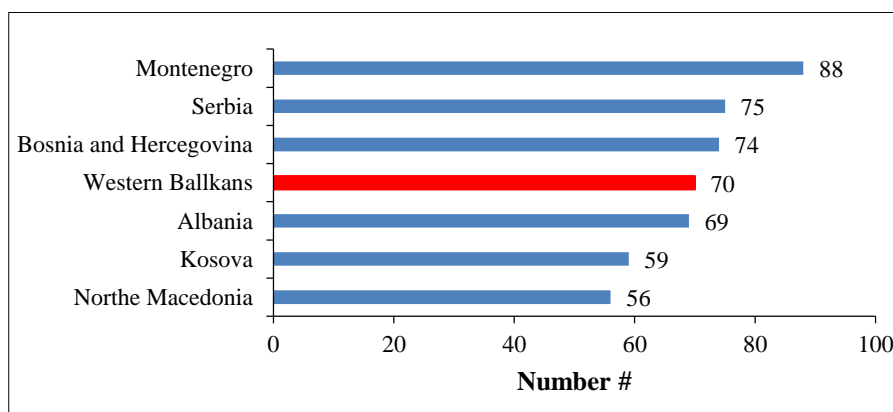


Figure 4. The number of deceased from traffic accidents per 1 million inhabitants in Western Balkans for 2021

Based on the data in Table 1, the trend of changes in the number of accidents over the years is not linear [17, 18]. With both rising and falling tendencies, the 20-year era saw significant changes (Figure 5). Over the past ten years, with the exception of 2020 due to the COVID-19 pandemic, there has only been a decline in accidents during the time when law enforcement was strengthened.

Table 1. The number of road traffic accidents by year for the 20-year period, 2002-2022

Year	Traffic Accidents				Consequences in Humans		
	Total accidents	Material damages	With bodily injuries	Hit and run accidents	With fatal consequences	Dead persons	Injured persons
2002	9386	8126	1153	/	107	132	1983
2003	5541	4019	1415	/	107	130	2012
2004	6564	5097	1326	/	141	170	2053
2005	13917	10963	2506	303	145	155	4206
2006	14582	10839	3013	574	156	178	4789
2007	17006	12229	3901	749	127	138	6264
2008	15939	11313	3850	658	118	133	6427
2009	19212	13346	4730	984	152	176	7984
2010	18030	12594	4326	952	158	175	7730
2011	18888	13338	4490	930	130	157	8321
2012	19754	14044	4555	1039	116	121	8561
2013	19954	13878	4960	1012	104	119	9817
2014	16300	10333	4876	980	111	127	9713
2015	17722	11145	5275	1185	117	129	10671
2016	18541	12312	6130	/	99	110	12009
2017	17695	11183	6390	/	122	137	12645
2018	15741	9424	6217	/	100	129	12359
2019	16199	9959	6140	/	100	113	11865
2020	13847	8375	5396	/	76	81	10194
2021	21274	13523	7652	/	99	111	14680
2022	20794	12951	7748	/	95	106	14714
Total	349441	236729	100815	9366	2533	2885	188298

