Policy Implications of Road Accident Patterns in Pakistan

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Abstract

There is a serious threat to public health and safety from road accidents in Pakistan. The people, places, and things that play a role in these incidents were the focus of this investigation. This descriptive study makes use of a secondary source data set that relates to RTCs that occurred on highways and motorways in Pakistan from 2016 to 2021. Based on our research, heavy traffic times, weekends, and populated areas were found to be high-risk places and times. Accident causes include unfavorable weather, drivers' ages and genders, and the condition of the roads. The 5Ps of road safety: plan, protect, prevent, prepare, and promote propose a holistic strategy to tackle these problems. Pakistan may drastically cut down on traffic accidents and increase safety by adopting these measures.

Keywords: Road safety, Traffic accidents, Pakistan, Human factors, Road infrastructure

Introduction

Road traffic accidents (RTAs) in Pakistan pose a significant public health and safety concern, resulting in a substantial number of fatalities and injuries every year. However, the true extent of this problem is often underestimated due to underreporting, particularly among young people (Younis et al., 2019). In Lahore, for instance, a staggering 99% of reported traffic incidents go unreported to the police, while 39% are not even reported to the Punjab Emergency Response Service (PERS). This underreporting skews the data and hinders effective efforts to address the issue.

Multiple factors, such as environmental conditions, driver characteristics, and infrastructural issues, significantly influence the frequency and severity of these accidents. Weather conditions have a substantial influence on the frequency of road traffic accidents in Pakistan. Rainfall, severe cold, fog, and heat correlate with elevated accident rates. Fog is responsible for 34% of weather-related road traffic accidents (RTAs), with rainfall contributing 25%, temperature extremes 21%, and other weather factors 20% (Hammad, et al., 2019). These conditions require cautious driving, particularly for smaller vehicles and inexperienced drivers.

On the other hand, head injuries are the major cause of mortality in road traffic accidents (RTAs), accounting for 64.6% of fatalities in Karachi. Approximately a considerable proportion of fatalities take place between the hours of 6:00 am and

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11:59 am (Khurshid, Sohail, Khurshid, Shah, & Jaffry, 2021), with most victims passing away instantly. Peshawar was also the location with the highest incidence of head injuries, followed by injuries to the lower limbs and polytrauma (Afridi, et al., 2021).

The severity of injuries sustained in RTAs on national highways depends on several factors. Some of these factors include driving too fast for conditions, drivers who are tired or irresponsible, drivers under the age of 25, and bad road conditions such potholes and nighttime lighting issues (Ullah, Farooq, & Shah, 2021). Targeted initiatives are necessary to improve road safety due to these issues.

Road traffic accidents (RTAs) occur more frequently in males, especially within the age group of 20 to 29 years. Motorcyclists represent a significant majority, accounting for 78.6% of the victims in Lahore. In Faisalabad, motorbikes accounted for 42% of road traffic accidents, underscoring the susceptibility of two-wheeler riders (Hammad, et al., 2019). Younger drivers and operators of smaller vehicles exhibit an increased risk (Manzoor, et al., 2023).

Effective road safety management in Pakistan requires addressing multiple issues, including adherence to traffic rules, improving vehicle safety standards, and enhancing post-accident care. The implementation of advanced traffic management systems and better forensic investigation techniques are crucial for reducing RTAs (Ali, Aasim, & Malik, 2022; Faizan, 2021). Additionally, policy proposals emphasize the need for upgrading the licensing system, enforcing safety laws, and promoting traffic education (Tayyab, Hussain, Haq, & Ahmed, 2021).

In Pakistan road traffic accidents cause many deaths, injuries, and economic losses. Accidents on highways and in cities like Lahore persist despite several interventions. Effective road accident prevention requires understanding temporal, geographical, infrastructural, environmental, and human aspects. A full investigation of how these factors affect accident frequency and severity is lacking. To fill this gap, this study examines road traffic accident trends and causes to inform policy and safety measures.

This study has three main objectives: First, to identify road accident trends over time, days, and locations. Second, examine how road infrastructure and environmental circumstances affect accident frequency and severity, including road types, surface conditions, and lighting. Third, to examine how driver demographics, behaviors, and accident kinds affect accident risks and outcomes. These objectives seek a holistic understanding of Pakistani road traffic accidents to inform data-driven road safety improvements. The corresponding research questions for each objective are as follows:

Objective 1: Temporal and Spatial Patterns of Road Accidents

RQ1a: Are there notable differences in accident rates at time of day and during peak and off-peak hours?

RQ1b: How do accident frequencies and severities fluctuate across different months and days of the week?

RQ1c: To what extent do weather conditions, seasonal changes, and lighting influence the occurrence and severity of accidents?

Objective 2: Road Infrastructure and Environmental Factors

RQ2a: How do road surface conditions and road types impact accident frequency?

Objective 3: Human Factors and Accident Patterns

RQ3a: What patterns exist in accident involvement relative to driver's age and gender?

RQ3b: What are the prevalent patterns in accident classifications, particularly between single-vehicle and multiple-vehicle incidents?

Methodology

This descriptive investigation utilizes a secondary source data set, that pertains to road traffic accidents (RTCs) that transpired on Pakistani highways and motorways between 2016 and 2021. The data set was provided by the National Highways and Motorway Police (NHMP). The data set offers a distinctive perspective on the dynamics of motor vehicle accidents by comprehensively capturing the environmental, temporal, and human components associated with these incidents. Ullah, Farooq, and Shah (2021) conducted an open-access study that serves as the data's origin.

