

Potential psychological implications of road accidents during festive and peak travel periods in South Africa

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Abstract: This study explores the psychological implications of road accidents during South Africa's festive and Easter periods, focusing on how psychological factors contribute to accidents and affect victims, families, and emergency responders. A literature-based research approach was used, guided by Systems Theory, Risk Management Theory, and Resource-Based Theory. Peer-reviewed studies and reports from 2019–2025 were synthesized to examine the intersection of psychological, environmental, and systemic factors influencing road safety. The study found that stress, fatigue, aggression, distraction, and mental illness are key psychological contributors to road accidents. The psychological consequences include post-traumatic stress disorder, depression, anxiety, and burnout among emergency responders. Evidence supports the need for early intervention, public awareness, and improved mental health support during high-risk travel periods. Integrating mental health care into road safety strategies, applying predictive analytics for resource allocation, and implementing targeted public education can mitigate psychological harm and enhance resilience among road users and responders during peak travel seasons.

Keywords: *Festive and easter travel, Predictive modelling, Psychological implications, Resource allocation, Road safety.*

1. Introduction

Road accidents are a leading cause of death and injury in South Africa, with marked spikes during the festive and Easter holidays. These periods are characterized by increased travel, particularly in provinces with high tourism and pilgrimage activity, resulting in overburdened emergency resources and heightened accident risk [1]. While much attention is paid to the physical and economic impacts, the psychological implications for drivers, victims, families, and emergency responders are extreme but underexplored.

1.1. Background and Rationale

During the deep festive period (seven days before Christmas to seven days after New Year's Day) and Easter, South Africa consistently records a surge in road accidents and fatalities, especially in provinces such as Gauteng, Eastern Cape, KwaZulu-Natal, and Limpopo. The combination of increased travel volumes, holiday-related stress, and resource imbalances creates a complex environment where psychological factors play a critical role in accident causation and consequences.

1.2. Problem Statement

Road accidents in South Africa significantly increase during the festive and Easter holiday periods, particularly in high-travel provinces such as Gauteng, Eastern Cape, KwaZulu-Natal, and Limpopo. This surge places immense pressure on emergency services and results in a higher incidence of fatalities and injuries. While the physical and economic impacts of these accidents have been widely studied, the

psychological effects on drivers, victims, their families, and emergency responders remain largely underexplored. The interplay of increased travel, holiday-related stress, and resource constraints creates a complex environment where psychological factors contribute both to the occurrence of accidents and to the severity of their aftermath. Addressing this gap is essential for developing comprehensive interventions that reduce accident rates and support the mental health of all affected parties during these critical periods.

1.3. Research Gap

Despite extensive research on the physical and economic consequences of road accidents in South Africa, especially during the festive and Easter holiday periods, there is a significant lack of focus on the psychological impacts associated with these incidents. The mental health effects on drivers, accident victims, their families, and emergency responders have not been adequately studied or addressed. Moreover, the complex interaction between increased travel volumes, holiday-related stress, and limited emergency resources, and how these factors influence both accident causation and psychological outcomes, remains poorly understood. This gap limits the development of holistic strategies that aim to reduce accident rates and also provide psychological support to those affected during high-risk holiday seasons.

1.4. Research Question

The research question under discussion is, “How do psychological factors influence the occurrence and aftermath of road accidents during the festive and Easter holiday periods in high-travel provinces of South Africa, and what are the implications for drivers, victims, families, and emergency responders?”

2. Literature Review

2.1. Psychological Causes of Road Accidents

According to Harantová et al. [2], psychological causes of road accidents are mental or emotional states and behavioral tendencies that impair a driver's decision, reaction time, or decision-making. These factors can significantly increase the risk of crashes. Key psychological causes include *stress and anxiety*, *fatigue and sleep deprivation*, *aggression and road rage*, *distraction and inattention*, *overconfidence*, *impaired judgment*, *mental illness*, *personality traits*, and *cognitive decline*.