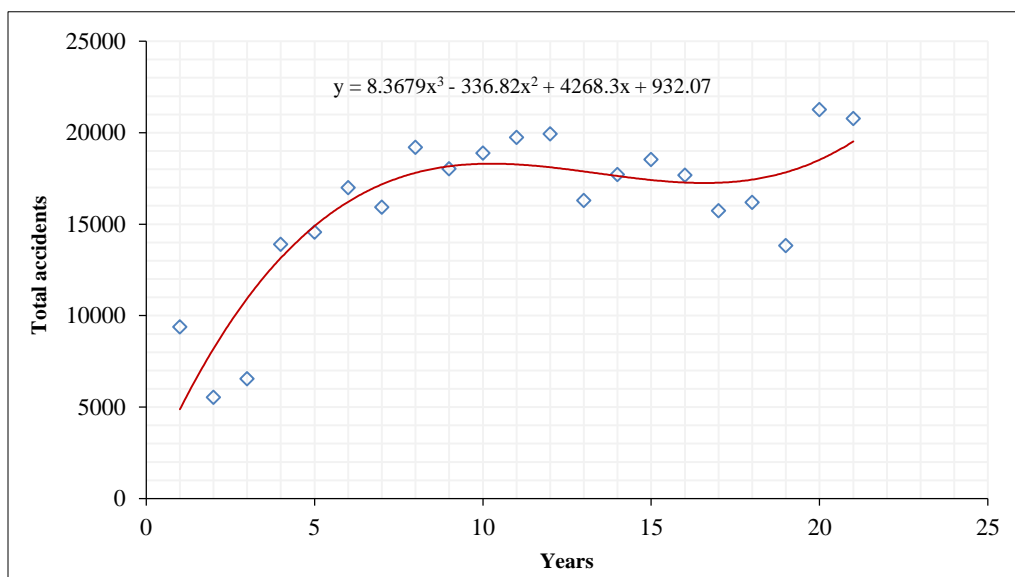


Figure 5. The trend of total road accidents in a period of 20 years

A graph showing the number of traffic accidents during the preceding ten years is shown in Figure 6. It focuses on the three years 2016–2018 that were chosen for analysis. The data pertaining to traffic accidents over a four-year period, beginning with the year the new law was adopted is presented in Table 2 [19, 20]. The following graphs display the number of accidents with material damage, injuries, and fatal consequences/number of fatalities based on the accident's consequences (Figures 7 to 9).

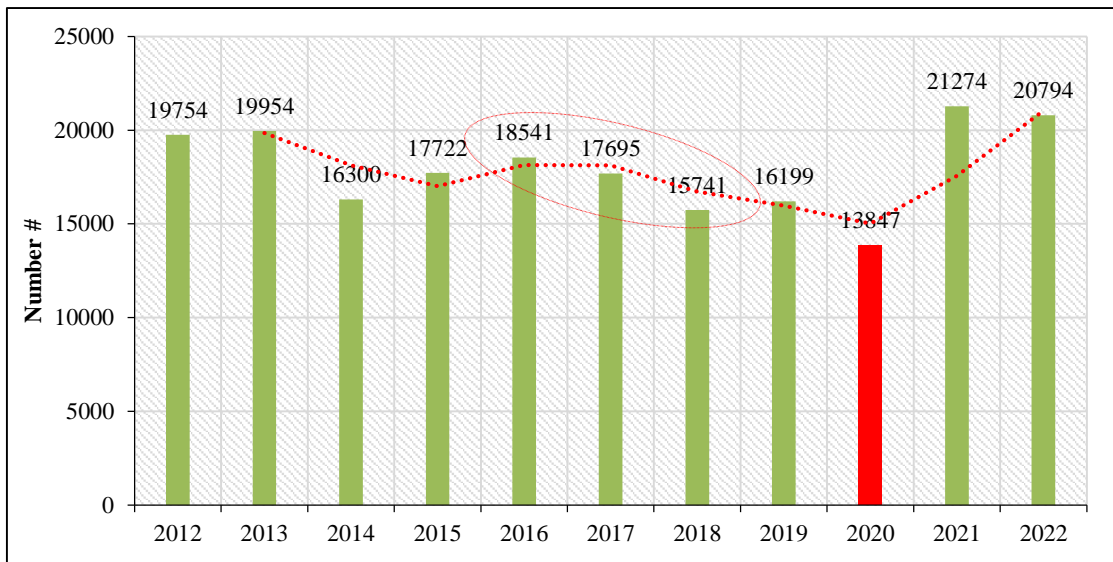


Figure 6. The trend of road accidents in a period of 10 years (2012-2022)