Variables

Table 1: Variable Analysis

Variable	Description
Crash Injury Severity	Levels of injury severity (e.g., minor, serious, fatal).
Month	The month in which the crash occurred to identify monthly trends.
Day of the Week	The specific day of the week (Monday to Sunday) to analyze weekly patterns.
Weekend vs. Weekday	A binary variable to distinguish crashes on weekends versus weekdays.
Time of Day	Time intervals of crashes (e.g., morning, afternoon, evening, night).
Peaks and Off-Peak Hours	Differentiates crashes occur during peak and off-peak traffic hours.
Weather Conditions	Types of weather at the time of the crash (e.g., clear, rainy, foggy).
Seasonal Variation	Categorizes crashes by seasons (e.g., summer, winter) to evaluate seasonal impact.
Road and Surface Condition	Road surface condition (e.g., dry, wet, icy) at the time of the crash.

Road Type	Type of road (e.g., highway, motorway) where the crash occurred.
Lighting Condition	The lighting condition (e.g., daylight, nighttime) during the crash.
Crash Specification	Specific details of crashes such as type (head-on, rear-end) and vehicle involvement.
Driver Age Group	Age categories of drivers involved in crashes.
Driver Gender	Gender of the drivers involved in crashes.

Data Analysis

Crash Injury Severity

The severity of traffic accidents on Pakistan's national highways presents a concerning picture, with a significant portion of crashes resulting in fatal outcomes. These highways are dangerous because 57.29% of the cases involve fatal injuries, and 29.75% involve major injuries. Minor injuries (6.93%) and non-injury incidents (6.03%) occur far less frequently, indicating that when accidents happen, they are often serious (Figure 1). This high rate of fatal and major injuries highlights an urgent need for measures aimed at enhancing road safety, perhaps through better infrastructure, enforcement of speed limits, and improved emergency response systems.
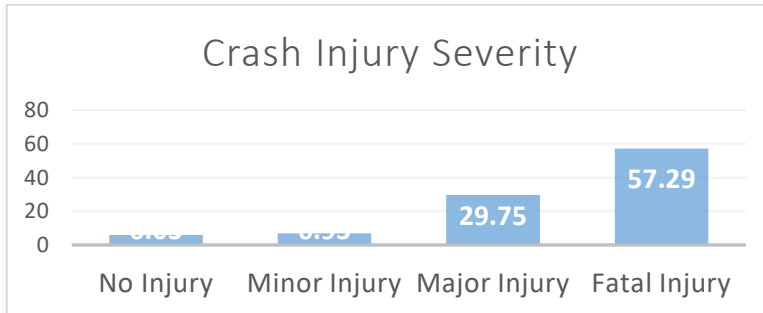

Figure 1: Percentage of Crashes by Injury Severity Level

Time of day

Time of day influences accident rates significantly. The most hazardous times are 3 p.m. to 6 p.m. (17.3%) and 12 p.m. to 3 p.m. (16.36%), likely due to high traffic volumes as people commute or run errands (Figure 2). Morning and evening rush hours (6 a.m. - 9 a.m. at 14.58%, and 6 p.m. - 9 p.m. at 14.33%) are also risky periods. Despite fewer cars on the road during off-peak hours, 66.74% of accidents occur during these times, suggesting that risky driving behaviors, perhaps due to overconfidence or fatigue in lighter traffic, might contribute to crashes. Such data underscores the need for consistent road safety enforcement across all hours.
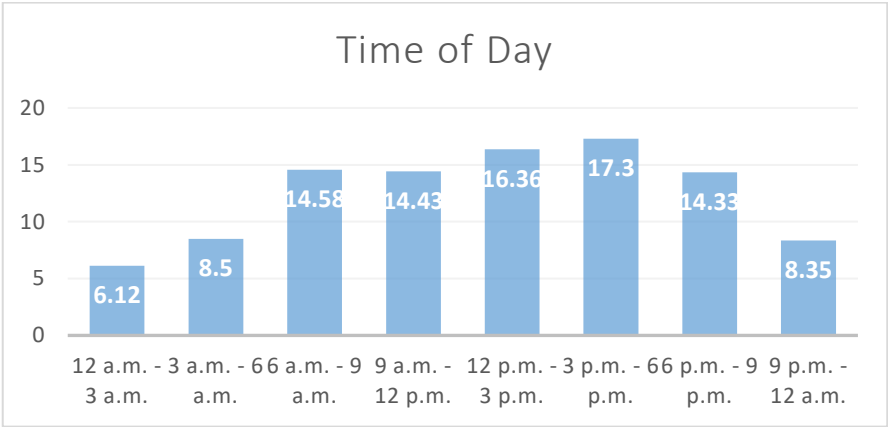
Time of Day

Time	Percentage
12 a.m. - 3 a.m.	6.12
3 a.m. - 6 a.m.	8.5
6 a.m. - 9 a.m.	14.58
9 a.m. - 12 p.m.	14.43
12 p.m. - 3 p.m.	16.36
3 p.m. - 6 p.m.	17.3
6 p.m. - 9 p.m.	14.33
9 p.m. - 12 a.m.	8.35

