

# Community Perceptions of Road Traffic Accident Causality in Central and Upper River Regions' South of the Gambia: A Comprehensive Mixed-Methods Analysis for Evidence-Based Road Safety

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DOI: <https://dx.doi.org/10.51244/IJRSI.2026.13020093>

Received: 18 February 2026; Accepted: 23 February 2026; Published: 05 March 2026

## ABSTRACT

Road traffic accidents remain a devastating public health crisis in low and middle-income countries, which account for over 90% of global fatalities despite having less than 60% of the world's vehicles. This study investigates community perceptions of accident causes in The Gambia's Central River and Upper River Regions using a mixed-methods approach that combined surveys, open-ended responses, and direct observation of road conditions.

The findings reveal that local communities possess a sophisticated, multi-layered understanding of why accidents occur. They identify three interconnected domains of causality: behavioural factors such as reckless driving (91% agreement) and driving under the influence (97% agreement); infrastructural deficiencies including poor roads (85% agreement), inadequate signage, and insufficient lighting; and systemic failures like weak law enforcement, poor vehicle maintenance, and substandard driver training.

Notably, perceptions varied meaningfully across groups. Drivers emphasized infrastructural problems while non-drivers pointed to behaviour; younger respondents highlighted peer-influenced risk-taking, whereas older participants focused on institutional failures. Communities themselves proposed solutions: enhanced driver education (70% endorsement), infrastructural investment, and sustained public awareness campaigns (94% agreement).

These findings challenge deficit-based views of community knowledge, demonstrating instead that local insights align with global road safety frameworks while retaining contextual specificity. The study underscores the value of participatory approaches in achieving Sustainable Development Goal 3.6, advocating for policy that integrates community-identified priorities with evidence-based interventions in The Gambia and similar contexts.

**Keywords:** Road Traffic Accidents, Community Perceptions, Causal Attribution, Participatory Policy, Mixed-Methods Research, Public Health, The Gambia, Road Safety Interventions

## INTRODUCTION

### The Global Burden of Road Traffic Accidents: A Public Health Crisis

Road traffic accidents (RTAs) constitute one of the most significant yet neglected global public health crises of the 21st century. It is reportedly claiming approximately 1.35 million lives annually and causing between 20 to 50 million non-fatal injuries. This has profound socioeconomic consequences for affected individuals, families, and communities (World Health Organization [WHO], 2023). The global burden of RTAs exhibits marked inequity, disproportionately affecting low and middle-income countries (LMICs), which account for 93% of

RTA fatalities despite possessing only 60% of the world's registered vehicles (WHO, 2023). Within sub-Saharan Africa, the situation is particularly alarming. The region experiences the highest road traffic fatality rate globally at 26.6 deaths per 100,000 as compared to the global average of 17.5 per 100,000 (WHO, 2023). This disparity stems from a complex interplay of factors including rapid urbanization, inadequate transportation infrastructure, limited enforcement of safety regulations, and insufficient post-crash emergency response systems (Peden et al., 2022).

The public health implications of RTAs extend beyond immediate mortality and morbidity. It encompasses long-term disability, psychological trauma, and substantial economic losses estimated at 1-3% of gross domestic product (GDP) in many LMICs (Bachani et al., 2020). Vulnerable road users like the pedestrians, cyclists, and motorcyclists bore the greatest burden, comprising 54% of global RTA fatalities, with particularly high rates in African contexts (WHO, 2023). The United Nations has recognized this crisis through the inclusion of Sustainable Development Goal (SDG) target 3.6. It aims to halve the number of global deaths and injuries from road traffic accidents by 2030, and the subsequent declaration of the Decade of Action for Road Safety 2021-2030 (United Nations, 2020). Achieving these ambitious targets requires context specific, evidence based interventions that address the multifactorial nature of RTA causality through integrated, multi-sectoral approaches.

### **The Gambian Context: Epidemiology and Policy Landscape**

The Gambia, a West African nation with a population of approximately 2.7 million and a rapidly growing vehicle fleet, exemplifies the challenges faced by LMICs in addressing road safety (Gambia Bureau of Statistics [GBOS], 2022). National statistics reveal a disturbing trend of increasing RTA incidence, with the Gambia Police Force reporting 324 fatalities and 1,612 serious injuries in 2022 alone. This shows a 12% increase from 2019 figures (Gambia Police Force Traffic Department, 2023). The economic impact is substantial, with conservative estimates suggesting annual losses exceeding 2.1% of GDP when accounting for medical costs, productivity losses, property damage, and administrative expenses (Ministry of Transport, Works and Infrastructure, 2021).