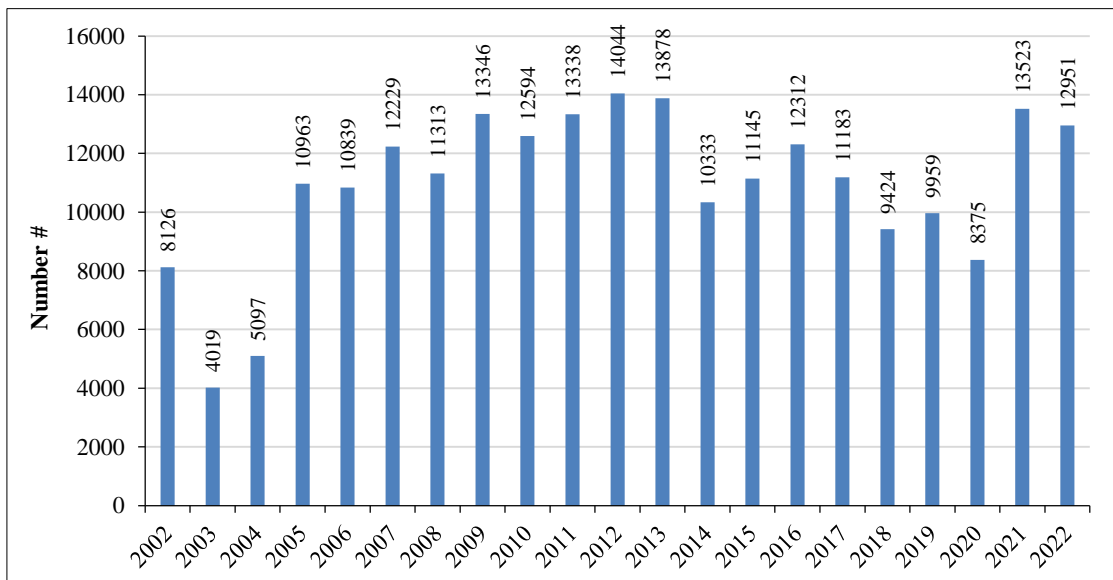


Figure 7. The trend of road accidents with material damages in the period 2002-2022

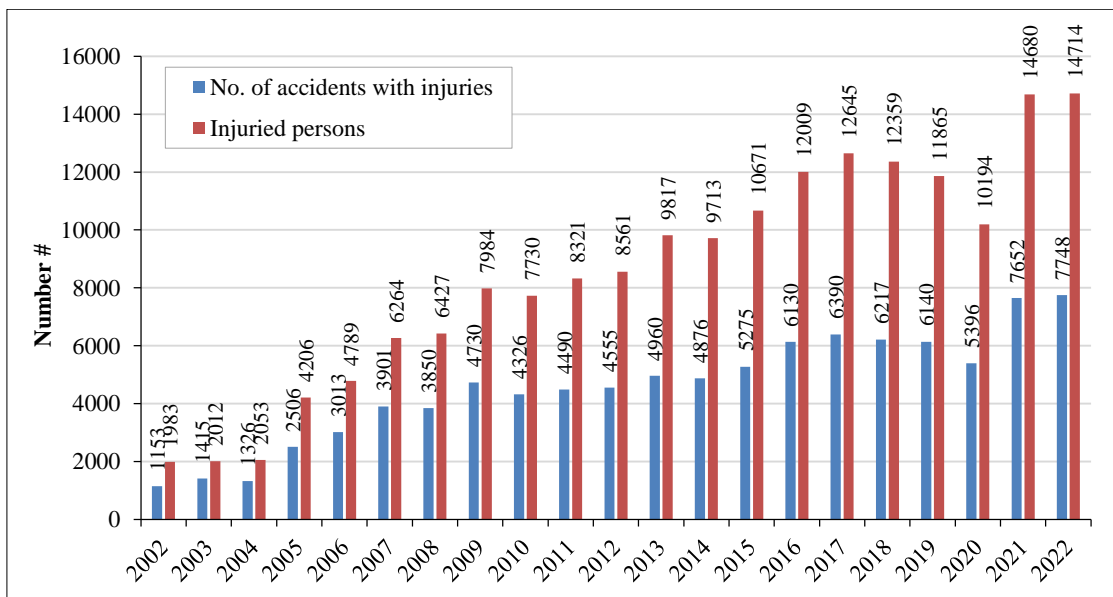


Figure 8. The trend of road accidents with injuries and injured persons in the period 2002-2022