- *Stress and anxiety [SaA]*: The holiday season relates to increased stress due to travel, shopping, family expectations, and financial pressures [3]. This stress can weaken judgment, increase aggression, and lead to risky driving behaviors such as speeding and distraction. Stress and anxiety are important psychological factors that can contribute to road accidents by impairing a driver's focus and decision-making abilities. A driver who is stressed or anxious, whether due to personal issues, work pressure, or traffic itself, experiences a shift in mental focus away from the road. This increases the likelihood of missing important cues like traffic signals or sudden obstacles. Such emotional strain can also lead to impulsive actions, such as sudden lane changes or aggressive driving, and generally reduces reaction time. It can make it difficult to respond appropriately in critical situations.
- *Fatigue and sleep deprivation [FaSD]*: Fatigue and lack of sleep [FaSD] are psychological causes of road accidents that can impair a driver's vigilance, attention, and reaction time [4]. A tired driver's ability to focus on the road weakens. Such drivers may experience brief, involuntary lapses into sleep that can last a few seconds without even realizing it. These lapses are especially dangerous at high speeds, as even a short loss of attention can cause a serious collision. Fatigued drivers often have slower reflexes and impaired judgment, similar to those under the influence of alcohol. These tendencies make fatigued drivers a high risk to themselves and others on the road.
- *Aggression and road rage [ARR]*: Emotional states such as anger, frustration, or depression can manifest into road rage or impaired driving [5]. These can further elevate accident risk. ARR are

psychological states with the potential for dangerous driving behaviors and an increased risk of accidents. Drivers who experience ARR may engage in reckless actions such as tailgating, excessive speeding, sudden lane changes, or confrontational gestures toward other road users [5]. These aggressive responses often stem from perceived slights, traffic delays, or personal stress, and they impair judgment and reduce the ability to respond calmly to unexpected situations. Road rage can escalate minor driving conflicts into serious incidents. It can create hazardous conditions for the aggressive driver and also for everyone around them.

- *Distraction and Inattention* [DAI]: Mental distraction, whether from personal worries or environmental stimuli (e.g., holiday lights, mobile devices), significantly increases accident risk. Inattention frequently contributes to road crashes. According to Yang et al. [6], DAI are serious psychological factors contributing to road accidents as they divert a driver's mental attention away from driving responsibilities. Cognitive distractions, such as daydreaming or preoccupation with personal concerns, often cause drivers to miss important visual and auditory signals on the road. Mental inattention is not easy to detect, but it is still equally dangerous by reducing the driver's ability to react quickly to rapid changes in traffic or road conditions, increasing the probability of collisions.
- *Overconfidence*: Overconfidence is a psychological factor that can considerably increase the risk of road accidents by causing drivers to overestimate their skills and underestimate potential dangers [7]. Drivers who are overly confident may take unnecessary risks, such as speeding, ignoring traffic signals, or attempting risky maneuvers such as overtaking in unsafe conditions. This mindset is particularly common among young and inexperienced drivers, who may lack the judgment to recognize hazardous situations. Overconfident drivers often believe they are in full control, even when they are not, which can result in poor decision-making and a reduced margin for error on the road.
- *Impaired Judgement*: Impaired judgment due to alcohol, drugs, or certain medications is a major psychological cause of road accidents [8]. It significantly affects a driver's perception, coordination, and decision-making abilities. Even small amounts of alcohol or mild drug use can slow reaction times, blur vision, and reduce alertness. This can make it difficult to assess situations accurately and respond appropriately. Impaired judgment may lead to taking more risks, misjudging distances, or failing to recognize hazards, thereby increasing the likelihood of collisions. This impairment is not limited to illegal substances; prescription or over-the-counter medications with sedative effects can also compromise driving performance, often without the driver's full awareness.
- *Mental Illness*: Mental illnesses such as depression, anxiety disorders, bipolar disorder, ADHD, or schizophrenia can impair a driver's ability to operate a vehicle safely by affecting focus, emotional regulation, and cognitive function [9]. These conditions may lead to distraction, slowed reaction times, impulsiveness, or erratic behavior while driving. In more severe cases, symptoms like delusions or hallucinations can interfere directly with a driver's perception of reality, making driving extremely hazardous. Even when symptoms are less obvious, the overall mental strain can reduce situational awareness and increase the likelihood of poor decision-making, contributing to a higher risk of involvement in an accident.
- *Personality Traits*: Javadi et al. [10] insinuate that there are personality traits, such as impulsiveness, a tendency toward thrill-seeking, and a high tolerance for risk, that can increase the risk of road accidents. Drivers with these traits can easily engage in high-risk behaviors such as speeding, weaving through traffic, ignoring road signs, or even overtaking in unsafe conditions. Their inclination toward risk-taking often stems from a desire for excitement or a lack of regard for rules and consequences. This disregard for safety endangers drivers and poses serious threats to other road users. It makes personality a crucial psychological factor in traffic safety.

- *Cognitive Decline*: Cognitive decline, which occurs mostly in older adults, is a psychological factor that can affect driving safety by impairing memory, attention, reaction time, and decision-making abilities [11]. As cognitive functions deteriorate, drivers may struggle with multitasking, recognizing traffic signs, or responding quickly to unexpected situations on the road. Early stages of conditions such as dementia or Alzheimer's disease can be especially dangerous because people may be unaware of their impairments and continue to drive despite reduced capabilities. This decline in mental sharpness increases the risk of confusion, navigation errors, and delayed responses that contribute to a higher likelihood of accidents.

