International Journal of Advanced Engineering, Management and Science (IJAEMS)
Peer-Reviewed Journal
ISSN: 2454-1311 | Vol-11, Issue-2; Mar-Apr, 2025
Journal Home Page: https://ijaems.com/
DOI: https://dx.doi.org/10.22161/ijaems.112.13

The Impact of Enforcement on Pedestrians: A Difference-in-Difference Model for Transportation Safety Policy in Taiwan

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Received: 07 Mar 2025; Received in revised form: 02 Apr 2025; Accepted: 06 Apr 2025; Available online: 12 Apr 2025

Abstract**—** *The research examines the impact of Taiwan's 2024 pedestrian safety policy amendment, which increased penalties for failing to yield to pedestrians. Analysis of 528 data points from 2023-2024 using a Difference-in-Difference (DID) methodology revealed significant temporal and spatial variations in effectiveness. Early 2024 showed increased accident rates, particularly in January, but demonstrated improvement by mid-year, with notable reductions in July–August compared to 2023. Infrastructure analysis indicated varying risk levels across intersection types, with unsigned intersections showing the highest risk coefficient and signalized intersections and flashing-signal intersections having the lowest risk. Metropolitan areas exhibited more significant fluctuations than rural regions. Based on these findings, the study recommends implementing differentiated time management mechanisms, prioritizing infrastructure improvements at high-risk intersections, and establishing region-specific enforcement strategies. Additionally, the research emphasizes the importance of enhancing pedestrian safety education and driver awareness to address Taiwan's longstanding "car-superior" traffic culture and improve overall road safety outcomes.*

Keywords**—** ***Promote traffic safety policy, Yield to pedestrians, Difference-in-Difference analysis (DID)***

I. INTRODUCTION

Vehicle driving courtesy to pedestrians is crucial to preventing traffic accidents and ensuring the safety of pedestrians, which is not only related to the maintenance of traffic order but also a key factor in safeguarding the lives of pedestrians. As one of the most vulnerable groups of road users, pedestrians need the understanding and protection of other road users. In the modern urban transportation system, balancing the convenience of motorized vehicles and

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the safety needs of pedestrians has become an essential issue in urban governance.

This low yielding rate directly impacts pedestrian safety, and the consequences are often very serious. Studies have shown that the yielding rate varies considerably from place to place: in Canada, the yielding rate for unprotected crosswalks is only about 10% (Fu et al., 2018); in Minnesota, it is about 30% (Craig et al., 2019); in Wisconsin, 28% of pedestrian-related crashes are due to failure to yield (Schneider and Sanders, 2015); and in 11 different locations in the United States, it is not surprising to find out that the yielding rate of pedestrians in the U.S. has increased by more than 20%.); Surveys in 11 different locations in the United States have found rates ranging from 8% to 100%, with an average of 66% (Anciaes et al., 2020). In China, discourtesy accounts for 13.88% of all traffic accidents, emphasizing the severity of the problem (Wang et al., 2021). These accidents not only cause injuries and deaths but also have huge social costs and family burdens. Even within the same country, there are significant differences in yielding behavior, and enforcement is one of the factors influencing the differences in driver yielding behavior and is a top priority for many law enforcement agencies (Wu et al., 2021; Liu et al., 2022; Xin et al., 2023; Xin et al., 2025).

In Taiwan, according to the Ministry of Transportation and Communications (MOTC), 394 pedestrians will be killed. More than 16,000 will be injured in traffic accidents in 2022. An average of about 47 pedestrians will be involved in roadway accidents daily, underscoring the seriousness of the pedestrian safety problem. The main reasons for the traffic safety problems of pedestrians in Taiwan are not only insufficient infrastructure and urban planning. In terms of traffic culture, Taiwan has long developed the concept of “cars are superior to pedestrians”, which, coupled with weak law enforcement, has led to frequent illegal parking and sidewalk occupancy, as well as widespread driving disrespectful to pedestrians.

Therefore, Taiwan will amend the relevant laws and regulations in 2024 to increase the penalties for not yielding to pedestrians. To improve pedestrian safety in Taiwan, this study aims to analyze the implementation of this policy. The purpose of this study is to explore the changes in the policy of giving way to pedestrians after the implementation of the policy and to observe whether there are differences in the local patterns and the presence or absence of signs in the promotion of the policy. The results of this study will help pedestrian safety programmers better understand pedestrian-vehicle interactions and develop effective policy enforcement measures to reduce pedestrian-vehicle crashes and improve pedestrian safety. Following the chapters of this study, Chapter 2 explains why the DID methodology is used in this study by focusing on the impact of policy drivers on pedestrian safety and the application of the DID methodology in various domains. Chapter 3 describes how the data for this study was obtained and converted into the input data. Chapter 4 analyzes the situation of giving courtesy to pedestrians after the government promotes the policy. Finally, Chapter 5 explains the study's results and offers relevant recommendations.