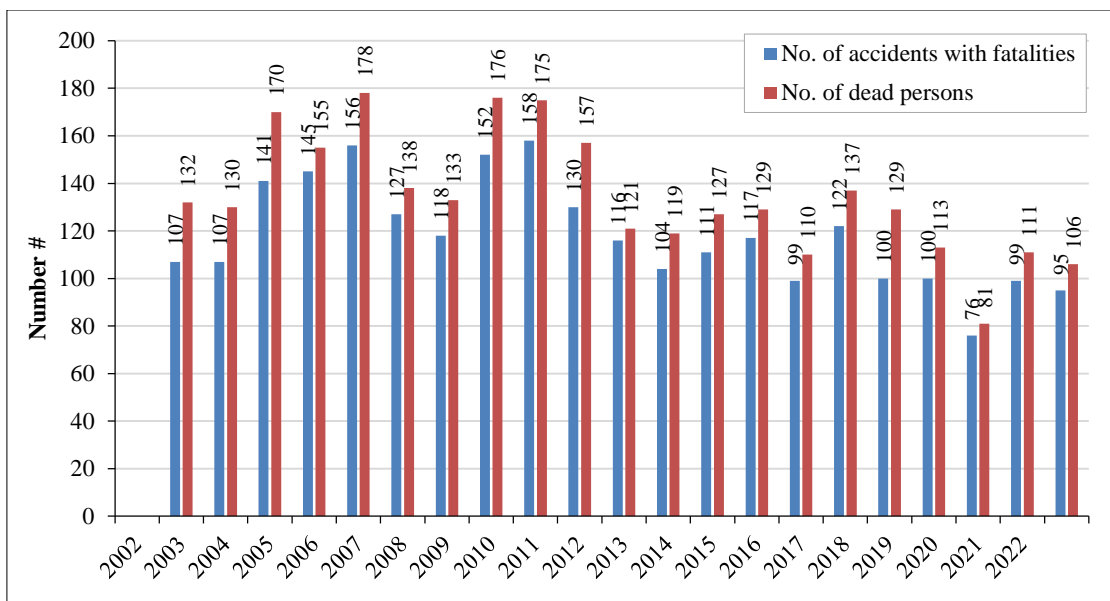


Figure 9. The trend of road accidents with fatalities and dead persons in period 2002-2022

Table 2. Road accidents in a period of 4 years

Year	01.10.2013-30.09.2014	01.10.2014-30.09.2015	01.10.2015-30.09.2016	01.10.2016-30.09.2017
Fatal accidents	108	108	108	111
Accidents with injuries	4848	5097	6180	6140
Accidents with material damage	11087	10677	12409	11369
Total	16043	15882	18697	17620

With reference to the graph presented in Figure 10, it can be observed that during the 2016–2017 analysis period, there were 2.78% more accidents with fatal outcomes, 40 fewer accidents involving bodily injuries, and 8.38% fewer accidents involving material damage. Figure 10 illustrates this trend [21]. This indicates that the category with the highest number of accidents has been impacted by the actions taken by law enforcement agencies.

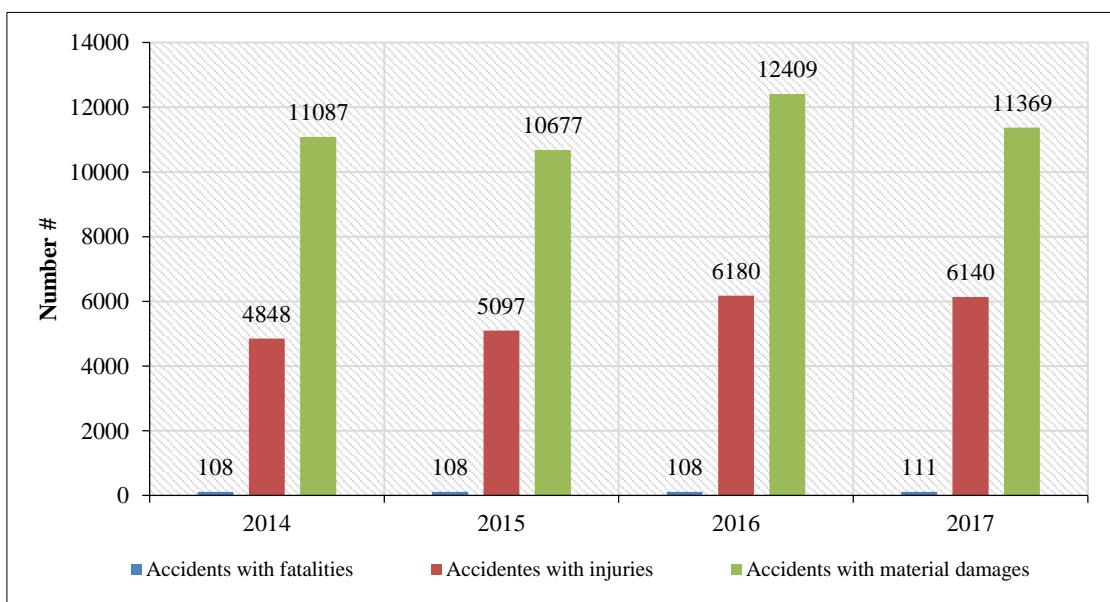


Figure 10. Accidents within the selected 4-year period

During the law's preparation, the financial penalties for breaking traffic laws were raised in order to uphold legal responsibilities and prevent accidents. Apart from the legislation's enactment, the primary issue lies in strengthening its execution. The primary state agency that implements policies and procedures to penalize violations and lower the number of accidents is the Kosovo Police. In Table 3 are presented the number of penalties in the span of four years.