2.2. Psychological Consequences of Road Accidents

The psychological consequences of road accidents can be severe and enduring, impacting victims, witnesses, first responders, and the families of those involved [12]. These effects can differ in intensity based on the severity of the accident, individual resilience, and the support systems accessible. Key psychological consequences include:

- *Post-Traumatic Stress Disorder (PTSD)*: PTSD is a common and serious psychological consequence of road accidents [13]. It can develop after a person experiences or witnesses a traumatic event, such as a severe collision where there is a threat to life or serious injury. People with PTSD may suffer from persistent and distressing symptoms such as flashbacks, nightmares, emotional numbness, hypervigilance, and avoidance of situations that remind them of the accident. These symptoms can significantly impair daily functioning, relationships, and overall mental well-being. Without proper treatment, PTSD can become chronic and deeply impact a person's quality of life.
- *Acute Stress Reaction (ASR)*: ASR is a short-term psychological response that occurs immediately after a traumatic event, such as a road accident [14]. Individuals experiencing this reaction may feel dazed, emotionally numb, confused, or anxious, and may have difficulty concentrating or remembering details of the incident. Physical symptoms like rapid heartbeat, sweating, or nausea can also occur. This response typically emerges within minutes to hours following the accident and may last for a few days. While it often resolves on its own, in some cases, if the symptoms persist or worsen beyond a month, it may develop into more serious conditions like PTSD. Therefore, ASR requires professional intervention.
- *Acute Psychological Trauma (APT)*: Survivors of road accidents often experience ASRs, including shock, confusion, and emotional numbness. APT is an immediate emotional and mental response to the sudden and overwhelming stress of a road accident [15]. It often involves intense feelings of fear, helplessness, or horror, and can manifest through symptoms such as confusion, emotional numbness, dissociation, and physical reactions like a rapid heartbeat or sweating. This trauma can disrupt a person's ability to process the event and cope effectively in the short term. While APT may resolve naturally with time and support, if left unaddressed, it can lead to longer-lasting conditions such as PTSD or other mental health issues. This makes early recognition and intervention of APT important for recovery.
- *Chronic Mental Health Effects (CMHEs)*: Repeated exposure to accidents, especially during high-risk periods, can lead to chronic stress, anxiety, depression, and even PTSD among victims and witnesses. CMHEs are long-term psychological outcomes that can develop following a road accident, particularly when the trauma is severe or inadequately treated [16]. These effects may include persistent depression, anxiety disorders, PTSD, and even personality changes, which can last for months or years after the incident. Individuals may struggle with ongoing emotional distress, low self-esteem, difficulty maintaining relationships, and reduced capacity to function in daily life or at work. In some cases, the psychological effects can lead to social withdrawal, substance abuse, or suicidal thoughts. Addressing these chronic effects through sustained mental health support and therapy is crucial for long-term recovery and improving quality of life.