II. LITERATURE REVIEW

2.1 The Impact of Policy Enforcement on Pedestrian

The impact of policy enforcement on pedestrian and driver behavior at street crossings remains understudied. While some research shows promising results—such as Sandt et al.'s (2016) findings that combining enhanced enforcement with minor

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engineering improvements increases driver compliance at marked crosswalks—the evidence base is limited. After intensified enforcement efforts, Van Houten and Malenfant's (2004) observational study demonstrated improved yielding rates. Similarly, Nee and Hallenbeck (2003) observed that strengthened enforcement could enhance yielding rates and pedestrians' perceived safety. Retting and Scwartz (2017) support this view, arguing for enforcement's role in improving pedestrian safety outcomes and driver compliance. Teye-Kwadjo (2011) highlighted how insufficient enforcement can increase risk-taking behavior among road users. This aligns with Huang et al.'s (2006) observation that areas with weak traffic enforcement tend to see persistent unsafe driving attitudes and behaviors. Kim et al.'s (2008) research into violation patterns following enhanced enforcement revealed that drivers were more prone to infractions than pedestrians.

2.2 The Application of DID Analysis in Promotional Strategies

The DID methodology represents a sophisticated empirical strategy for evaluating causal effects of policy interventions and exogenous stimuli (Callaway and Sant'Anna, 2021). This econometric approach, which has gained substantial prominence in contemporary research frameworks (Krueger et al., 2020), is characterized by three fundamental components: the utilization of multiple temporal periods, variations in treatment timing, and the critical parallel trend assumption, which typically maintains validity only subsequent to controlling for observable covariates.

In the transportation domain, the DID methodology has demonstrated significant analytical utility across diverse empirical investigations. Empirical analyses have elucidated intergenerational variations in transport mode utilization between Generation X and Y cohorts, establishing the differential impacts of sociocultural, socioeconomic, and sociotechnical determinants across various transportation modalities. Kuo et al. (2021) validated the efficacy of DID in numerous traffic-related studies, providing robust evidence for causal relationships. Notably, comprehensive analysis of London's Night Tube operations by Zhang et al. (2022) has provided quantitative insights regarding its implications for nocturnal economic activity, real estate valuations, traffic incident frequencies, and criminal behavior patterns, thereby informing evidence-based urban planning and policy formulation. Furthermore, econometric evaluation by Biondi et al. (2022) of Poland's cycling initiative demonstrated a statistically significant 18% increment in bicycle traffic volume, substantiating the efficacy of targeted transportation policy interventions.

The methodological robustness of DID has been particularly evident in analyzing intermodal transportation dynamics. Empirical investigation by Zhang et al. (2018) of the relationship between high-speed rail (HSR) implementation and aviation demand patterns revealed significant competitive effects within the 500-kilometer market segment while simultaneously identifying complementary effects in long-haul markets exceeding 1500 kilometers, suggesting potential stimulation of extended-distance air travel demand. In the context of ride-sharing services, econometric analyses by Hall et al. (2018) have established that Uber's market entry generated positive externalities for public transit utilization, manifesting in a 5% increase in ridership over a 24-month period, with heterogeneous effects across urban scales and transit agency dimensions. These empirical findings

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demonstrate the DID methodology's capacity to not only establish policy impact causality but also to quantify substitution and complementarity effects across transportation modalities, thereby contributing substantively to evidence-based transportation policy development and implementation strategies.

III. RESEARCH METHOD

3.1The Background

Pedestrian safety is an important issue in modern urban traffic management, and the courteous behavior of drivers towards pedestrians is not only the cornerstone of traffic order but also the key to safeguarding the lives of pedestrians. In a complex urban traffic environment, pedestrians are often the most vulnerable road users and require special attention and protection. However, Taiwan's current pedestrian safety problems stem from a combination of factors. Firstly, there is a lack of infrastructure and urban planning; secondly, the deeper problem lies in the deep-rooted culture of "cars over people". This culture, coupled with insufficient law enforcement, has led to frequent illegal parking, sidewalk encroachment, and driving disrespectfully to pedestrians.

This study examines the changes in driver behavior after implementing the policy of giving way to pedestrians. The study pays particular attention to the impact of different local morphologies and signalization on policy implementation. It aims to provide policymakers with concrete policy recommendations by analyzing the interaction patterns between pedestrians and vehicles. These findings will help formulate more effective enforcement measures, ultimately achieving the goals of reducing traffic accidents and enhancing pedestrian safety.

3.2 Data Preparation

The data for this study was obtained from the public information available on the website of the Taiwan Ministry of Transportation and Communications (MOTC) Road Traffic Safety Guidance Committee to get detailed information on the number of pedestrians killed in traffic accidents, the number of pedestrians injured in traffic accidents, whether they belonged to a large city, and whether there were traffic signals at the place where the accidents occurred for each county and city in Taiwan from 2023 to 2024. Five hundred twenty-eight data (as shown in Table 1) were collated to serve as inputs for the research model.