Figure 2: Percentage of Accidents by Time of Day

Traffic Peaks and Off-Peak Hours

Traffic Peaks and Off-Peak Hours

	Percentage
AM Peak (7:30 - 10:30 a.m.)	16.75
PM Peak (4:30 - 7:30 p.m.)	16.51
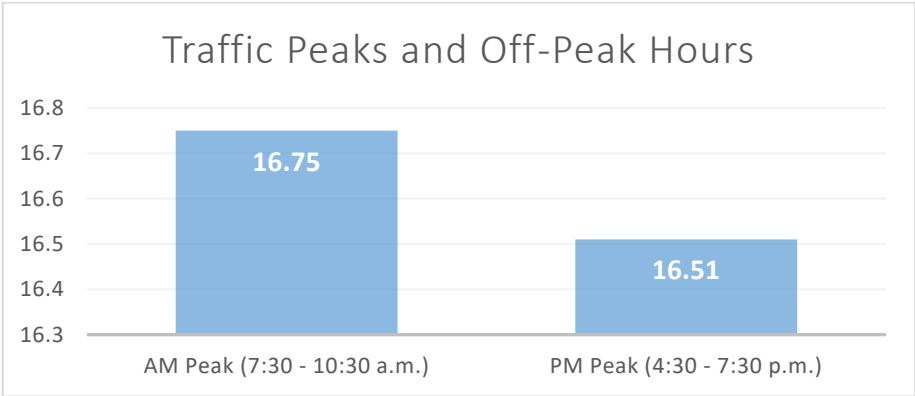
Figure 3: Percentage Difference in Accident Incidents between Peak and Off-Peak Hours

Day of the week

Accidents also vary by day of the week, with weekends being particularly dangerous. Saturday sees the highest percentage of accidents at 17.59%, followed by Friday (14.73%) and Sunday (14.6%) (Figure 3). Overall, 30.75% of crashes happen on weekends, suggesting that increased travel for leisure, combined with possible overconfidence or fatigue, could contribute to these higher rates. While weekdays account for 69.25% of accidents, the elevated risk on weekends calls for enhanced public awareness and possible enforcement measures during these times (Figure 4).
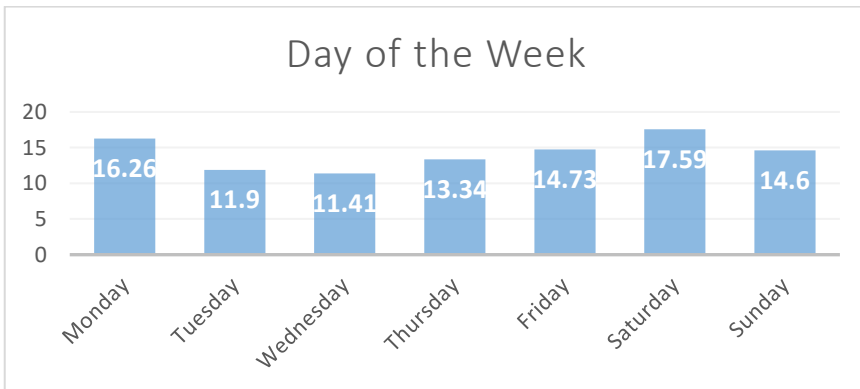
Day of the Week

(Bar chart values: Monday 16.26, Tuesday 11.9, Wednesday 11.41, Thursday 13.34, Friday 14.73, Saturday 17.59, Sunday 14.6)

Figure 4: Percentage Difference in Accident Incidents across the Week

Weekend vs. Weekday

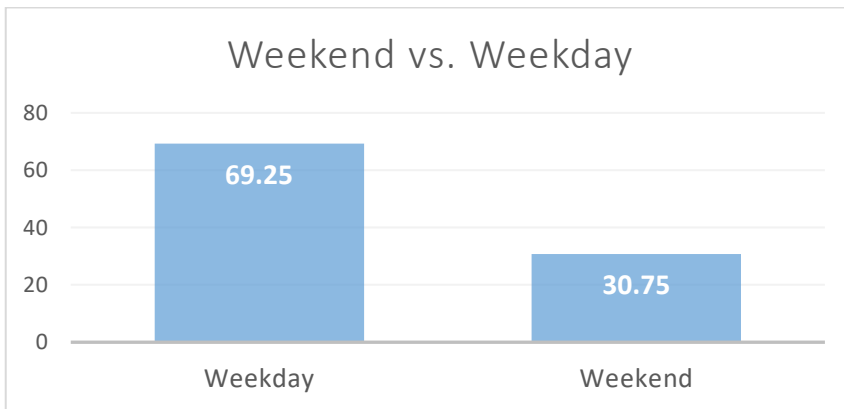## Weekend vs. Weekday

(Bar chart values: Weekday 69.25, Weekend 30.75)

Figure 5: Percentage Difference in Accident Incidents between Weekends and Weekdays