The Gambian government has responded to this crisis through various policy initiatives. These include the National Road Safety Strategy 2018-2022 and subsequent action plans emphasizing the "Safe System" approach (Government of The Gambia, 2018). However, implementation challenges persist, including limited funding allocation (road safety receives less than 0.5% of the national transport budget), fragmented institutional coordination, and weak enforcement capacity (Jallow, 2021). Furthermore, existing interventions have predominantly adopted a top-bottom approaches with limited community engagement, potentially undermining their relevance, acceptability, and sustainability in local contexts (Sanneh and Colley, 2022).

### **The Critical Role of Community Perceptions in Road Safety**

While epidemiological data provides essential insights into RTA patterns, understanding community perceptions of accident causality represents a crucial yet underutilized dimension in road safety planning. Perceptions are defined as the cognitive frameworks through which individuals interpret, organize, and make sense of experiences. These fundamentally shape risk assessment, behavioural responses, and support for interventions (Slovic, 2016). In the context of RTAs, community perceptions influence multiple dimensions of safety for example, driving behaviours, compliance with regulations, acceptance of preventive measures, and advocacy for infrastructural improvements (Rosenbloom et al., 2021).

Research in diverse cultural contexts demonstrates that communities often develop sophisticated, experience based understandings of RTA causality. This may diverge from expert assessments but it provides valuable insights into locally relevant risk factors and intervention points (Nguyen et al., 2020). For instance, studies in Ghana and Kenya have revealed that communities prioritize different causal factors than official reports, emphasizing contextual elements such as spiritual beliefs, social relations, and local governance dynamics (Ackaah et al., 2019; Odero et al., 2020). These perceptual frameworks are not merely cognitive constructs but are embedded in social practices, cultural norms, and historical experiences that mediate how communities respond to safety initiatives.

The theoretical foundation for examining community perceptions draws from several interdisciplinary frameworks. Social constructionist perspectives emphasize how realities like risk and safety are constituted through social processes, language, and shared meanings (Berger & Luckmann, 1966). Health belief models highlight how perceived susceptibility, severity, benefits, and barriers influence preventive behaviors (Rosenstock et al., 1988). More recently, socio-ecological models have been applied to road safety, recognizing the multiple interacting levels of individual, interpersonal, community, institutional, and policy can shape both risk and protective factors (Haagsma et al., 2020). Integrating community perceptions within these frameworks enables more holistic, contextually grounded approaches to RTA prevention.

## Research Gap and Study Rationale

Despite growing recognition of community perceptions' importance, significant knowledge gaps persist in the Gambian context. First of all, the existing research has predominantly focused on quantitative analysis of RTA trends and macro-level risk factors, with limited investigation of community perspectives (Ceesay, 2020). Secondly, where community perceptions have been examined, studies have typically employed singular methodological approaches without integrating quantitative and qualitative data to capture both the prevalence and detailed understanding of causal attributions (Sarr, 2021). Thirdly, minimal research has explored how perceptions vary across demographic subgroups within communities, potentially obscuring important differences that could inform targeted interventions (Jagne, 2022). Fourthly, there is insufficient linkage between perceptual research and practical policy formulation, this limits the translational impact of findings.

This study addresses these gaps through a comprehensive investigation of community perceptions in the Southern regions (CRR and URR) of The Gambia with distinctive challenges of road accidents. The regions' mixed road infrastructure, reliance on agricultural transportation, and limited emergency services make it an informative case study for understanding community perspectives in resource constrained settings. By examining both the content and variations in causal attributions, this research aims to generate insights that can inform more participatory, contextually responsive road safety planning in The Gambia and the sub-region at large.

## Research Objectives and Questions

**Primary Objective:** To comprehensively analyse community perceptions regarding the causes of road traffic accidents in the Southern Regions (CRR and URR) of The Gambia, and explore implications for evidence based road safety policy formulation.

### Research Questions:

1. What are the predominant perceptions regarding the causes of road traffic accidents among community members in CRR and URR South Regions of The Gambia?
2. How do these perceptions vary across different demographic groups within the communities?
3. What interventions do community members propose for preventing road traffic accidents, and how do these align with evidence based road safety strategies?
4. How can community perceptions be systematically integrated into road safety policy formulation and implementation in The Gambian context?

## LITERATURE REVIEW

### Global Epidemiology of Road Traffic Accidents: Patterns and Determinants

Road traffic accidents represent a complex global health challenge with distinct epidemiological patterns across geographic and economic contexts. According to the World Health Organization's (2023) latest Global Status Report on Road Safety, approximately 1.35 million people die annually from RTAs, with an additional 20-50 million sustaining non-fatal injuries, many resulting in long-term disability. The global distribution of this burden is profoundly unequal. For instance, high-income countries have experienced significant reductions in

RTA mortality over the past decade (average annual reduction of 3.1%), while many LMICs have seen stagnation or increases (WHO, 2023). This disparity reflects differential investment in road safety systems, with high-income countries allocating approximately 2-3% of transport budgets to safety measures compared to 0.1-0.5% in most LMICs (Organisation for Economic Co-operation and Development [OECD], 2022).