Table1 Structure of the data on the study

Country	Month	Car_dead	Policy promotion	Big city	Policy x big city	Car_cause	Car_sign_Yes	Car_sign_flashing_beacon	Car_sign_No
Keelung	January	16	0	0	0	16	6	1	4
Keelung	February	5	0	0	0	5	0	3	1
Keelung	March	14	0	0	0	14	3	3	3
…									
Keelung	November	14	0	0	0	14	1	4	5
Keelung	December	8	0	0	0	8	2	1	2
Taipei	January	78	0	1	0	78	23	4	20

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Country	Month	Car_dead	Policy promotion	Big city	Policy x big city	Car_cause	Car_sign_Yes	Car_sign_flashing_beacon	Car_sign_No
Taipei	February	66	0	1	0	66	21	5	17
…									
Taipei	November	51	0	1	0	51	9	1	21
Taipei	December	63	0	1	0	63	15	5	19
…									
Keelung	November	16	1	0	0	16	5	1	6
Keelung	December	12	1	0	0	12	1	1	0
Taipei	January	67	1	1	1	67	17	5	22
Taipei	February	40	1	1	1	40	8	4	12
…									

3.3 DID Approach Measure Bus-to-Campus Policy

The DID method is usually used to analyze the effects of policies or other exogenous factors. First, the subject is divided into an experimental group that is affected by the policy and a control group that is not affected by the policy, and the difference between the experimental group and the control group before and after the policy is calculated separately. Since there are many factors that affect the explained variables, the differences in the differences can be eliminated by contrasting the control group with the experimental group to present the policy effects that the researcher wants to understand. In general, the DID measurement model is as follows.

$$y_{gt} = \beta_0 + \beta_1 g + \beta_2 t + \beta_3 g \times t + \varepsilon_{gt} \qquad (1)$$

y_{gt} is the explained variable; g represents whether it is a dummy variable for the experimental group, 1 for the experimental group, 0 otherwise; t represents whether the time is a dummy variable after the policy is implemented, 1 if the sample is at the time after the policy is implemented, 0 otherwise; and g × t is the cross product of the two dummy variables. In the difference-in-difference model, the coefficient β_3 of g × t is the policy effect that we want to observe, i.e., the DID.

IV. THE RESULTS

4.1 Descriptive Statistics

An analysis of the 2023 and 2024 pedestrian fatality and injury statistics in Taiwan shows that the difference between the two years shows a significant phase change. The early part of the 2024 pedestrian fatality and injury data shows a considerable increase compared to the same period in 2023, especially in January, which may be closely related to the sudden increase in traffic during the Chinese New Year holiday. Looking at the mid-range, the trend gradually changes between April and August, with the gap between the 2024 fatality and injury figures and the 2023 figures narrowing. However, they remain relatively high between April and June. In particular, there was a significant turnaround in July and August, when the 2024 figure fell below the 2023 level for the first time, a change that may reflect the

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beginning of the effectiveness of traffic safety management measures at this time. However, in the latter part of the year, the data show a different pattern, with the number of fatalities and injuries being significantly higher in 2023 than in 2024, with the difference being most significant in November and December, when the number of deaths and injuries climbed to a high of nearly 170, compared to a lower level in the same period in 2024. Such a difference in data demonstrates the positive impact of the enhanced enforcement efforts by the law enforcement agencies, which not only effectively raised drivers' awareness of traffic safety but also substantially improved road safety, showing that the relevant management measures have achieved the desired effect.