Monthly distribution

The **monthly distribution** of accidents suggests that crashes are not evenly spread throughout the year (Figure 2). July stands out with the highest incidence at 14.68%, perhaps due to increased travel during the summer. Other high-risk months include March (10.43%), April (11.22%), and August (10.73%). In contrast, October (5.16%) and November (5.38%) see relatively fewer accidents. This seasonal trend might reflect variations in road usage, weather conditions, and travel patterns, with warmer months bringing a surge in travel that leads to more accidents.
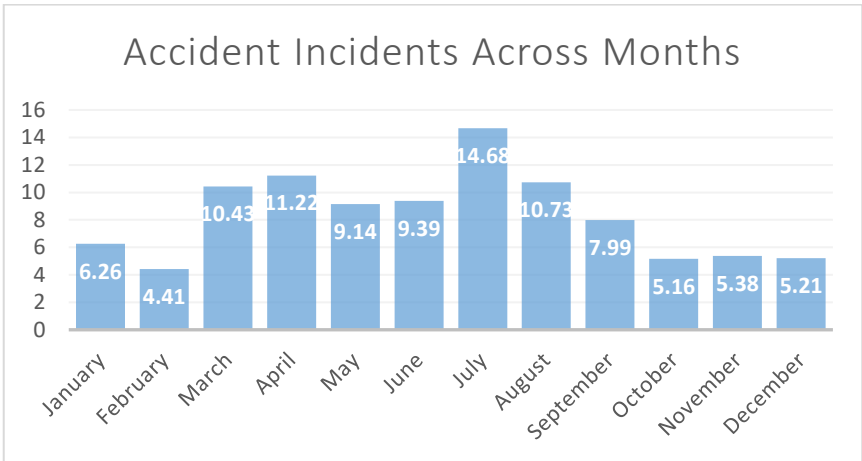
Accident Incidents Across Months

Figure 6: Percentage Difference in Accident Incidents across Months

Weather conditions

      Weather conditions also play a role in traffic accidents, although they might not be the primary factor. Most crashes, 60.15%, occur under sunny conditions, likely because clear weather encourages more people to travel (Figure 7). However, cloudy (22.85%) and rainy conditions (17%) also contribute to accidents, with rain potentially increasing accident severity due to slick roads and reduced visibility. The high proportion of accidents in clear weather might reflect the sheer volume of vehicles on the road, underscoring the need for year-round safety vigilance.
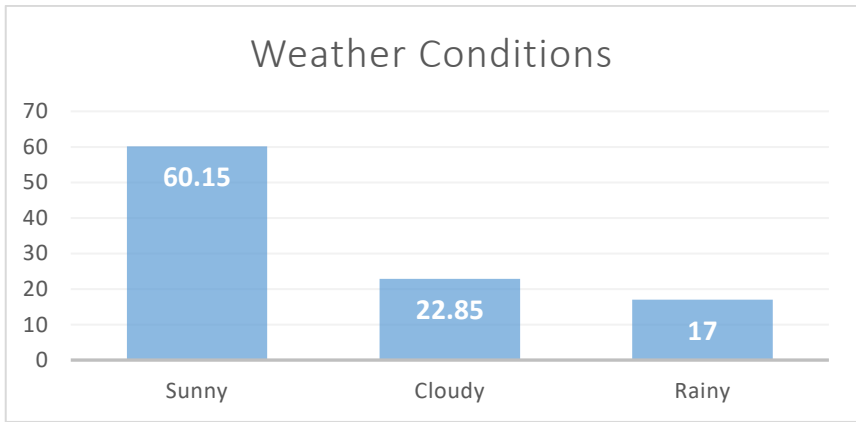
Weather Conditions

Figure 7: Percentage Difference in Accident Incidents by Weather Condition

Lighting Condition

      A significant portion of accidents (68.41%) occur during daylight hours. This suggests that even in well-lit conditions, factors like driver distraction, speeding, and road conditions can contribute to accidents.
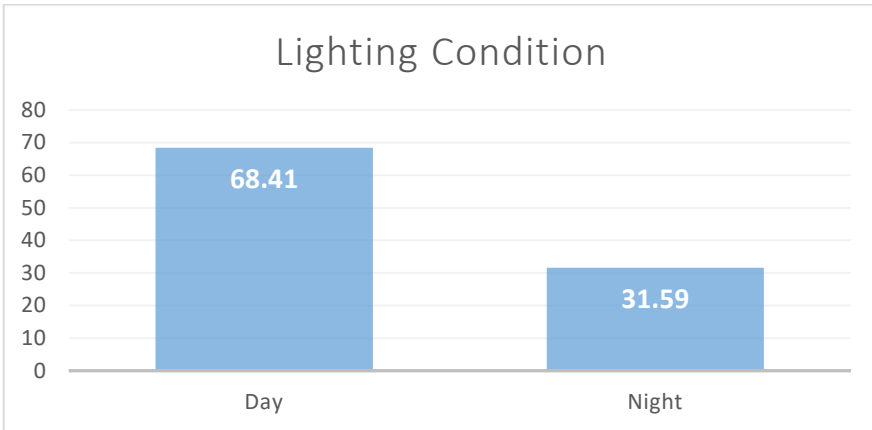
Figure 8: Percentage Difference in Accident Incidents between Day and Night