Table 3. The number of penalties registered against users in road traffic

Number of penalties / Periods	01.10.2013-30.09.2014	01.10.2014-30.09.2015	01.10.2015-30.09.2016	01.10.2016-30.09.2017
TOTAL	303,376	302,617	320,027	391,112

Based on the data from Table 3, the number of registered penalties compared to the number of inhabitants is 219 tickets/1000 inhabitants. Compared to the average of European countries (94 tickets/1000 inhabitants) it is very high. This data is an indicative of an increase in accident prevention measures and police operations.

Figure 11 depicts the quantity and trend of penalties found throughout the selected four-year period (2014-2017). The trend has a quadratic function and appears to be increasing.

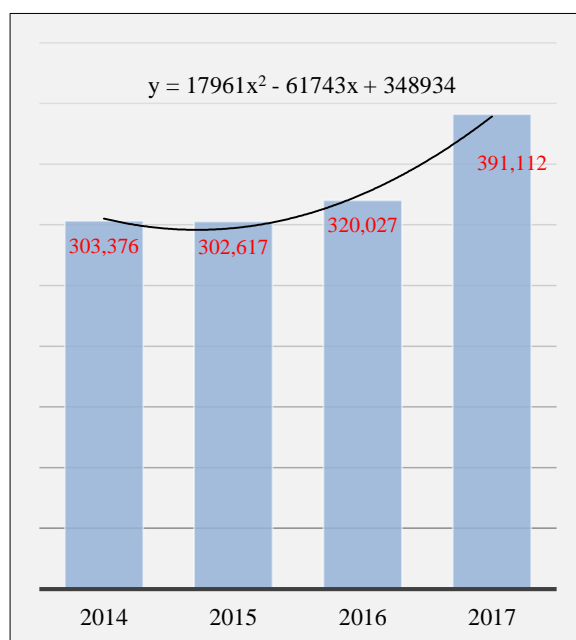


Figure 11. The quantity and trend of penalties found throughout the given four-year period

5. Analyzing Data and Comparing Accident Causes and Penalties

To assess the magnitude of the impact of increased law enforcement on the prevention of road accidents, we compared the causes of accidents with types of penalties given [20]. Sixty-seven percent of tickets with known causes were used in the sample of penalties (excluding penalties with little impact on causing an accident) (Table 4).

Table 4. Number and type of Penalties analysed

No	Types of penalties	01.10.2013-30.09.2014	01.10.2014-30.09.2015	01.10.2015-30.09.2016	01.10.2016-30.09.2017
1	Exceeding the speed limit	129,963	142,011	144,851	179,322
2	Irregular bypassing/overtaking	3,585	2,394	4,807	6,594
3	Failure to respect the right of way	957	1,538	521	959
4	Disregarding pedestrians	430	278	307	419
5	Driving under the influence of alcohol/drugs	685	594	1,092	806
6	Not keeping distance	1,745	1,629	1,756	1821
7	Disobeying traffic signs	19,875	20,213	23,519	24,810
8	Unsafe entry on the road	829	781	669	973
	TOTAL	158,069	169,438	177,522	215,704

The causes of the accidents that happened during the studied periods (for the same categories of accidents) were used as the basis for the study in 37% of the cases (Figure 12). Table 5 shows the number and causes of accidents over a four-year period. Figure 13 depicts the data in a chart format.