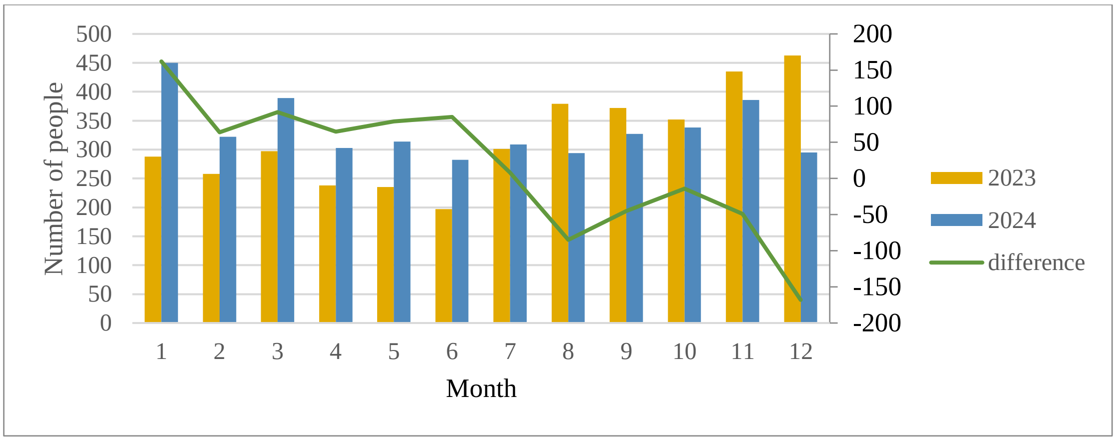

Fig. 1 The difference of promote safety policy between 2023 and 2024

According to the analysis of the trend chart, pedestrian fatalities and injuries at different types of signalized intersections showed significant seasonal variations, with higher fatalities and injuries at unsignalized intersections from January to March, especially in March when the difference reached nearly 200 cases, and then declining gradually thereafter. The performance of intersections with traffic control signs and pedestrian signals was relatively stable, indicating that traffic signals effectively ensure pedestrian safety. The overall casualty situation at flashing signalized junctions was better than that at unsigned junctions despite a few fluctuations in the middle of the year. Notably, all types of junctions showed significant decreases in fatalities and injuries in December. This consistent downward trend may reflect the increased awareness of pedestrian safety during the promotion of the policy or the effectiveness of the police in enhancing road safety management.

Overall, the data highlights the importance of traffic signaling facilities to pedestrian safety. It is recommended that the relevant authorities prioritize adding appropriate signaling facilities in road planning and continue to promote traffic safety education to reduce the incidence of pedestrian fatalities and injuries.

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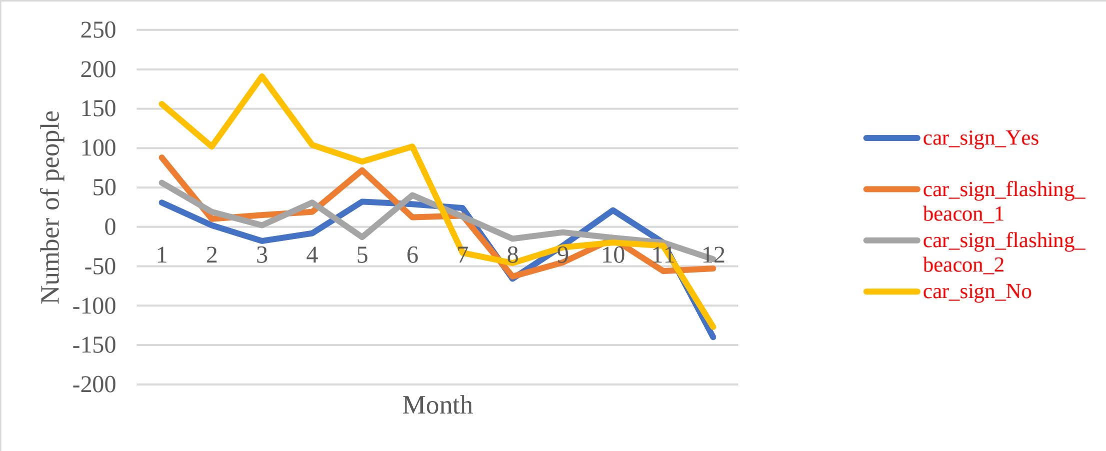
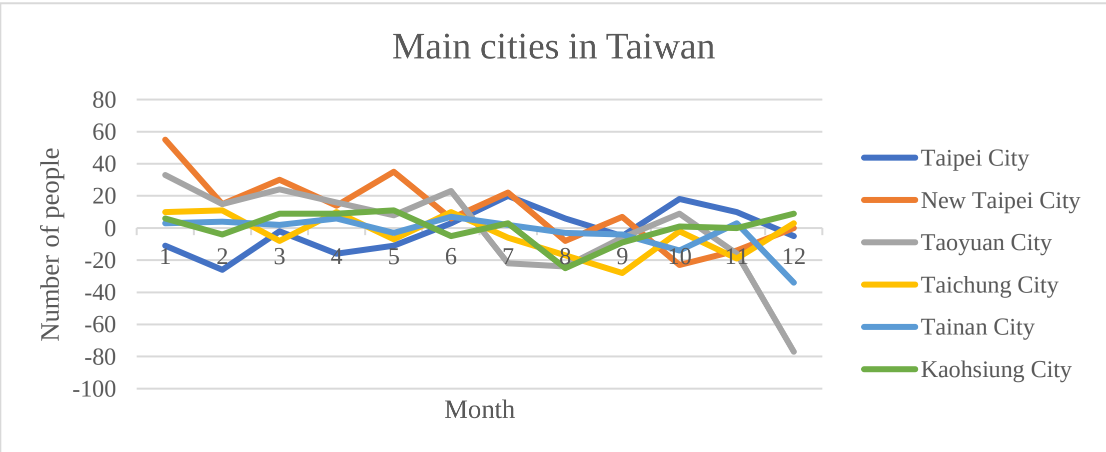