Seasonal Variations

When looking at seasonal variations, it is apparent that summer, from June to August, has the highest incidence of crashes at 34.8%, followed closely by spring (March to May) at 30.79% (Figure 8). This seasonality might be linked to an increase in road travel during these warmer months, as well as festivals and vacations that bring more vehicles onto highways. Winter (15.88%) and autumn (18.53%) see comparatively fewer accidents, suggesting that these cooler months experience lower travel rates.
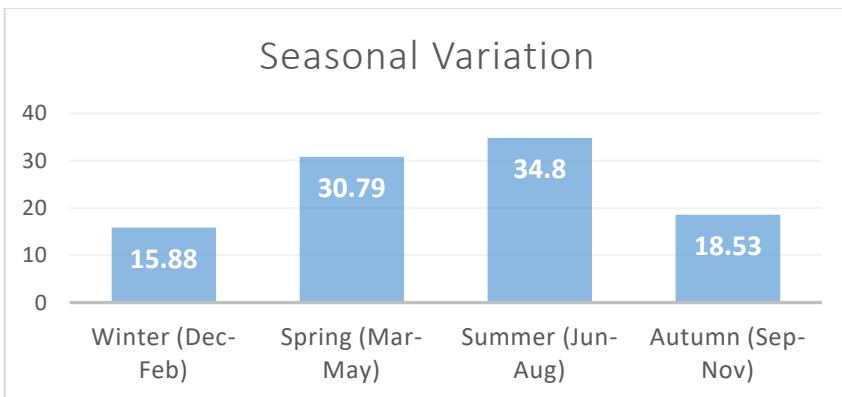

Figure 9: Percentage Difference in Accident Incidents by Season

Road and surface conditions

Examining road and surface conditions, dry road conditions dominate, with 92.24% of accidents occurring on dry surfaces and only 7.76% on wet surfaces. This might reflect Pakistan's generally dry climate but also emphasizes that accidents aren't just a result of adverse weather conditions (Figure 10). Furthermore, more accidents occur during daylight (68.41%) than nighttime (31.59%), although night

crashes might carry a higher risk of severe injuries. Urban areas, which see 61.65% of crashes, have higher accident rates than rural areas (38.35%), which are likely due to greater traffic density and more frequent road interactions in urban settings (Figure 10).
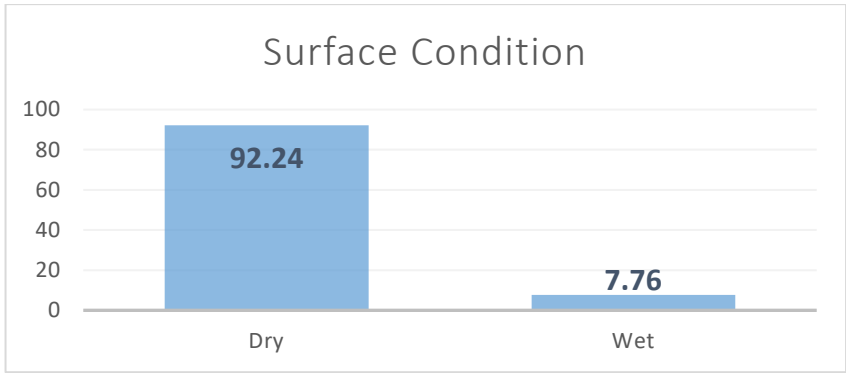

Figure 3 Percentage Difference in Accident Incidents by Road Surface Condition
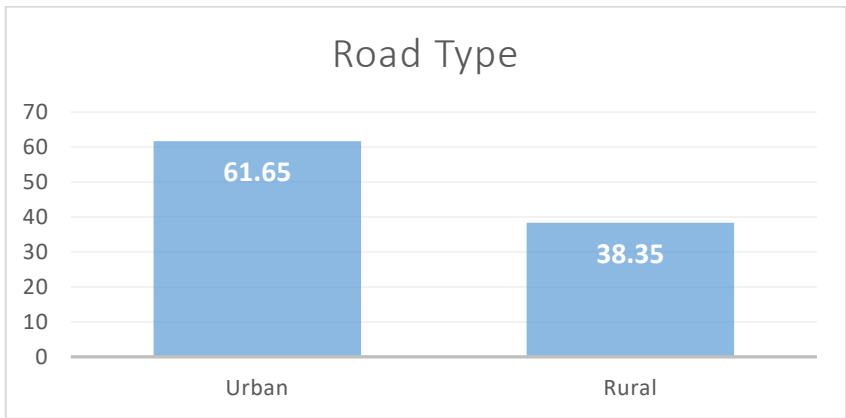
Road Type

Figure 4 Percentage Difference in Accident Incidents by Road Type

Type of Crash

The type of crash also provides insights, with multiple-vehicle collisions making up 65.65% of incidents, while single-vehicle crashes account for 34.35% (Figure 12).
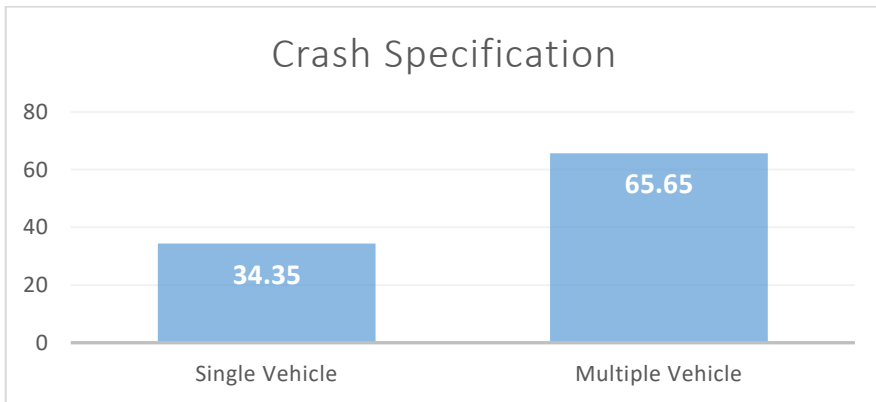
Figure 5 Percentage Difference in Accident Incidents by Crash Type (Multiple-Vehicle vs. Single-Vehicle)