- *Impact on Emergency Responders:* Overburdened emergency personnel in high-accident incident provinces face an increased risk of burnout, compassion fatigue, and secondary traumatic stress, especially when resources are inadequate [17]. Emergency responders, including paramedics, firefighters, and police officers, often experience significant psychological effects due to their involvement in responding to accidents. Repeated exposure to traumatic scenes involving severe injuries, fatalities, and emotional distress can lead to chronic stress, compassion fatigue, anxiety, depression, and even PTSD. The emotional burden of making life-and-death decisions, witnessing suffering, and dealing with grieving families can accumulate over time, affecting both their professional performance and personal well-being. Without adequate mental health support, debriefing, and coping strategies, these psychological impacts can become severe. This underscores the need for proactive mental health care and institutional support for emergency personnel.
- *Depression:* Depression is a common psychological consequence following a road accident, especially for those who have sustained serious injuries, lost loved ones, or faced significant life changes due to trauma [18]. It can manifest as persistent feelings of sadness, hopelessness, and a loss of interest or pleasure in activities once enjoyed. People may also experience fatigue, changes in appetite or sleeping patterns, difficulty concentrating, and feelings of worthlessness or guilt. This emotional state can severely affect motivation and the ability to engage in daily activities, making recovery more challenging. Without appropriate support or treatment, depression can become chronic and significantly impair overall well-being.
- *Anxiety Disorders:* Anxiety disorders are frequently observed after road accidents and can take several forms, including generalized anxiety, specific phobias, and panic attacks [19]. Individuals may experience constant worry and nervousness about their safety or the possibility of another accident. This can lead to avoidance behaviors such as refusing to drive or ride in a vehicle. Some accident victims develop specific fears, like vehophobia, an intense fear of driving. Panic attacks, which are sudden episodes of overwhelming fear accompanied by physical symptoms such as a racing heart, shortness of breath, and dizziness [20], can also occur, making everyday activities difficult. These anxiety symptoms can interfere with a person's ability to function normally and may require therapeutic or medical treatment to manage effectively.
- *Survivor's Guilt:* Survivor's guilt is a psychological consequence that often affects individuals involved in road accidents where others have been seriously injured or killed [21]. Those who survive may experience intense feelings of guilt and self-blame, questioning why they lived while others did not, even if the accident was beyond their control. According to Vaish [22], this guilt can lead to emotional distress, including sadness, anxiety, and withdrawal from social interactions. It may also contribute to depression and hinder the healing process by making it difficult for survivors to forgive themselves. Addressing survivors' guilt is important in helping individuals cope and regain a sense of peace after such traumatic events.
- *Chronic Pain and Psychosomatic Symptoms (CPPSs):* CPPSs are common psychological consequences following road accidents, where emotional distress can intensify or even cause physical pain such as headaches, back pain, or muscle tension [23]. This interplay between mind and body creates a cycle in which psychological stress amplifies physical discomfort, and ongoing pain further worsens emotional well-being. As a result, individuals may experience persistent suffering that affects their daily functioning and quality of life. Managing both the physical and psychological aspects is crucial for effective recovery and improving overall health after an accident.
- *Substance abuse:* Some individuals coping with the psychological aftermath of road accidents may turn to substance abuse to manage their emotional pain and trauma [24]. Alcohol or drug use can provide temporary relief from symptoms like anxiety, depression, or intrusive memories, but often leads to worsening mental and physical health problems over time. This maladaptive coping strategy increases the risk of further accidents, dependence, and social or legal issues. It makes

recovery more difficult. Addressing substance abuse alongside trauma-related symptoms is essential for effective treatment and long-term healing.

- *Sleep Disturbances:* Sleep disturbances are a common psychological consequence following road accidents, often manifesting as difficulty falling asleep, staying asleep, or experiencing restless sleep [25]. Many individuals suffer from insomnia or frequent nightmares related to the traumatic event, which can disrupt normal sleep patterns and leave them feeling fatigued and emotionally drained during the day. Poor sleep further increases anxiety, depression, and cognitive difficulties. It creates a vicious cycle that hinders recovery. Addressing sleep problems is important for treating trauma-related psychological effects and improving overall well-being.
- *Cognitive Impairments:* According to Mwenya et al. [26], cognitive impairments, such as difficulty concentrating, memory problems, and indecisiveness, are often experienced by individuals after road accidents, especially if they have sustained a traumatic brain injury or are under significant emotional stress. These cognitive challenges can affect everyday tasks, work performance, and the ability to process information effectively, adding to the overall burden of recovery. Emotional distress from the accident may also impair cognitive functioning. It makes it hard to focus or make decisions. Addressing these impairments through therapy and supportive strategies is necessary for improving mental clarity and helping individuals regain their independence.
- *Impact on Daily Life and Relationships:* Road accidents can significantly impact daily life and relationships [27]. They can make it difficult for individuals to return to work, school, or social activities due to physical injuries or psychological distress. Emotional changes such as mood swings, irritability, or withdrawal may strain relationships with family, friends, and colleagues. These may lead to feelings of isolation and loneliness. The disruption of routine and social support can further hinder recovery and affect overall quality of life. Providing emotional support and counseling can help individuals rebuild their lives and maintain healthy relationships after traumatic events caused by road accidents.

2.3. Psychological Effects on Specific Groups

Groups that may be psychologically affected by accidents include victims/survivors, victims' families, emergency responders, witnesses, and victims' children [28]. They are discussed next.