The determinants of RTA risk operate at multiple levels within a complex system. At the individual level, factors include speeding, alcohol impairment, distracted driving (particularly mobile phone use), fatigue, and non-use of protective equipment (helmet, seatbelt, child restraints) (Peden et al., 2022). Vehicle related factors encompass mechanical failures, inadequate maintenance, and design incompatibility with road environments (Jurewicz et al., 2020). Environmental and infrastructural determinants include poor road design, inadequate signage and lighting, insufficient separation of vulnerable road users, and hazardous roadside objects (Wegman et al., 2017). Institutional and policy factors involve weak legislation, limited enforcement capacity, inadequate post-crash response systems, and fragmented institutional coordination (Bhalla et al., 2021). Understanding these multifactorial determinants is essential for developing comprehensive interventions, yet most RTAs result from interactions across multiple levels rather than single causative factors (Salmon et al., 2019).

### **The African Context: Unique Challenges and Emerging Responses**

Sub-Saharan Africa faces particularly severe road safety challenges, with the region's RTA fatality rate (26.6 per 100,000) nearly double the global average (WHO, 2023). This crisis stems from intersecting factors. These factors include; rapid motorization (vehicle fleets growing at 7-10% annually in many countries), underdeveloped road infrastructure, high proportions of vulnerable road users, limited trauma care systems, and weak regulatory frameworks (Naci et al., 2020). The economic impact is substantial, with conservative estimates suggesting annual costs of \$65 billion (3-5% of regional GDP), disproportionately affecting poor households who often lack social protection mechanisms (Afukaar et al., 2021).

Regional responses have evolved significantly in recent years. The African Road Safety Action Plan 2021-2030, endorsed by the African Union, adopts the Safe System approach with emphasis on institutional strengthening, data improvement, and targeted interventions for high-risk factors (African Union Commission, 2021). Country level initiatives vary considerably in scope and implementation, with notable successes in Rwanda (comprehensive helmet laws), Ghana (enhanced traffic policing), and South Africa (integrated road safety strategies) (Huang et al., 2022). However, persistent challenges include limited domestic funding allocation (most countries rely on external donors for more than 60% of road safety budgets), weak inter-sectoral coordination, and inadequate monitoring and evaluation systems (Bachani et al., 2020).

### **Community Perceptions of Road Safety: Conceptual Frameworks and Empirical Evidence**

#### **Theoretical Foundations of Risk Perception**

Community perceptions of road safety are grounded in broader theories of risk perception and social construction of knowledge. The psychometric paradigm, pioneered by Slovic and colleagues, identifies multiple dimensions along which risks are perceived, including voluntariness, controllability, familiarity, and catastrophic potential (Slovic, 2016). In road safety contexts, risks perceived as voluntary, controllable, and familiar (such as routine commuting) are typically judged as less threatening than equivalent statistical risks that are involuntary or unfamiliar (Rundmo, 2021). Cultural theory of risk emphasizes how worldviews and social relations shape risk perceptions, with individualist cultures tending to blame driver behavior while hierarchical cultures emphasize systemic failures (Douglas & Wildavsky, 1982). Social amplification of risk framework examines how social and institutional processes intensify or attenuate risk perceptions through media coverage, social networks, and stigma (Kasperson et al., 2020).

More recent integrative models recognize the situated nature of risk perception, where cognitive processes interact with embodied experiences, social contexts, and cultural narratives (Zinn, 2020). In transportation research, the Theory of Planned Behavior has been extensively applied. It demonstrates how attitudes, subjective norms, and perceived behavioural control influence road safety behaviours (Forward, 2021). The Health Belief Model similarly highlights perceived susceptibility, severity, benefits, and barriers as determinants of preventive

actions (Rosenstock et al., 1988). For community level perceptions, socio-ecological models provide useful frameworks for understanding how individual cognitions are shaped by interpersonal relationships, community norms, institutional policies, and broader cultural values (Haagsma et al., 2020).

### **Empirical Research on Community Perceptions of RTA Causality**

Empirical studies across diverse contexts reveal consistent patterns in how communities perceive RTA causes. It also demonstrates important contextual variations. Systematic reviews indicate that communities worldwide tend to attribute RTAs primarily to human factors, particularly driver behaviour (Hassan and Abdel-Aty, 2021). However, the specific behavioural factors emphasized, vary considerably. For instance, studies in high-income countries frequently identify distraction (especially mobile phone use) and fatigue as primary concerns (Oviedo-Trespalacios et al., 2022), while research in LMICs emphasizes speeding, overtaking errors, and impairment from alcohol or drugs (Ackaah et al., 2019). This variation likely reflects differential exposure to risk factors, with mobile phone penetration and associated distraction behaviours being more prevalent in high-income settings.