Driver Demographics

Driver demographics reveal a notable trend, with drivers aged 25-50 years involved in 87.7% of accidents, which is expected given that they represent a significant portion of the driving population (Figure 13). Younger drivers under 25 contribute to 7.71% of crashes, and older drivers above 50 make up 4.59%. This data implies that the most active age group on highways also faces the highest risk, which could point to both higher exposure and possible behavioral factors. Gender disparities are stark, with male drivers involved in 92.98% of accidents compared to 7.02% for female drivers (Figure 14). This may suggest that men's higher road presence and possibly riskier driving habits need addressed in targeted safety campaigns.
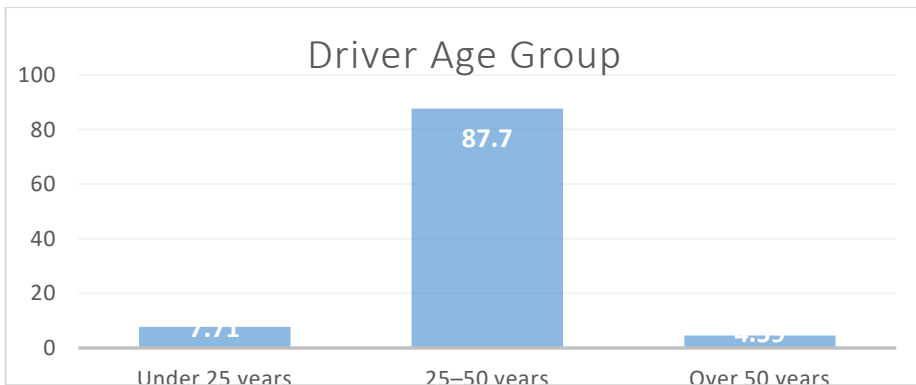

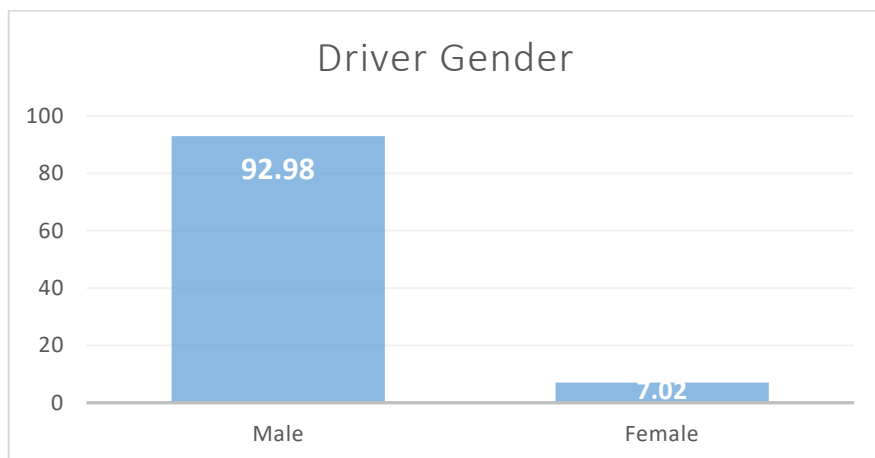***Figure 6*** Percentage Difference in Accident Incidents by Age Group

Figure 7: Percentage Difference in Accident Incidents by Gender

Discussion

Temporal and Spatial Patterns of Road Accidents

An examination of traffic accident data from Pakistani roadways has shown key factors affecting accident severity. A considerable percentage of accidents led to severe injuries (29.75%), mild injuries (6.33%), and deaths (57.29%). This concerning trend highlights the immediate necessity for extensive road safety measures.

Statistically, accident rates are very sensitive to the time of day. Data shows that the busiest times of day are between 3 to 6 p.m. and 12 to 3 p.m., when there is a lot of traffic because people are commuting or running errands. Additionally, there are two times of day when traffic is very heavy: 6 a.m. to 9 a.m. and 6 p.m. to 9 p.m. (14.33%). Even though there are less vehicles on the road during off-peak hours, 66.74 percent of accidents still happen during these times. One of the reasons could be distractions, especially smartphone use, cause most off-peak accidents. Using a smartphone for more than 10 seconds might cause serious accidents even in low-traffic areas (Delgado, Wanner, & McDonald, 2016; Willens, 2024). Moreover, in these times drivers are more likely to engage in dangerous behaviors, like driving too fast or using mobile phone (Akshay, Pushpa, & Manoranjan, 2021). Evidence suggests that people are more prone to participate in risky driving behaviors during off-peak hours, particularly at night and in the early morning (Åkerstedt, Kecklund, & Hörte, 2001). Sleep deprivation (Alvaro, et al., 2018; Ebel, 2013), circadian rhythms, and alcohol (Keall, Frith, & Patterson, 2005) intake are all key contributors to this elevated risk. Interventions aimed at educating people about sleep and driving, as well as stricter enforcement of nighttime driving limits, could help reduce these hazards (Nguyen, Jauregui, & Dinges, 1998).