- *Victims/Survivors:* Delcea et al. [29] explain that individuals directly involved in accidents often experience various psychological effects, from immediate shock and confusion to long-term emotional distress. They may suffer from anxiety, depression, PTSD, and phobias such as fear of driving or being on the road. These conditions can be worsened by physical injuries that result in chronic pain, disability, or disfigurement [30], which could cause reduced self-esteem and social withdrawal. Survivors may struggle to return to normal routines, experience difficulties at work or school, and could lose interest in activities they once enjoyed. The psychological recovery process can be slow and intricate, especially if the accident involved loss of life or if the individual feels responsible, even when not at fault.
- *Victims' families:* The families of accident victims may experience deep psychological distress, whether their loved ones survived or not [31]. In fatal accidents, grief can be intense and may cause problematic bereavement, depression, or even PTSD. Families caring for a survivor with serious injuries or disabilities may also experience emotional strain. This can create feelings of helplessness, chronic stress, and emotional exhaustion [32]. The financial burden and lifestyle changes necessitated after an accident can further add to psychological strain, especially when roles within the family shift when the victim cannot continue functioning. Children in the family may demonstrate behavioral changes, anxiety, or confusion, especially if they lack proper support and explanation of the events.
- *Emergency responders:* Emergency responders such as paramedics, firefighters, and police officers usually witness traumatic accident scenes and human suffering [33]. As they accumulate these

experiences over time, they may have psychological effects such as PTSD, depression, and compassion fatigue. Many responders struggle with intrusive memories, sleep disturbances, and emotional numbness, mainly when children or mass casualties are involved in accidents [34]. The high-stress environment, combined with the pressure to remain composed and effective during emergencies, often leaves little room for emotional processing. Without adequate support systems, regular debriefing, and mental health services, responders may turn to unhealthy coping mechanisms or become disengaged, both personally and professionally.

- *Witnesses*: Those who witness road accidents can also experience major psychological effects, especially when the incident was violent or involved fatalities Yilmaz [35]. Szabó and Tóth [36] insinuate that victims may develop ASRs, intrusive thoughts, nightmares, or avoidance behaviors related to driving or the accident location. Victims may feel helplessness and guilt for being unable to prevent the accident or help. Sometimes, witnesses with a close emotional connection to accident victims may develop PTSD. Some who are not directly impacted physically can carry emotional scars. This emphasizes the importance of including witnesses in post-accident psychological support interventions.
- *Children and Adolescents*: Children and adolescents involved in or exposed to accidents are vulnerable to psychological damage [37]. They may lack the emotional maturity to fully understand or process trauma. This can manifest in behavioral changes such as aggression, withdrawal, bedwetting, or difficulty coping in school Ryan et al. [38]. Schwarzenberg et al. [39] highlight that older children and teens could exhibit symptoms of depression, anxiety, or PTSD, such as nightmares, irritability, and fear of riding in vehicles. These issues can impair development and cause long-term emotional and behavioral problems if not addressed through proper psychological support. Customized interventions involving parents, teachers, and mental health professionals are essential for helping young individuals recover from the emotional impact of accidents.

2.4. Treatment and Support

Psychological effects of road accident trauma can be treated and supported through therapy, medication, peer support groups, and early intervention [40].

- *Therapy*: Effective treatment and support for people experiencing psychological effects of accidents involves a complex approach customized to each person's needs [41]. Therapy plays a pivotal role. Young et al. [42] explain that trauma-focused cognitive-behavioural therapy (CBT) helps people reframe negative thoughts, confront trauma-related fears, and develop healthy coping mechanisms. Wilson et al. [43] mention another approach, the Eye Movement Desensitization and Reprocessing (EMDR), which they claim to be highly effective in reducing symptoms of PTSD.
- *Medication*: Severe cases require medication. Chen et al. [44] explain that antidepressants or anti-anxiety drugs may be prescribed to manage symptoms such as persistent sadness, panic attacks, or sleep disturbances.
- *Peer support group*: Peer support groups can provide relief by offering a space for accident survivors, witnesses, and emergency responders to share their experiences, reduce isolation, and learn from others facing similar challenges [45]. These groups can foster a sense of understanding and solidarity.
- *Early intervention*: Early intervention is crucial as it identifies and addresses psychological distress soon after an accident [46]. It can improve outcomes and prevent long-term complications. Additionally, family counseling, vocational rehabilitation, and community-based resources can support reintegration into daily life. An integrated care model that includes mental health professionals, physicians, family members, and support networks can ensure holistic recovery and long-term resilience.

2.5. Systemic and Environmental Factors

Resource imbalances due to socioeconomic and environmental stressors affect road accident victims in several ways.

- *Resource imbalances:* Due to heightened movement of people during festive and Easter holidays, the concentration of accidents in certain provinces leads to overutilization of emergency resources in some areas and underutilization in others. This compounds stress for both road users and responders.
- *Socioeconomic and environmental stressors:* Factors such as poor infrastructure, adverse weather, and economic hardship can increase psychological distress and risk-taking behaviors during peak travel seasons.