Infrastructural factors represent a second major category of community identified causes, particularly in resource constrained settings. Communities in rural areas of LMICs consistently identify poor road conditions, inadequate signage, insufficient lighting, and hazardous roadside environments as significant contributors to RTAs (Nguyen et al., 2020). These perceptions often align with technical assessments, suggesting that communities possess accurate observational knowledge of their local environments (Wegman et al., 2017). However, communities may overemphasize visible infrastructural deficiencies while underestimating less visible factors like road design standards or vehicle safety features, reflecting the availability heuristic in risk perception (Tversky and Kahneman, 1974).

Institutional and systemic factors represent a third category. These encompass perceptions about law enforcement, regulatory frameworks, vehicle inspection systems, and emergency response. Research indicates that communities in settings with weak governance institutions frequently cite corruption in licensing and enforcement, inadequate traffic policing, and limited post-crash care as contributing to RTA risk (Bhattacharya et al., 2021). These perceptions reflect not only objective institutional weaknesses but also broader societal trust levels, with low institutional trust correlating with greater attribution of RTAs to systemic failures rather than individual behaviour (Rosenbloom et al., 2021).

### **Demographic Variations in Perceptions**

Substantial evidence demonstrates that perceptions of RTA causality vary across demographic groups, reflecting differential experiences, social positions, and cognitive frameworks. Age represents a particularly significant factor, with systematic differences between younger and older road users. Younger individuals tend to perceive lower personal risk, attribute accidents more to external factors (road conditions, other drivers' behaviour), and emphasize technological distractions. The older individuals on the other hand, perceive higher vulnerability, acknowledge age-related impairments, and emphasize experience based factors (Jones, 2017). These differences likely reflect both developmental factors (younger adults' sensation seeking tendencies, older adults' risk aversion) and cohort effects (different historical experiences with transportation systems).

Gender differences in perception follow consistent patterns across cultures, with women generally perceiving higher risk, expressing greater support for restrictive safety measures, and attributing RTAs more to human factors, while men exhibit higher risk tolerance, greater confidence in their driving abilities, and stronger attribution to external factors (Lee, 2018). These differences align with broader patterns in risk perception research and likely reflect both biological factors (differences in sensation seeking) and socialization processes (gendered norms about risk taking and responsibility).

Occupational status, particularly professional driving experience, significantly influences causal attributions. Professional drivers tend to emphasize infrastructural and systemic factors while minimizing behavioural causes. These potentially reflect defensive attribution patterns and first-hand experience with road conditions (Useche et al., 2021). In contrast, non-drivers and pedestrians typically place greater emphasis on driver behaviour and

vehicle related factors. These reflect their vulnerability and limited control over the transportation environment (Musselwhite et al., 2020).

Educational attainment correlates with more complex, multi-causal understandings of RTA aetiology. The educated individuals are more likely to acknowledge systemic and infrastructural factors alongside behavioural causes (Patel, 2018). This likely reflects both greater exposure to diverse information sources and enhanced analytical capabilities for understanding complex systems.

### **Methodological Approaches in Perceptual Research**

Research on community perceptions employs diverse methodological approaches, each with distinct strengths and limitations. Quantitative surveys, utilizing Likert scales or ranking exercises, efficiently capture the prevalence of specific perceptions across large samples, enabling statistical analysis of demographic variations and associations with behaviours (Hassan & Abdel-Aty, 2021). However, they risk imposing researchers' conceptual frameworks and may overlook nuanced, context specific understandings.

Qualitative methods, including focus groups, in-depth interviews, and participatory mapping, provide rich, contextualized insights into how communities construct meaning around RTAs, revealing cultural narratives, symbolic associations, and lived experiences (Nguyen et al., 2020). These approaches are particularly valuable for exploratory research in understudied contexts but face challenges in generalizability and systematic comparison.

Mixed-methods designs, increasingly recognized as optimal for perceptual research, integrate quantitative and qualitative approaches to capture both breadth and depth of understanding (Creswell and Plano Clark, 2018). Sequential designs (quantitative to qualitative or qualitative to quantitative) allow for iterative refinement, while concurrent designs collect both data types simultaneously for comprehensive analysis. The transformative paradigm further emphasizes how research methodologies should align with empowerment goals, particularly when working with marginalized communities (Mertens, 2020).

Recent methodological innovations include photo-voice (community members documenting risk factors through photography), participatory GIS (mapping perceived hazardous locations), and deliberative forums (structured community discussions to develop consensus on priorities) (Dennis et al., 2021). These participatory approaches not only generate data but also engage communities as active partners in knowledge production and solution development.