Like the rest of the world, Pakistan sees a greater accident rate on weekends. This might be because of certain days in the weekend or just before it, dangerous

actions among delivery riders, or motorcycle crashes (Sanjurjo-de-No, Pérez-Zuriaga, & García, 2023). The percentage of accidents is highest on Saturday (17.59%), then on Friday (14.73%), and finally on Sunday (14.6%). According to a recent study, the majority of accidents occur on Fridays (Dias, Silva, & Bernardino, 2023). The fact that 30.75 percent of accidents occur on weekends raises the possibility that weekend commuters are more likely to be overconfident or exhausted, in addition to the fact that more people travel for leisure on these days (Brogmus, 2007). Data shows that although 69.25% of accidents occur during the week, the increased danger on weekends need more public awareness and maybe enforcement measures (Tiruneh, et al., 2018).

Monthly distribution of accidents, which indicates that there is an uneven distribution of crashes throughout the year. At 14.68%, July has the highest occurrence, which may be attributable to the fact that more people travel during that season. April (11.22%), March (10.43%), and August (10.73%) are three more months that provide a high danger. In comparison, the accident rates are lower in November (5.38%) and October (5.16%). Similar to the rest of the world, Pakistan sees an increase in traffic accidents throughout the summer. Regions like the United States and Australia have seen an increase in deadly accidents due to climate change, which is characterized by greater temperatures and changing weather patterns (Ambanattu, et al., Effect of climate change on road traffic accidents in the UAE: a narrative review., 2023; Li, Varghese, Liu, Bi, & Tong, 2023). There needs to be adequate climate management in vehicles because the accident rate on roadways might treble when ambient temperatures are high. Heat has both direct and indirect impacts, the former of which is a decline in cognitive ability and the latter being shifts in the patterns of precipitation (Park, Kwon, & Park, 2023). Higher fatal crash rates have been associated with hotter and more humid climates in places like Bangladesh (Islam, Iqra, Huq, & Tasnim, 2023).

Road Infrastructure and Environmental Factors

Although it may not be the main factor, weather conditions do contribute to road accidents. Most crashes, 60.15 percent, tend to happen when the weather is sunny, probably because more individuals are inclined to travel when the weather is nice. On the other hand, accidents are common when it's cloudy (22.85%) or rainy (17%). The latter can make roads slippery and visibility worse, which can lead to more serious accidents. This is consistent with other countries' findings, which show that overcast and wet weather is positively associated with traffic crash fatalities (Ambanattu, et al., 2023; Mhetre & Thube, 2023). Rainy days can cause water to accumulate on the road surface, lowering the friction coefficient and increasing the risk of deviation and safety concerns (Zhang, 2023). The high number of incidents in clear weather may reflect the volume of vehicles on the road, emphasizing the need for year-round safety.

Summer (June–August) has the greatest accident incidence at 34.8%, followed closely by spring (March–May) at 30.79%, according to the seasonal fluctuations. Road travel may rise during warmer months due to festivals and holidays that attract more cars onto roadways. During the winter (15.88%) and fall (18.53%), there are fewer accidents, indicating that fewer people are travelling during these cooler months. According to seasonal patterns, the months with the most traffic can necessitate heightened road safety initiatives and readiness. A study conducted in Turkey indicates that accidents are most frequent during autumn, with a decline in prevalence observed from winter to summer (Akhtar, Brooks, Kitchen, & O'Connor, 2023).

When it comes to road and surface conditions, dry roads take the lead, accounting for 92.24% of accidents and 7.76% on wet surfaces. This may reflect Pakistan's generally dry environment, but it also emphasizes that accidents are not just the result of poor weather conditions. Furthermore, more accidents occur during the day (68.41%) than at night (31.59%), yet night wrecks may pose a larger risk of serious injury. Urban regions had 61.65% more accidents than rural areas (38.35%), which is most likely due to higher traffic density and more frequent road contacts in urban settings.

Wet roads and poor pavement surface conditions dramatically enhance the likelihood of a traffic collision. Moderate rainfall is especially harmful; however, resurfacing and maintaining proper pavement conditions can significantly lower accident rates. Policymakers should incorporate these elements into road safety policies to reduce the risks associated with wet and badly maintained roads.

Wet roads increase traffic accidents due to decreased skid resistance and longer stopping distances (Hussein, Hassan, & Fahey, 2021). High rainfall levels increase the likelihood of accidents, with moderate rainfall posing the greatest danger (Sangkharat, Thornes, Wachiradilok, & Pope, 2021). Poor pavement conditions, like roughness and inadequate skid resistance, are associated with increased accident risk (Mkwata & Chong, 2022). Resurfacing roads decreases crash frequency and severity while improving surface conditions. Post-resurfacing improves safety by increasing skid resistance and smoothing driving surfaces (Rasol, et al., 2021). Heavy rains may lessen the risk due to lower traffic congestion during extreme weather.

Human Factors and Accident Patterns

Lastly, we can learn something from the kind of crash that occurred; 65.65% of all accidents include more than one vehicle, whereas 34.35% involve just one. On congested roadways, where drivers often change lanes and collide with one another, collisions involving many vehicles are common (Hussain & Shi, 2019; Javid, et al., 2022). Studies have shown that an individual's level of motorbike riding expertise is a strong predictor of risky driving habits and collisions, according to the research. There is a correlation between aggressive driving and longer rides, as well as certain demographic factors (young and male) and risky driving habits (Yousaf & Wu, 2023).

This trend highlights the importance of implementing safe driving standards, such as keeping a safe distance and following speed limits, particularly on highways with heavy traffic.