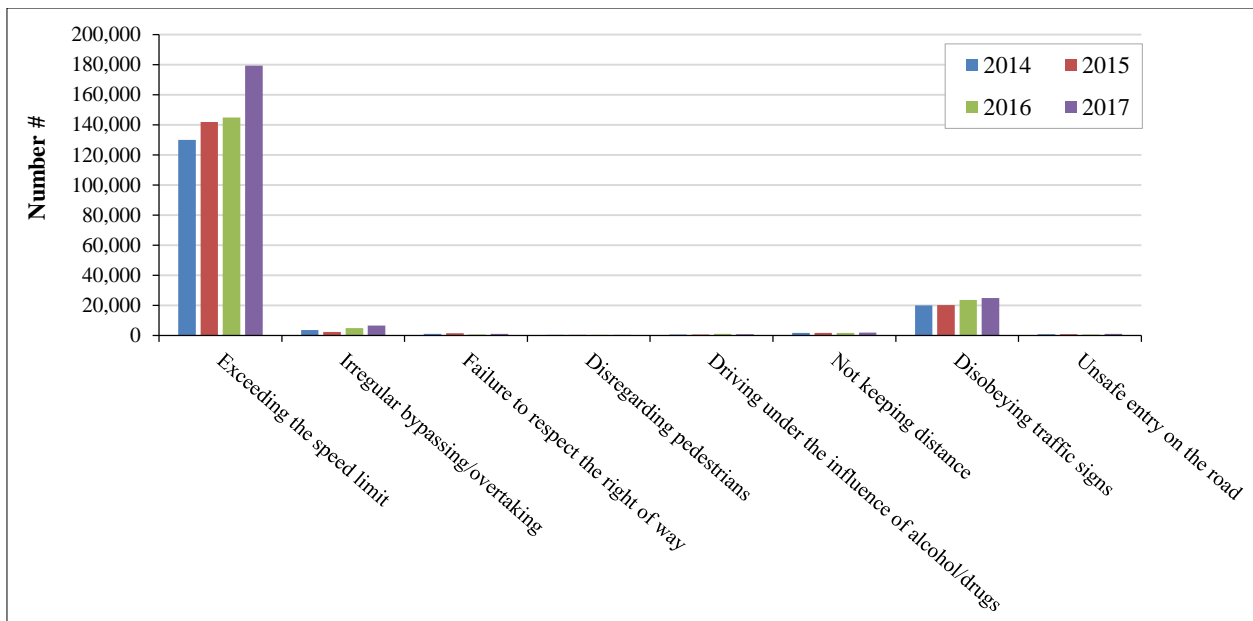


Figure 12. The number and trend of penalties found by type within the selected 4-year period

Table 5. Number and causes of Accidents analysed

No	Cause/Year	2014	2015	2016	2017
1	Exceeding the speed limit	486	397	416	145
2	Irregular bypassing/overtaking	676	878	879	902
3	Failure to respect the right of way	769	740	796	840
4	Disregarding pedestrians	78	30	12	19
5	Driving under the influence of alcohol/drugs	138	115	111	125
6	Not keeping distance	2595	3062	3069	2887
7	Disobeying traffic signs	369	414	413	403
8	Unsafe entry on the road	1063	1290	1338	1331
TOTAL		6174	6926	7034	6652

To assess the impact of increased law enforcement on accident prevention, the same causes of accidents will be compared with the penalties found [22] throughout the various time periods. We provide the ratio of accidents to discovered violations to show the commitments of human and material resources in the identification of violations [24], [25].

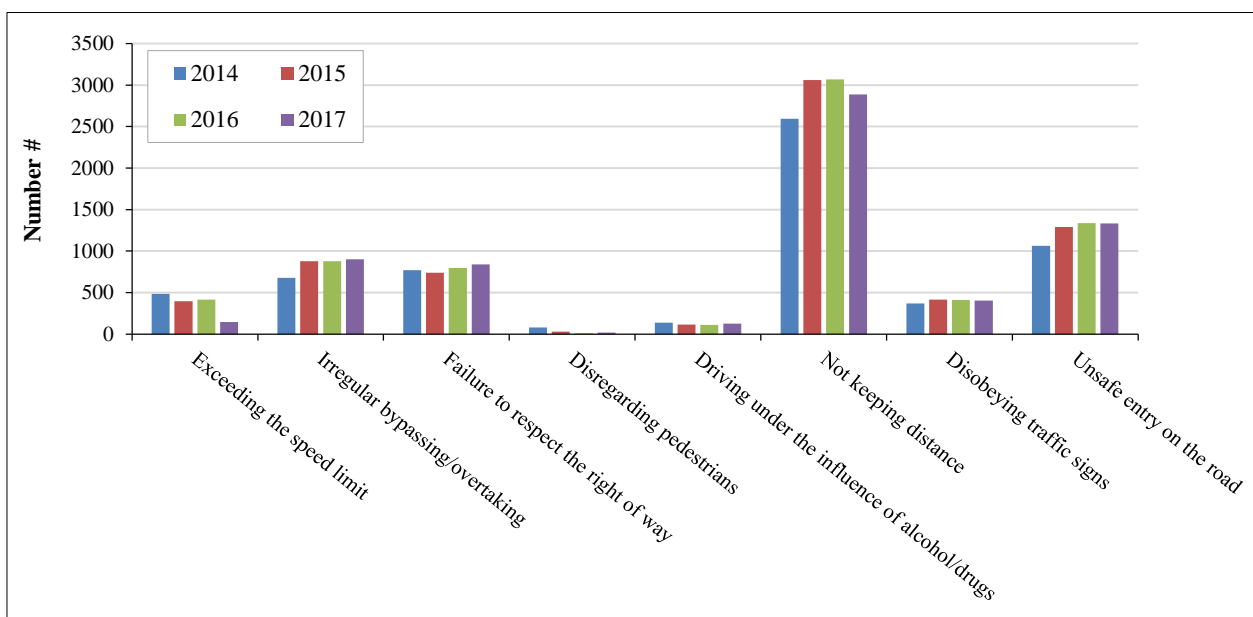


Figure 13. The number and type of causes of accidents within the selected 4-year period

By comparing the statistics in Table 6 on the number of accidents and penalties, it is clear that police actions and measures to prevent accidents have increased from the beginning of law enforcement (represented as a percentage increase or decrease).