### **The Gambian Context: Existing Research and Identified Gaps**

Research on road safety in The Gambia remains limited but has expanded in recent years. Epidemiological studies have documented increasing RTA incidence, high pedestrian vulnerability, and seasonal variations (peaking during rainy seasons when road conditions deteriorate) (Ceasay, 2020). Behavioural research has identified concerning patterns including low seatbelt use (approximately 15% in front seats, 3% in rear seats), limited helmet use among motorcyclists (estimated 25%), and high prevalence of speeding (detected in 40% of vehicles using radar speed guns) (Sanneh and Colley, 2022).

Studies examining community perspectives have begun to emerge, though with methodological limitations. Jagne (2022) conducted focus groups in urban Banjul, finding that communities emphasized driver behaviour and poor road conditions as primary causes, with limited recognition of systemic factors. Sarr (2021) surveyed 200 drivers nationwide, identifying differences in risk perception between commercial and private drivers but with minimal qualitative depth. These studies, while valuable, have typically employed singular methodologies, focused on urban contexts, or examined limited demographic variations.

Significant knowledge gaps persist regarding rural community perceptions, integrated mixed-methods approaches, detailed analysis of demographic variations, and linkage between perceptual research and practical policy development. This study addresses these gaps through comprehensive investigation in the Southern

Regions of CRR and URR of The Gambia; employing concurrent mixed-methods design. It examines multiple demographic dimensions, and develops actionable recommendations for participatory policy formulation.

### Theoretical Framework for the Current Study

This research integrates multiple theoretical perspectives to develop a comprehensive framework for understanding community perceptions of RTA causality in the Southern Region of CRR and URR of The Gambia (Figure 1). At the foundation lies social constructionism. It recognizes that perceptions are not mere reflections of objective reality but are actively constructed through social processes, language, and cultural meanings (Berger & Luckmann, 1966). This perspective informs our qualitative approach to understanding how community members narrate their experiences and interpret causality.

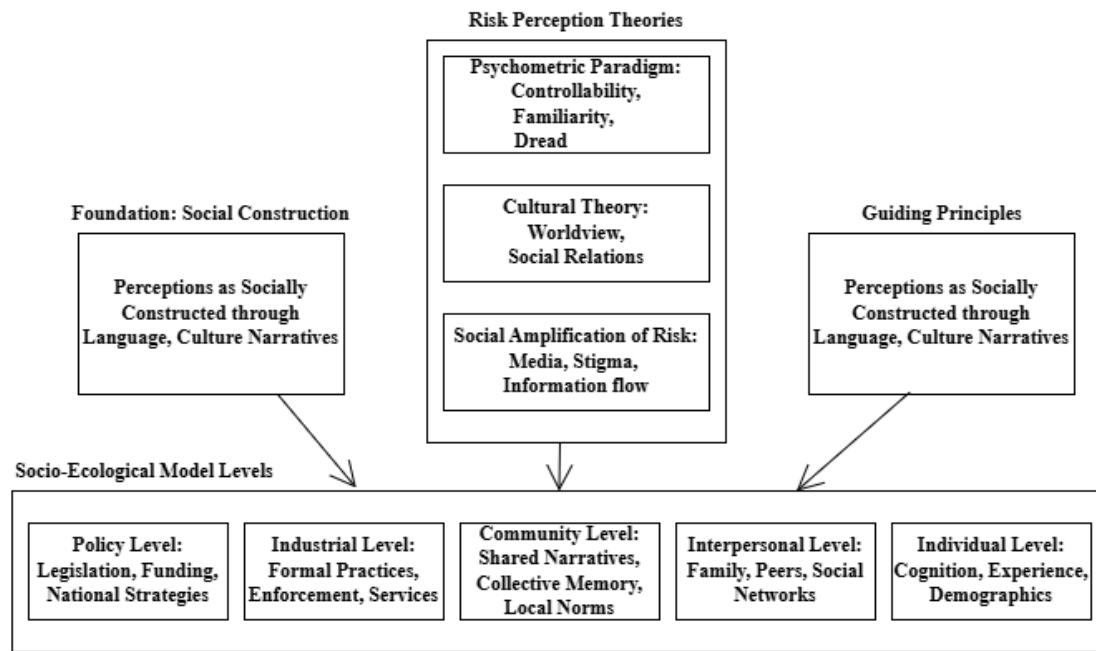


Figure 1: Integrated Theoretical Framework for Understanding Community Perceptions of RTA Causality

The socio-ecological model provides the overarching structure, recognizing that perceptions operate across multiple interacting levels (Haagsma et al., 2020):

- **Individual level:** Cognitive processes, personal experiences, demographic characteristics
- **Interpersonal level:** Social networks, family influences, peer norms
- **Community level:** Shared narratives, collective experiences, local institutions
- **Institutional level:** Formal policies, enforcement practices, service provision
- **Policy level:** Legislation, funding allocation, national strategies

Within this multi-level framework, we apply specific theories of risk perception to understand how communities assess and respond to RTA risks. The psychometric paradigm helps analyse how different risk factors are evaluated along dimensions like controllability, familiarity, and catastrophic potential (Slovic, 2016). Cultural theory illuminates how worldviews and social relations shape blame attribution (Douglas and Wildavsky, 1982). The Social Amplification of Risk Framework examines how information flows and social processes intensify or attenuate concern about specific factors (Kasperson et al., 2020).