Fig. 2 The difference of signalized intersections between 2023 and 2024

According to the analysis of pedestrian fatality and injury trends across Taiwan, the data from 2023 to 2024 show significant geographic differences. Among large cities, New Taipei City reached a peak of about 55 cases early in the year and then gradually declined, while Taipei City began to decline after reaching a peak in July. Most striking is the trend in December at the end of the year, with several regions showing significant declines, with Taoyuan City showing the most pronounced drop, with 80 fewer cases in 2024 compared to 2023. Changes in the central area are relatively mild, with most counties and cities remaining within a range of plus or minus 15 cases in 2024 compared to 2023, except for Taichung City, which shows a difference of 30 fewer cases in September. Conversely, the southern region shows more significant fluctuations in the second half of the year, with Kaohsiung City experiencing a decrease of 25 cases in August and Tainan City seeing a decrease of 35 cases by the end of the year. The eastern part of the country and the outer islands were relatively stable, with more minor fluctuations, except for Yilan County, which saw a significant drop at the end of the year.

Overall, the fluctuations in metropolitan areas were significantly more important than those in rural areas, especially during the end of the year, which may be related to the increase in festivals, climate change, or the implementation of specific policies, and are worthy of further attention and response by the relevant units.



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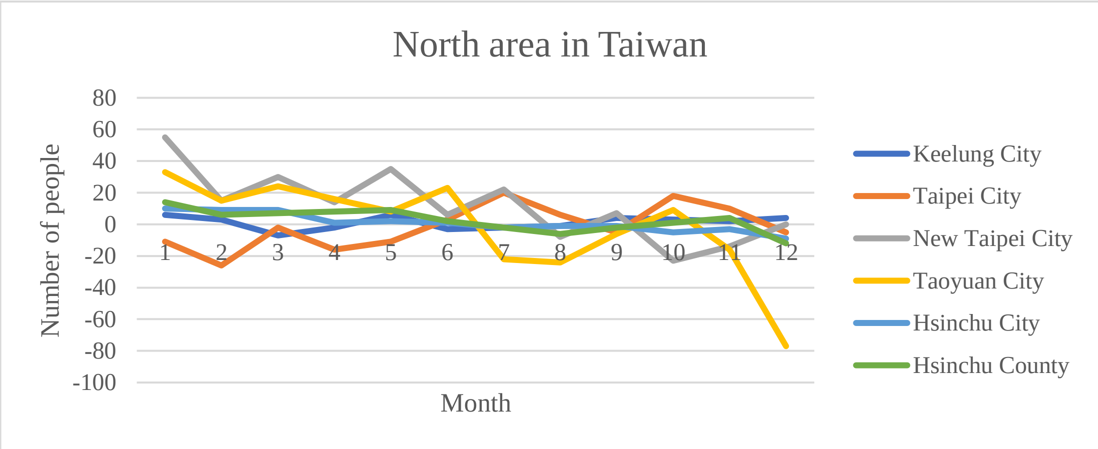