Table 6. Comparison of Accidents and Penalties in % based on the causes of accidents

Cause/Period	Action	01.10.2014-30.09.2015	01.10.2015-30.09.2016	01.10.2016-30.09.2017
Exceeding the speed limit	Accidents	-18.3%	4.79%	-65.14%
	Penalties	9.27%	2.00%	23.80%
Irregular bypassing/overtaking	Accidents	29.9%	0.11%	2.62%
	Penalties	-33.22%	100.79%	37.17%
Failure to respect the right of way	Accidents	-3.8%	7.57%	5.53%
	Penalties	60.71%	-66.12%	84.07%
Disregarding pedestrians	Accidents	-61.5%	-60.00%	58.33%
	Penalties	-35.35%	10.43%	36.48%
Driving under the influence of alcohol/drugs	Accidents	-16.7%	-3.48%	12.61%
	Penalties	-13.28%	83.84%	-26.19%
Not keeping distance	Accidents	18.0%	0.23%	-5.93%
	Penalties	-6.65%	7.80%	3.70%
Disobeying traffic signs	Accidents	12.2%	-0.24%	-2.42%
	Penalties	1.70%	16.36%	5.49%
Unsafe entry on the road	Accidents	21.4%	3.72%	-0.52%
	Penalties	-5.79%	-14.34%	45.44%

6. Discussions

Comparing data from past years on accident causes reveals that the causes with a high number of accidents have reduced (affecting the overall number), while the causes with a small number of accidents have increased slightly. We will present and discuss key findings in detail:

Accidents exceeding the permitted speed – There is a 65.14% decrease in the number of accidents, but a 23.80% increase in the number of detected penalties. When viewed numerically, the number of accidents caused by exceeding the permissible speed is quite low (145), although the number of penalties is relatively large (179322), due to police actions and measures (equipment) and the ease with which the violation can be found. This cause of accidents accounts for 0.82% of all accidents. According to the trend analysis, an increase in measures and actions for detected infractions has affected a drop in the number of accidents.

Irregular bypassing/overtaking - The number of accidents has increased by 2.62%, while the number of penalties has increased by 37.17%. In terms of numbers, the number of accidents caused by this cause is relatively modest (902), however the number of fines has steadily increased over the four-year study period. According to the data, the number of accidents caused by this cause has increased at a low rate compared to prior years (a 29.9% increase in 2015). This cause of accidents accounts for 5.12% of all accidents.

Failure to respect the right of way - There has been a 5.53% increase in the number of accidents, as well as an 84.07% increase in the number of penalties. In terms of numbers, the number of accidents (840) is about equal to the number of fines (959). The number of accidents is decreasing (the previous year there was a 7.57% increase). This relates to the possibility of determining the cause of the accident, as well as the difficulty in determining the penalty (physical presence of personnel or equipment). This cause of accidents accounts for 4.77% of all accidents.

Disregarding the pedestrians - there has been a 58.33% increase in the number of accidents, with a 36.48% increase in the number of penalties. This type of accident has a low numerical value (19), but the penalties are 419. This cause of accidents accounts for 0.11% of all accidents. The rise in pedestrian safety measures and actions, as well as information (media campaigns), has resulted in a low number of incidents.

Driving under the influence of alcohol/drugs [23] - we have a 12.61% increase in the number of accidents, but a 26.19% drop in the number of penalties. In terms of numbers, the number of accidents (125) is minimal in comparison to the overall number of fines (806). This factor has a direct correlation with the increase in the number of accidents and the decrease in the number of penalties compared to the previous year. This cause of accidents accounts for 0.71% of

all accidents. The reduction of measures and actions, as well as their concentration in particular months (July and August), has resulted in an increase in the number of accidents when the cause is under the influence of alcohol.

Failure to maintain the safety distance - we have a 5.93% drop in accidents, but a 3.70% increase in the number of penalties. When we look at the numbers, we see that the number of accidents when the reason is failure to maintain a safe distance (2887) is more than the number of detected penalties (1821). This is related to the activities and methods (equipment) for identifying and ascertaining the violations, and in the case of accidents, the major violation is the result of the accident, and as such, the violation for the cause takes precedence. This cause of accidents accounts for 16.38% of all accidents. Because detecting violations necessitates the employment of equipment and personnel, the indicator of the number of accidents by cause is calculated directly from the number of accidents. Direct steps and activities, as well as measures for other causes of accidents, influenced the reduction of their number in this case.