Finally, the study is guided by participatory action research principles, viewing community members not merely as research subjects but as potential partners in knowledge production and solution development (Mertens,

2020). This orientation shapes both our methodology (emphasizing community engagement) and our intended outcomes (developing actionable recommendations for participatory policy).

This integrated theoretical framework enables comprehensive examination of both the content of community perceptions (what factors are identified as causal) and the processes through which these perceptions are formed, maintained, and potentially transformed through engagement with research and policy processes.

## METHODOLOGY

### Research Design and Philosophical Orientation

This study employed a concurrent transformative mixed-methods design situated within a pragmatic philosophical paradigm (Creswell and Plano Clark, 2018; Mertens, 2020). The pragmatic approach prioritizes research questions over methodological purism. This allows the integration of diverse data types to comprehensively address the complex phenomenon of community risk perception (Feilzer, 2020). The transformative dimension explicitly acknowledges the power dynamics inherent in knowledge production and aims to conduct research with rather than on communities, positioning local residents as knowledgeable agents whose perspectives can inform policy (Mertens, 2020). The concurrent design facilitated the simultaneous collection and analysis of quantitative and qualitative data, enabling triangulation and providing a more complete understanding than either approach alone (Fetters, 2020).

The design was structured in three integrated phases (Figure 2). Phase One involved community profiling and instrument development, including observational audits of road infrastructure. Phase Two constituted concurrent data collection through surveys and qualitative interviews/focus groups. Phase Three involved integrated analysis, where quantitative findings illuminated the prevalence of perceptions while qualitative data provided depth, context, and meaning. This design aligns with best practices for community based perceptual research, which emphasizes methodological pluralism to capture both the distribution and the relevant construction of beliefs (Hesse-Biber, 2017).

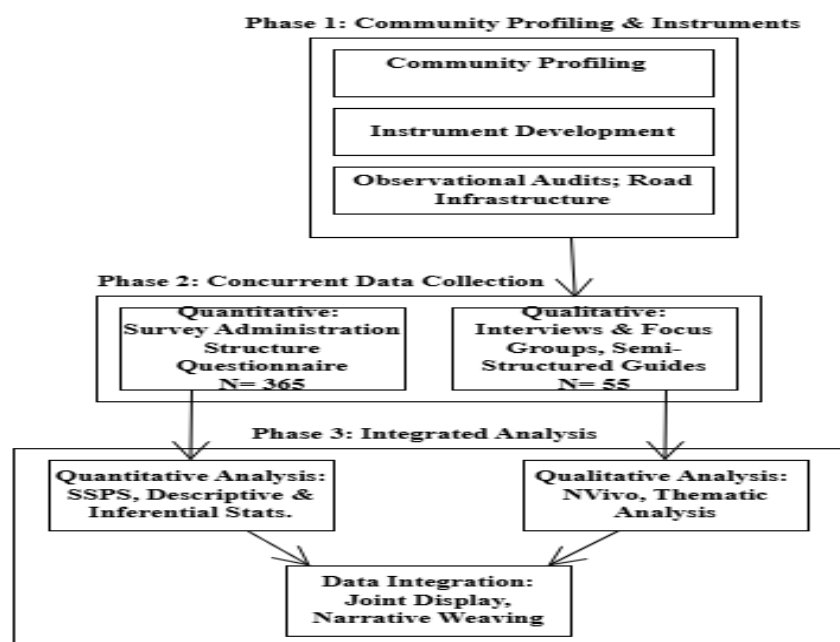


Figure 2: Visual Schematic of the Concurrent Transformative Mixed-Methods Design

### Study Setting and Contextual Profile

The research was conducted in the CRR and URR South Regions of The Gambia. According to the 2023-2036 Gambia Bureau of Statistics (GBOS) projections, the regions have an estimated population of 384,421, residents which consist the CRR South and the entire URR. They are predominantly engaged in subsistence agriculture

(groundnuts, millet, rice) and small-scale trade (GBOS, 2023). The region has some prominent settlements that are significant in the socio-economic activities of the country. These include; Dankunku, Kudang, Brikama-Ba, Janjanbureh, Bansang, Sare-Bojo, Basse, Fatoto etc. These settlements are mentioned specifically due to their significance to the study. They were used as focused centres to collect data and their immediate vicinities.