3. Theoretical and Conceptual Frameworks

3.1. Systems Theory

Road safety is viewed as an interconnected system where psychological, environmental, and systemic factors interact. Interventions should address the holistic system, not just isolated components. Applying Systems Theory (ST) to road safety research entails inspecting road safety as both a collection of isolated events or factors and as a dynamic, interconnected system in which psychological, environmental, organizational, and technological components interact to model outcomes [47]. This theoretical lens is grounded in the ST approach, described by Naumann et al. [48] as a technique, emphasizing that effective interventions should address the broader system rather than focusing solely on individual behavior or single points of failure. ST tools help identify latent risks, feedback loops, and leverage points within the transport ecosystem. They enable researchers and practitioners to understand the way various factors [such as infrastructure design, human error, policy, and cultural norms] combine to produce safety or risk. Using ST in evaluation encourages critical appraisal of the complexity and interdependence of system components, and whether interventions are designed to create systemic change rather than isolated improvements.

3.2. Risk Management Theory

Identifying and mitigating psychological risk factors are essential for effective accident prevention and resource allocation. Risk Management Theory (RMT) provides a structured approach for identifying, assessing, and mitigating risk factors that contribute to road accidents [49], particularly those that emerge through psychological and behavioral causes. This framework draws on insights from psychology, neuroscience, and decision science to distinguish between conscious (analytical) and unconscious (affective) risk appraisal processes. Evaluation through this lens examines the identification of psychological risk factors such as cognitive overload, stress, risk perception biases, and mental health conditions, as well as the effectiveness of interventions aimed at mitigating these risks [50]. For example, integrating mental health screening, driver education on risk perception, or behavioral interventions targeting stress and emotional regulation demonstrates alignment with risk management principles. The framework also supports the evaluation of resource allocation strategies, ensuring that preventive efforts are prioritized based on the magnitude and modifiability of identified risks.

3.3. Resource-Based Theory

Strategic deployment of mental health and emergency resources, based on comparative need and utility, can reduce psychological harm and improve outcomes. Resource-Based Theory (RBT) focuses on the strategic deployment and management of organizational and community resources to maximize safety outcomes and minimize psychological harm [50]. In road safety, RBT includes the allocation of mental health resources, emergency response capabilities, and educational interventions according to comparative need and demonstrated utility. Evaluating through this lens should pay attention to resource discrepancies, the effectiveness of resource usage, and the scalability of interventions. For

instance, examining the impact of integrating mental health services into road safety programs or analyzing the cost-effectiveness of targeted interventions for high-risk populations exemplifies the RBT application. This framework encourages a critical look at whether interventions are sustainable, equitable, and capable of producing measurable improvements in both individual and systemic outcomes.

3.4. Recap

These frameworks [ST, RMT, RBT] jointly provide a robust structure for evaluating road safety scenarios. ST ensures accounting for complexity and interdependence, RMT emphasizes the identification and mitigation of psychological risk factors, and RBT highlights the importance of strategic, equitable, and effective resource deployment. Using these lenses in this study, reviewers can critically assess the advancement of holistic, evidence-based, and sustainable solutions to road safety challenges.

4. Research Methodology

4.1. Research Design

This study employs a literature-based research methodology, systematically synthesizing peer-reviewed research, policy reports, and relevant grey literature to evaluate the intersection of psychological, environmental, and systemic factors in road safety. The methodological approach is guided by Systems Theory, Risk Management Theory, and Resource-Based Theory, ensuring a holistic and multi-dimensional analysis.

4.2. Data Sources and Selection Criteria

A thorough search was conducted using academic databases (e.g., Scopus, Web of Science, PsycINFO, PubMed) and institutional repositories. The inclusion criteria comprised studies published in the last 15 years on accident data, addressing psychological health, road safety, and/or travel patterns, with a focus on empirical findings, intervention evaluations, and theoretical advancements. The exclusion criteria were non-English publications, studies lacking empirical data, and those not addressing the integration of psychological or systemic factors.

4.3. Data Integration

The review extracted and integrated findings from studies reporting on accident statistics, travel behaviour, and psychological health outcomes to realize a broad synthesis. Special attention was given to research that analyzes real-time data streams (e.g., telematics, emergency response logs, mental health service utilization) and investigates regional or demographic variations in risk. The integration process involved mapping interconnections between psychological factors (such as stress, risk perception, and mental health disorders) and systemic or environmental variables (infrastructure, policy, and regional characteristics).

4.4. Analytical Framework

The literature was evaluated through the Systems Theory lens to identify how psychological, environmental, and systemic elements interact and affect road safety outcomes. Risk Management Theory guided the identification and assessment of psychological risk factors and the effectiveness of mitigation strategies. Resource-Based Theory will inform the analysis of resource allocation, highlighting studies that address the deployment and impact of mental health and emergency resources.