Disobeying traffic signs - has resulted in a 2.42% drop in the number of accidents, but a 5.49% increase in the number of penalties. When compared to the total number of accidents and penalties, they are quite insignificant. Throughout the investigated period, the trend of fines determined by this cause of accidents has been growing, whereas the number of accidents has been dropping. This cause of accidents accounts for 2.3% of all accidents.

Unsafe entry on the road - There has been a 0.52% drop in the number of accidents, but a 45.44% increase in the number of penalties. Even in this category of accidents, the number of accidents (1331) outnumbers the number of penalties (973). This cause of accidents accounts for 7.55% of all accidents. The finding of the violation is made through the cause of the accident in cases where it is the primary cause, and it is not shown in cases where it is not the main cause. The decline in the number can be linked to prevention measures and activities, although the low number of penalties can be explained by the possibility of determining the violation and the prevalence of the violation with larger weight.

In the practice of enforcing the law, difficulties have arisen - gaps in the law that, with time, have begun to have negative effects, to name a few: The Supreme Court's decision that keeping a person in prison for traffic fines violates human rights and freedoms, the ability to appeal out of court for driving bans (suspension of driver's license), and court delays for decisions regarding traffic fines (a delay of more than two years in announcing the decision cancels the started procedure and the fine is called obsolete).

7. Conclusions

The following conclusions can be drawn from the analysis of the data and their pattern, as well as the previous discussions:

- In the first year of implementation, the total number of traffic accidents decreased. This is more visible in the impact of police measures and actions that have affected the reduction of accidents with material damage, a partial reduction of accidents with injuries, and no apparent effect on those with deadly outcomes. This is because the number of fatal accidents is tiny in comparison to the number of other accidents. When comparing the total number of accidents and penalties between 2016 and 2017, the rise in actions and measures to strengthen the application of the law through penalties is 22.21%. This has resulted in a 5.76% decrease in the number of accidents.
- Based on the data and analysis, the findings are not favourable, with an increase in the number of accidents of the type of irregular overtaking/overtaking and driving under the influence of alcohol/drugs, where we have a decrease in the number of detected penalties and therefore an increase in the number of accidents. Because detecting such violations involves more qualified staff and specialized equipment, the number of violations found is lower than the number of accidents.
- The largest number of discovered violations were not directly focused on the causes of the highest number of accidents but on superficial findings. For example, without a deeper investigation of why this number is so high and how to act to reduce that number with concrete and alternative activities, it was concluded that the violation is speeding.
- The increase in penalties by 21.51% through measures and police activities to reinforce the law's application has influenced the number of accidents by 5.43% across all factors studied. The activities and measures of police officers have not immediately reflected the decline or increase in the number of accidents, but there is a trend toward improvement presented on the graphs.

In the years to come, in addition to the causes of accidents and traffic penalties, a more analytical division in terms of occurrences and forecasts would be clearer. The categorization of fines based on gender, age, vehicle utilized, location, road, time, and climatic circumstances would allow for more accurate risk assessment and preventive measures, as well as the application of more technology in traffic monitoring and control.

Based on the discussions and conclusions, we may summarize that new law enforcement has produced positive results and that efforts should be made to achieve even greater results. However, it cannot solve all traffic-related issues. We can back up this conclusion with certain results from this paper showing that not all causes of accidents have decreased. It is still important to increase cooperation among all interested parties in society, including police, legislative institutions, government, driver training institutions, civil society, and citizens, in order to increase awareness among drivers and pedestrians about the importance of driving and walking carefully in traffic, respecting other traffic participants, adhering to traffic rules, and supporting the reduction of traffic accidents.

8. Declarations

8.1. Author Contributions

Conceptualization, V.B. and I.D.; methodology, V.B.; software, I.D.; validation, V.B., I.D., and J.R.; formal analysis, V.B.; investigation, I.D.; resources, J.R.; data curation, I.D.; writing—original draft preparation, V.B.; writing—review and editing, I.D.; visualization, I.D.; supervision, I.D.; project administration, V.B.; funding acquisition, V.B. All authors have read and agreed to the published version of the manuscript.

8.2. Data Availability Statement

The data presented in this study are available in the article.

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8.5. Conflicts of Interest

The authors declare no conflict of interest.

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