The transportation ecosystem is characterized by several risk enhancing factors. Total approximated distance of 195 kilometers (km), a summary breakdown of the road composition is given in table (3.1). Traffic composition is mixed, consisting of private vehicles, commercial passenger vans ("Gelli-gellis"), motorcycles, animal drawn carts, and a high volume of pedestrian and bicycle traffic, particularly on market days. A preliminary observational audit conducted by the research team identified consistent infrastructural deficits, for instance; absence of pedestrian walkways on 95% of surveyed roads, inadequate drainage causing standing water and erosion, minimal roadway signage, and no functional street lighting in most of the roads.

This setting was selected as a critical case (Flyvbjerg, 2011) due to its representative combination of rural and urban Gambian characteristics: reliance on agriculture, underdeveloped infrastructure, limited emergency medical services (medical centres are sparsely distributed in the region), and a transportation system undergoing rapid but unregulated motorization. Understanding community perceptions here provides insights applicable to similar regions in The Gambia and the broader Sahel region.

**Detailed Breakdown of the Stretch:**

**1. Central River Region-South Segment (Sofanyama Bolong to URR Border)**

**Start Point:** Sofanyama Bolong (LRR/CRR border)

**Key CRR Towns on Route:** Kudang, Bansang, Janjanbureh (via ferry), Brikama-Ba.

**End of CRR Segment:** The administrative border between CRR-South and URR, west of the settlement of Diabugu.

Approximate Distance for CRR-South Portion: 110 km

**2. Upper River Region Segment (Border to Fatoto)**

**Start Point:** CRR/URR border.

**Route through URR:** Continues east through Diabugu, past Basse Santa Su (Basse), to Fatoto.

**End Point:** Fatoto.

Approximate Distance for URR Portion: 85 km

Table 3.1: A Summary of the South Bank Road (SBR) CRR and URR

Leg of Journey	Start Point	End Point	Approx. Distance	Notes
Total Southern Road	<b>Sofanyama Bolong</b> (CRR start)	<b>Fatoto</b> (URR major town)	<b>195 km</b>	Follows paved South Bank Road (SBR).
CRR-South Section	Sofanyama Bolong	CRR/URR Border	110 km	Includes major nodes: Kudang, Bansang.
URR Section	CRR/URR Border	Fatoto	85 km	Passes the regional capital, Basse.

**Source:** This figure is based on cross-referenced distances from Gambian transport guides, route planners, and geographical mapping systems (GRA)

**Population, Sampling Strategy, and Sample Size**

The target population comprised all adult residents (aged 18 years and above) of the regions who had resided in the area for at least one year, ensuring sufficient exposure to local road conditions and accident contexts. A multi-stage, purposive-stratified sampling strategy was employed to ensure diverse representation while accounting for logistical constraints.

**Stage 1: Cluster Identification.** The region was divided into eight geographical clusters based on proximity to major roads and population density: (1) Urban Centre (towns in each cluster), (2) Peri-urban Corridor (within 5km of trunk road), (3) Accessible Rural (served by seasonal feeder roads), and (4) Remote Rural (limited vehicular access).

**Stage 2: Purposive Sampling for Qualitative Component.** From each cluster, 20 to 22 key informants were purposively selected to maximize information richness (Patton, 2015). This included:

- Community Elders/Leaders (Alkalolu, Ward Councillors): For historical and normative perspectives.
- Professional Drivers (Taxi, "Gelli-gelli," Truck): For operational knowledge and risk exposure.
- Victims/Survivors of RTAs or their families: For experiential, first-hand accounts.
- Healthcare Workers (from the Minor Health Center): For clinical perspective on injuries.
- Local Law Enforcement (Police unit officers): For regulatory and enforcement perspectives. A total of 55 participants were recruited for qualitative components: 37 for in-depth interviews (IDIs) and 18 for focus group discussions (FGDs).

**Stage 3: Stratified Convenience Sampling for Quantitative Component.** A target sample of N=384 was calculated using the RaoSoft online sample size calculator for a finite population (384,421), with a 95% confidence level and 5% margin of error. To reach this, researchers stationed themselves at high traffic community nodes (central market, major mosque, transport park, weekly Lumo markets) on different days of the week. Every fifth adult passing the node and is willing to participate was invited to participate, with quotas set to ensure proportional representation from the eight geographical clusters and gender balance. The final survey sample achieved was N=365, yielding a response rate of 87% and a margin of error of ±6.2%. While not statistically generalizable to the national population, this sample provides a robust basis for regional level analysis and captures diverse viewpoints within the communities. The final integrated sample achieved was N=420 (survey: 365; qualitative: 55).