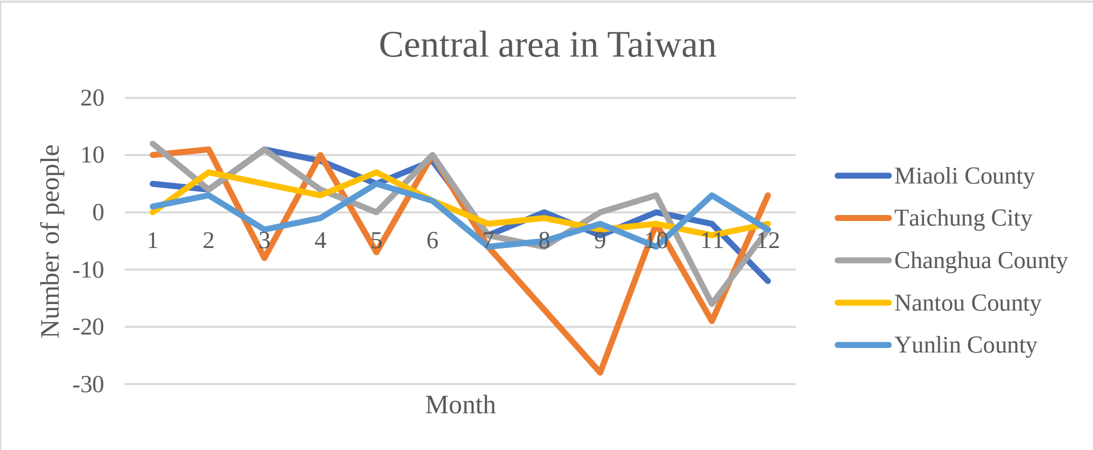

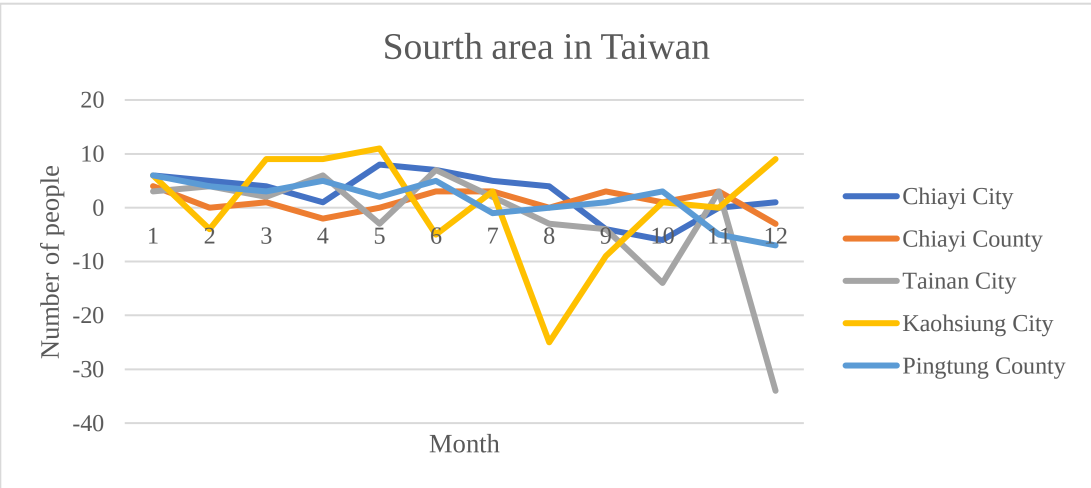

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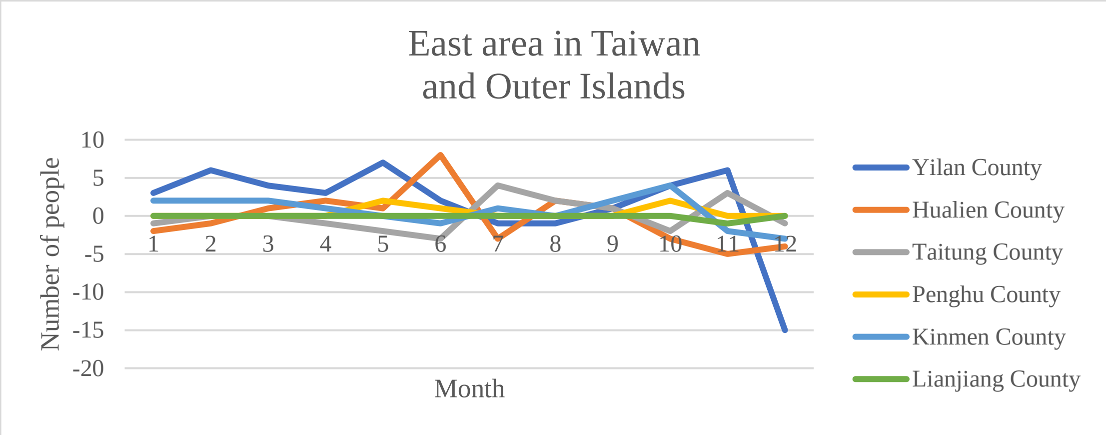

Fig. 3 The difference of promote safety policy between cities

4.2 Results of DID Analysis

1. Change in Fatalities before and After Courtesy Pedestrian Policies Promote

Based on the regression analysis results in Table 2, this study investigated the relationship between the impacts of pedestrian courtesy policy on pedestrian fatalities. The analysis showed that the constant term of the regression model was 10.774 (SD=0.815, t=13.227, p<0.001), which meant that when the city did not promote the policy, the base value of pedestrian deaths was 10.774. Its regression coefficient was 32.087 (SD=2.206, t=14.546, p<0.001), which meant that when the city did not promote the policy, the average increase of pedestrian deaths was 32.087 units per unit increase. This relationship is statistically significant. This relationship is statistically significant because the p-value is less than 0.001, indicating that we can be highly confident that this relationship is not randomly generated. In addition, the standardized coefficient (Beta) of 0.536 indicates that policy promotion has a moderate positive effect on pedestrian fatalities. This standardized coefficient allows us to compare the relative impacts of different scale variables. The regression equation can be expressed as car accident = 10.774 + 32.087 × did. All coefficients in the model are statistically significant (p<0.001), and the t-values are much larger than the threshold value of 2.

Table 2 the DID analysis result for pedestrian killed in car accident

	Unstandardized coefficient		Beta	t	Sing.
	Estimated value	Standard error			
Constant	10.774	.815		13.227	.000
DID	32.087	2.206	.536	14.546	.000
Dependent variable: Pedestrian killed in car accident					

Regarding traffic fatalities, the analysis shows in Table 3. There was extremely significant between-group differences (F = 1066.833, p < .001). The between-group variation (sum of squares = 149469.495) is substantially more important than the within-group variation (sum of squares = 73695.685), with a total variation of 223165.180, indicating apparent differences between groups in traffic fatality data.