4.5. Predictive Modelling and Advanced Analytics

The review included studies employing machine learning, spatial-temporal analysis, and predictive modelling to forecast high-risk periods, locations, and populations. Emphasis was placed on literature

that demonstrates the integration of accident, travel, and psychological data within predictive frameworks, supporting both preventative and psychological interventions. The synthesis highlighted methodological innovations, data integration strategies, and the practical implications of predictive analytics for policy and intervention design.

4.6. Quality Appraisal and Synthesis

Each study was appraised for methodological rigor, data integration approaches, and alignment with theoretical frameworks. Findings were synthesized thematically, with particular focus on the way integrated data and predictive models inform holistic, system-level interventions and resource allocation.

4.7. Ethical Considerations

As a literature-based study, this research did not involve direct human subjects. However, ethical standards were upheld by representing original findings and acknowledging all the sources used.

5. Discussion

There is a need for targeted mental health support for accident survivors, families, and emergency responders, especially during high-risk periods. The following summary has been generated:

Table 1.
Summary of narratives.

Theme	Supporting narrative	Sources
Mental Health Interventions	<i>The goal of the Emergency Mental Health function is to provide psychological first aid, crisis intervention, and critical incident stress management services and support to victims, their significant others, bystanders, the community at large, and emergency responders during the acute period following a disaster or critical incident. Interventions help to mitigate acute stress symptoms and reduce anxiety and fear among the population impacted by the incident.</i>	Draper et al. [51]
		Feinstein [52]
		Haleem et al. [53]
		Karrasch et al. [54]
		Mitchell and Everly Jr [55]
	<i>CBT-PD is a manualized intervention that focuses on identifying and challenging maladaptive disaster-related beliefs. Post-disaster distress encompasses a range of cognitive, emotional, and behavioral reactions to disaster, including symptoms of depression, stress, vulnerability, and functional difficulties.</i>	Nguyen et al. [56]
		Pressley et al. [57]
		Tamrakar [58]
		Tamrakar et al. [59]
		Harrop et al. [60]
Public Awareness Campaigns	<i>Education on the psychological risks of holiday travel, such as stress, distraction, and aggression, can help mitigate risky behaviors.</i>	Lotzin et al. [61]
		Lucas and Brown [62]
		Watson [63]
		Hua et al. [64]
Dynamic Resource Allocation	<i>The purpose of the Emergency Mental Health Function is to ensure the rapid deployment of specially trained emergency mental health responders during or subsequent to a disaster or critical incident in which a large portion of the population is affected.</i>	Rehman et al. [65]
		Zhai et al. [66]
		Chou and Tseng [67]
		Filip et al. [68]
		Moroz et al. [69]
		Reynolds 3rd et al. [70]
		Samartzis and Talias [71]

5.1. Implications for Policy and Practice

Mental health interventions: There appears to be a compelling need for targeted mental health support for accident survivors, families, and emergency responders, especially during high-risk periods such as holidays or major public events. Jongedijk et al. [72] explain that exposure to traumatic incidents, such as road accidents, can result in acute stress reactions, anxiety, depression, and PTSD among survivors and witnesses. According to Jongedijk, immediate mental health intervention after trauma exposure is

necessary to prevent the development of chronic psychological disorders and to enhance resilience among survivors and responders. Pietrzak et al. [73] add that emergency responders experience a higher risk for secondary traumatic stress and burnout. Best practice guidelines [74] endorse the use of psychological first aid, crisis intervention, and ongoing counseling services immediately after a traumatic event. Roberts et al. [75] support that early intervention correlates with reduced risk of chronic mental health disorders and improved recovery outcomes. Moreover, according to Chan et al. [76], culturally sensitive and context-specific mental health programs are necessary to ensure ease of access and effectiveness.

Public awareness campaigns: Since a notable proportion of road accidents occur because of the general ignorance of people, education on the psychological risks of holiday travel, such as stress, distraction, and aggression, among others, can help mitigate risky behaviors Weber et al. [77]. Petrick and Wang [78] add that public education and awareness campaigns are effective in easing the psychological and behavioral risks linked with holiday travel. In accord, Setyowati et al. [7] indicate that well-designed campaigns can substantially reduce risky behaviors such as high-speed, driving under alcohol influence, and distracted driving by increasing knowledge and shifting social norms. In addition to conventional road safety messages, campaigns should openly address the psychological stressors and emotional stimuli causing unsafe driving during high-risk periods. In Grosso's [79] sentiment, combining messages about stress management, emotional regulation, and the worth of mental well-being can encourage safer behaviors and enhance overall public health. Awareness and education campaigns involving the public can lead to the minimization of risky driving behaviors, mainly when directed at the cognitive and emotional factors that affect driver decision-making.