As one would expect from such a large segment of the driving population, drivers between the ages of 25 and 50 account for 87.7 % of all accidents. Drivers under the age of 25 account for 7.71% of collisions, while drivers over the age of 50 account for 4.59%. This research suggests that the age group most likely to be active on highways also has the highest risk, which may be due to a combination of variables including increased exposure and possibly changes in behavior. The gender gap is wide: 7.22% of incidents involving female drivers and 92.98% involving male drivers. In Pakistan, women make up fewer than 10% of the driving population, according to the provincial traffic administration. This trend is visible world over (Vinish, et al., 2023; Bhele & Rajchal, 2023). As the research shows, individual aberrant driving behavior greatly promotes unsafe expressway driving, with violations and errors being more important among male and young drivers (Akshay, Pushpa, & Manoranjan, 2021; Lee, Guldmann, & Rabenau, 2023). It appears that there is a need for safety initiatives that specifically target men, given their increased road presence and potentially riskier driving practices.

Highways are riskier environments for accidents that result in fatal injuries, while urban roads tend to have more minor injuries due to higher traffic density and lower speeds. The comparison could help emphasize road safety measures that prevent fatal injuries on highways, such as better road signs, speed limits, and emergency response systems.

Reducing speeds, improving road infrastructure (by adding barriers or guardrails), and enhancing emergency response systems should be the primary goals of highway safety initiatives due to the greater severity of incidents on these routes. On the flip side, pedestrian safety, traffic management, and motorcyclist safety could all use some work in densely populated places, where small accidents happen all the time. This would help mitigate the impact of these incidents and keep people safe in regions with heavy traffic.

Conclusion

This research examined the temporal, spatial, and human factors affecting road accidents in Pakistan. The analysis identified specific patterns in accident occurrence, highlighting peak hours, weekends, and urban areas as high-risk periods and locations.

Temporal factors, including time of day and day of the week, significantly influenced accident rates. Peak hours, defined by significant traffic congestion, and off-peak hours, associated with potential distractions and fatigue-related concerns, were recognized as essential intervals for accident prevention.

Spatial factors, such as road infrastructure and environmental conditions, were significant contributors. Urban areas, characterized by intricate road networks and elevated traffic density, exhibit increased accident rates. Adverse weather conditions, including rain and fog, increased the risk of accidents, especially on inadequately maintained roads.

Driver's behavior and demographics were identified as significant contributors to accidents. Accident statistics indicate an overrepresentation of younger and older drivers, along with male drivers. The study emphasized the effects of driver fatigue, alcohol consumption, and distracted driving on the incidence of accidents.

A multi-faceted approach is essential to effectively address these issues. This encompasses focused safety campaigns, enhanced road infrastructure, more rigorous enforcement of traffic regulations, and initiatives aimed at public awareness. Understanding the complex interplay of these factors enables policymakers and stakeholders to formulate effective strategies aimed at reducing road accidents and improving road safety in Pakistan.

Recommendations: A Comprehensive Approach to Road Safety

*Figure 8*The Policy Model based on 5Ps of Road Safety

The 5Ps of Road Safety

Plan:

- **Integrated Urban Planning:** Prioritize pedestrian and cyclist safety in urban planning, creating safe and accessible infrastructure.
- **Sustainable Transportation Planning:** Promote sustainable transport options like public transport included buses and intracity trains to reduce reliance on personal vehicles.

- **Data-Driven Decision Making:** Utilize data analytics to identify accident hotspots and implement targeted interventions.

Protect:

- **Infrastructure Improvements:** Invest in road infrastructure improvements, such as well-maintained roads, clear signage, and adequate lighting.
- **Road Safety Audits:** Conduct regular road safety audits to identify potential hazards and implement corrective measures.
- **Vehicle Safety Standards:** Enforce strict vehicle safety standards and regulations, including mandatory use of seat belts and child safety restraints.

Prevent:

- **Strict Law Enforcement:** Implement strict enforcement of traffic laws, including penalties for speeding, rule violations, and reckless driving.
- **Public Awareness Campaigns:** Conduct comprehensive public awareness campaigns to educate the public about road safety rules and regulations.
- **Driver Training and Education:** Promote driving education programs to improve driving skills and knowledge.

Prepare:

- **Emergency Response Systems:** Enhance emergency response systems, including well-equipped ambulances and trained first responders.
- **Trauma Care Facilities:** Establish well-equipped trauma centers and medical facilities near high-risk areas to provide timely medical care.
- **Crisis Management Plans:** Develop comprehensive crisis management plans to effectively respond to accidents and minimize their impact.

Promote:

- **Active Transportation:** Encourage active transportation, such as walking and cycling, through the development of safe and accessible infrastructure.
- **Public Transportation:** Invest in public transportation systems to reduce reliance on personal vehicles and alleviate traffic congestion.
- **Behavior Change Interventions:** Implement behavior change interventions to promote safe driving behaviors, such as using seat belts, avoiding distractions, and adhering to speed limits.

Adopting these recommendations can substantially decrease the number of road accidents, save lives, and establish safer and more sustainable roads.

Limitations of the study

The investigation is subject to a number of limitations. To start, the research only looks at secondary sources of information, thus it doesn't show the whole scope of traffic incidents in cities and other densely populated areas. Secondly, it is limited in its scope because it only includes descriptive analysis and does not incorporate inferential statistics, which means that it does not account for causal connections or prediction regressions. Additionally, the study solely considers demographic variables such as age and gender, excluding drivers' traffic literacy and a host of other personal aspects. The need for more research using primary data and sophisticated statistical methods has been recognized.

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