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Table 3 the ANOVA result in difference cities

		SS	df	Mean square	F	Sig.
Pedestrian killed in car accident	Between-groups	149469.495	1	149469.495	1066.833	.000
	Within-groups	73695.685	526	140.106		
	Sum	223165.180	527			

2. Pedestrian Yielding Policy Promotes Changes in stopping Behaviors of before and after Drivers

Based on the analysis results in Table 4, this study investigated the effect of drivers' stopping behavior changes before and after promoting the courtesy pedestrian policy. The analysis showed that the constant term of the regression model was 10.908 (standard error = 0.810, t = 13.467, p < 0.001), which indicated that when the policy was not promoted, the baseline value of pedestrian deaths due to driver failure to yield was 10.908. Its regression coefficient was 33.550 (standard error = 2.193, t = 15.296, p < 0.001), representing that for every unit increase in driver failure to yield, there is an average increase of 33.550 units in pedestrian deaths. This relationship is statistically significant because the p-value is less than 0.001, indicating that we can be highly confident that this relationship is not randomly generated. In addition, the standardized coefficient (Beta) of 0.555 indicates that driver failure to yield has a moderate positive effect on pedestrian fatalities. This standardized coefficient allows us to compare the relative influence of different scale variables. The regression equation can be expressed as driver failed to yield = 10.908 + 33.550 × did. All coefficients in the model are statistically significant (p < 0.001), and the t-values are much larger than the threshold value of 2.

Table 4 the DID analysis result for pedestrian died because driver failed to yield

	Unstandardized coefficient		Beta	t	Sing.
	Estimated value	Standard error			
Constant	10.908	.810		13.467	.000
DID	33.550	2.193	.555	15.296	.000
Dependent variable: Pedestrian died because driver failed to yield					

Regarding failure to yield to pedestrians, the data presents the highest F-value (F = 1117.103, p < .001), with the between-group variation (sum of squares = 154574.697) showing a significant difference from the within-group variation (sum of squares = 72783.149), totaling 227357.847. This result strongly suggests significant differences in pedestrian yielding behavior between groups (as shown in Table 5).

Table 5 the ANOVA result of driver failed to yield in difference cities

		SS	df	Mean square	F	Sig.
Pedestrian died because driver failed to yield	Between-groups	154574.697	1	154574.697	1117.103	.000
	Within-groups	72783.149	526	138.371		
	Sum	227357.847	527			

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3. Driving Changes in Stopping Behavior of before and after Drivers at Signed Intersections

According to the results of regression analysis in Table 6, the promotion of pedestrian courtesy policy has a significant positive effect on crashes at all three different types of intersections (p < .001), with the most important effect on unsigned intersections (Beta = 0.559), followed by signed intersections (Beta = 0.502), and relatively small effect on flashing-signal intersections (Beta = 0.332 The effect on flashing signalized intersections was relatively small (Beta = 0.332).

Specifically, without the promotion of the pedestrian courtesy policy, accidents at unmarked intersections would increase by 9.983 units, at marked intersections by 10.992 units, and at flashing signal intersections by 1.610 units, which suggests that the pedestrian courtesy policy would have a similar and more significant impact on unmarked and marked intersections, and a relatively more minor impact on flashing signal intersections. This finding has important practical significance for traffic safety management. It suggests that there is a significant difference in the degree of influence of the pedestrian yielding policy factor in different types of intersections and that the impact of this factor needs to be considered more carefully, especially in unsignalized and signalized intersections. Meanwhile, the statistical validation results of all models showed good reliability (t-value greater than 2).

Table 6 The DID analysis result for pedestrian died at signed intersections

	Unstandardized coefficient		Beta	t	Sing.
	Estimated value	Standard error			
Constant	3.397 (1) .932 (2) 2.781 (3)	.305 (1) .074 (2) .238 (3)		12.778 (1) 12.637 (2) 11.671 (3)	.000
DID	10.992(1) 1.61 (2) 9.983	.825 (1) .200 (2) .645 (3)	.502 (1) .332 (2) .559 (3)	13.320 (1) 8.059 (2) 15.453 (3)	.000
Dependent variable: 1. Pedestrian dies that have signalized intersections 2. Pedestrian dies that have flash signalized intersections 3. Pedestrian dies that have not signalized intersections					

Although the result of the signalized intersections is smaller than the previous two items, it still shows a considerably high F-value (F = 924.171, p < .001). The between-group variation is 18983.594, with within-group variation at 10804.677 and total variation reaching 29788.271, similarly reflecting significant between-group differences. The result of the flash signalized intersections, while relatively more minor, remains statistically significant (F = 173.611, p < .001). The difference between its between-group variation (363.763) and within-group variation (1102.115) is comparatively more minor, with a total variation of 1465.879, indicating that while group differences exist, they are relatively mild. The result of un-signalized intersections shows significant results (F = 590.468, p < .001). The

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between-group variation is 10478.183, with within-group variation at 9334.164, and total variation reaching 19812.347. This result demonstrates apparent between-group differences in this category as well (Table 7).