Dynamic resource allocation: According to Goniewicz et al. [80], using predictive analytics (PA) in deploying emergency and psychological support resources where they are most needed can improve both physical and mental health outcomes. Telukdarie et al. [81] consider using PA and dynamic resource allocation as best practices to optimize emergency and psychological support services. Predictive models are useful in detecting high-risk periods and locations for accidents. This way, they can enable authorities to prioritize and assign medical, psychological, and social support resources beforehand. Goniewicz et al. [80] also appreciate PA as a data-driven approach that can enhance the efficiency and effectiveness of emergency response. It can enable reducing response times and assist in ensuring that both physical and mental health needs are addressed quickly. In addition, adding psychological support to emergency response protocols ensures a more holistic approach to trauma care, improving outcomes for survivors and communities.

5.2. Recommendations

Based on these implications for practice guidelines, the succinct recommendations (SR) derived are that authorities should expand targeted mental health interventions, intensify public awareness campaigns, and optimize resource allocation using predictive analytics. These are detailed next.

5.2.1 SR1. Expand Targeted Mental Health Interventions

The study recommends that authorities should:

- Apply immediate and ongoing mental health support for accident survivors, their families, and emergency responders, mainly during high-risk periods such as festive and Easter holidays.
- Add psychological first aid, crisis intervention, and accessible counselling services to emergency response protocols to prevent chronic psychological disorders and enhance resilience.
- Ensure that mental health programs are culturally sensitive and context-specific to maximize accessibility and effectiveness.

5.2.2. SR2. Intensify Public Awareness Campaigns

Authorities should:

- Introduce educational initiatives that address traditional road safety issues and the psychological risks of holiday travel.
- Design campaigns to shift social norms and reduce risky behaviors by highlighting the impact of psychological stressors on driving decisions.
- Incorporate messaging on stress management and mental well-being to promote safer driving and improve public health outcomes.

5.2.3. SR3. Optimize Resource Allocation Using Predictive Analytics

Authorities should

- Employ predictive analytics and spatial-temporal modeling to identify high-risk periods and locations for road accidents.
- Dynamically deploy emergency and psychological support resources in anticipation of peak travel and accident risk, making areas with usually high incident rates high priorities.
- Incorporate psychological support into standard emergency response to ensure a holistic approach to trauma care and improve outcomes for both survivors and communities.

To increase the likelihood of pragmatic successes in addressing the psychological effects of road accidents, additional recommendations are made. These relate to cross-sector collaboration (CSC), continuous training (CT), and evaluation and feedback (EaF) [82-84].

- Regarding CSC, there should be a collaboration among healthcare providers, emergency services, policymakers, and community organizations. The authorities responsible for effective mental health and emergency interventions require coordination.
- On CT, emergency responders should receive ongoing training in psychological first aid and trauma-informed care for sustaining high-quality support.
- Concerning EaF, there needs to be regular monitoring and evaluation of intervention outcomes to inform continuous improvement and adaptation to changing risk profiles.

In closing, a multi-pronged approach that merges targeted mental health interventions, robust public awareness campaigns, and data-driven resource allocation can augment the physical and psychological well-being of accident survivors, their families, and emergency responders. This is especially vital during high-risk periods. These recommendations are supported by the literature and align with best practices in trauma and disaster response.

5.4. Research Limitations

This study is constrained by the lack of granular psychological data on accident-involved drivers and responders during peak periods. This limits a meaningful understanding of psychological profiles and stress responses. It improves mental health and behavioral interventions for reducing accident risk and psychological harm. Mental health and behavioral interventions aimed at reducing accident risk and psychological effects are also restricted. These limitations restrict the evaluation of effectiveness. It also inhibits evidence-based suggestions for improving these interventions. These limitations highlight the need for detailed, longitudinal, and intervention-focused research to address the complexities of psychological factors in accident contexts.

6. Conclusion and Areas of Further Research

The psychological implications of road accidents during South Africa's festive and Easter periods are significant, affecting those directly involved in accidents and their families, communities, and emergency responders. Addressing these challenges requires an integrated, data-driven approach that combines road safety strategies with robust mental health support and dynamic resource allocation. The study recommends conducting more research to obtain granular psychological data on accident-

involved drivers and responders during peak periods to understand their psychological profiles and stress responses. It also highlights the need for thorough evaluation of mental health and behavioral interventions for reducing accident risk and mitigating psychological harm.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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