Table 7 the ANOVA result which signed intersections in difference cities

		SS	df	Mean square	F	Sig.
Pedestrian dies that have signalized intersections	Between-groups	18983.594	1	18983.594	924.171	.000
	Within-groups	10804.677	526	20.541		
	Sum	29788.271	527			
Pedestrian dies that have flash signalized intersections	Between-groups	363.763	1	363.763	173.611	.000
	Within-groups	1102.115	526	2.095		
	Sum	1465.879	527			
Pedestrian dies that have not signalized intersections	Between-groups	10478.183	1	10478.183	590.468	.000
	Within-groups	9334.164	526	17.746		
	Sum	19812.347	527			

V. SUMMARY OF DATA ANALYSIS

Before and after the promotion of the safety policy, the difference in the monthly pedestrian traffic accident fatality rate peaked in January-March, then stabilized in April-June, improved in July-September, and increased in December. The DID results further confirmed that the regression coefficients for the change in fatality rate were 32.087 (Beta = 0.536, $p < 0.001$) and the coefficient for the change in driving behavior was 33.550 (Beta = 0.555, $p < 0.001$), both of which were statistically significant. Regarding the presence or absence of signals, the analysis of intersection type effects showed that the highest risk coefficient was found for unsigned intersections (Beta = 0.559), followed by signaled intersections (Beta = 0.502), and the relatively low coefficient was found for flashing-signal intersections (Beta = 0.332). Finally, the regional variation analysis shows that the volatility of metropolitan areas is significantly higher than that of non-metropolitan areas, with the risk coefficient of New Taipei City reaching 0.55 at the beginning of the year and Taipei City peaking in July. Taoyuan City showed a significant downward trend (-0.80) at the end of the year. In contrast, the fluctuations in non-metropolitan areas were more minor, with the central region maintaining a range of ±0.15 and the southern region showing more significant variability in the year's second half but still more stable than the metropolitan areas.

A significant correlation exists between the configuration of the signaling system and the risk of accidents. The multivariate regression analysis indicates regression coefficients of 9.983 for unsigned intersections, 10.992 for signed intersections, and 1.610 for flashing signal intersections, highlighting the substantial impact of infrastructure configurations on pedestrian safety. Additionally, seasonal variation analysis demonstrates a notable cyclical pattern in accident frequency, with the highest risk coefficients occurring in the first quarter of the year, particularly in metropolitan areas.

VI. CONCLUSION AND RECOMMENDATIONS

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5.1 Conclusion

From a practical application point of view, the findings of this study highlight the need to adopt differentiated strategies for traffic safety management at different types of junctions. In particular, for unmarked junctions most affected by the pedestrian yielding policy, priority should be given to enhancing the relevant safety measures. Signalized junctions, although the impact coefficient is slightly lower than that of unsignalized junctions, still need to be given high priority and may require optimization of signal timing or provision of additional ancillary facilities to reduce the risk of accidents. For flashing signal intersections, although the impact of the pedestrian yielding policy is relatively smaller than that of no-signal intersections, it should not be ignored, and consideration can be given to adjusting the operation mode of flashing signals or adding other safety measures according to the actual situation.

The findings of this study not only help to understand the relationship between the promotion of pedestrian yielding policy and traffic accidents at different cities and types of intersections in Taiwan but also provide an important reference for future traffic safety improvement measures. Through the results of these data analyses, traffic management departments can formulate more targeted safety strategies and optimize the allocation of resources to more effectively prevent and reduce traffic accidents at various types of intersections and enhance the overall level of road safety. In addition, this study also provides a reasonable research basis for further investigation of other factors affecting traffic accidents in the future, which will help to establish a better traffic safety assessment system.

5.2 Recommendations

According to the study, the government has established safety policies that necessitate a differentiated time management mechanism. Specifically, the high-risk periods of January to March and October to December require special management measures, whereas the safety performance during the summer months can serve as a reference for policy formulation. Additionally, the significant disparity between metropolitan and non-metropolitan areas underscores the necessity of implementing regionally tailored management strategies. Furthermore, the study highlights the crucial role of infrastructure provision and the importance of intersection signalization for enhancing pedestrian safety. However, considering the limited resources, it is recommended to prioritize the improvement of high-risk intersections.

Furthermore, the study highlighted that the allocation of enforcement priorities should account for spatial and temporal variability, particularly during high-risk periods and in high-risk areas. Additionally, pedestrian safety education and driver awareness are crucial. Nonetheless, this study has certain limitations, and it is recommended that future studies explore other influencing factors and develop more precise prediction models to enhance the evaluation system.

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