Table 3.2: Final Sample Composition by Data Collection Method

Method	Target Sample	Achieved Sample	Cluster Distribution	Gender (M/F)
Survey	384	365	C1: 28%, C2: 31%, C3: 25%, C4: 16%	58%/42%
IDIs	37	37	All clusters represented	61%/39%
FGDs	18 (4 groups)	18 (4 groups)	One FGD per cluster	Varies by group
<b>TOTAL</b>	<b>439</b>	<b>420</b>		<b>59%/41%</b>

The entire study: the total integrated sample (N=420)

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## Data Collection Instruments and Procedures

Data collection occurred over an 8-week period from September to November 2025. A team of four trained, multilingual research assistants (fluent in Mandinka, Fulani, and English) conducted all field activities.

### Quantitative Survey Instrument

A structured questionnaire was developed in English, translated into Mandinka and Fulani, and back translated to ensure conceptual equivalence (Brislin, 1986). The instrument was piloted with 30 residents from two major settlements in the regions, and Cronbach's alpha for the perception scales was calculated at 0.81, indicating good internal reliability (Tavakol and Dennick, 2011). The final instrument contained five sections:

**Section A: Socio-demographics** (age, gender, occupation, education, income bracket, driving experience, personal/family RTA history).

**Section B: Perceived Causality Scale.** 22 items measured on a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree). Items were derived from the WHO's risk factor framework and prior Gambian studies, covering domains of Behaviour (e.g., "Drivers often use mobile phones while driving"), Vehicle ("Many vehicles on our roads are not roadworthy"), Infrastructure ("Poor road conditions are a major cause of accidents"), and Environment/Society ("Corruption in vehicle licensing contributes to accidents").

**Section C: Prevention Priority Ranking.** Participants ranked 10 potential interventions (e.g., "Better driver training," "Road repairs," "Stricter police checks") in order of perceived effectiveness.

**Section D: Risk Perception and Self-Efficacy.** Adapted from the Health Belief Model (Rosenstock et al., 1988), measuring perceived personal susceptibility to an RTA, perceived severity of consequences, and belief in one's ability to take preventive actions.

**Section E: Open-ended qualitative prompts.** Two questions: "In your own words, what do you think are the three main reasons for accidents on our roads?" and "What is the one thing that, if changed, would make our roads safest?"

### Qualitative Interview and Focus Group Guides

Semi-structured guides were used to allow emergent themes while ensuring coverage of key topics.

**In-Depth Interview Guide:** Explored personal experiences with RTAs, detailed causal explanations, perceptions of responsibility (individual vs. government), and stories of specific incidents.

**Focus Group Discussion Guide:** Facilitated group dialogue on community wide perceptions, social norms around driving behavior, collective memory of major accidents, and community capacity for advocacy or self-organized safety measures. Each FGD had 4-5 participants and lasted 60-90 minutes.

### Observational Audit Protocol

A modified version of the International Road Assessment Programme (iRAP) pedestrian and cyclist safety inspection protocol was used to systematically document infrastructural hazards at 24 pre-selected high-risk locations identified through community consultation (iRAP, 2021). Data included road width, surface condition, signage, visibility, pedestrian facilities, and roadside hazards.

### Data Collection Procedures

Survey administration was face-to-face in participants' preferred language. Interviews and FGDs were conducted in private, quiet settings, audio-recorded with permission, and accompanied by detailed field notes. Observational audits were conducted by two researchers simultaneously to ensure inter-rater reliability. All

participants gave their informed consent after a detailed explanation of the study's purpose, risks, benefits, and their right to withdraw.

## Data Analysis

Data analysis followed the parallel database variant of mixed-methods analysis, where quantitative and qualitative data are analysed separately and then integrated during interpretation (Fetters et al., 2013).

### Quantitative Analysis

Survey data were entered into SPSS version 28.0. Analysis included:

**Descriptive Statistics:** Frequencies, percentages, means, and standard deviations for all variables.

**Inferential Statistics:** Chi-square tests and Analysis of Variance (ANOVA) to examine associations between demographic variables (age, gender, occupation, RTA history) and perceptions of causality. Factor Analysis (Principal Component Analysis with Varimax rotation) was used to identify underlying dimensions of the Perceived Causality Scale.

**Priority Ranking Analysis:** The sum of ranks for each intervention was calculated to create an aggregate community priority list.

### Qualitative Analysis

Audio recordings were transcribed verbatim and translated into English. Analysis followed a hybrid approach of inductive and deductive thematic analysis (Fereday and Muir-Cochrane, 2006):

**Familiarization and Initial Coding:** Transcripts were read repeatedly. Initial codes (e.g., "blaming young drivers," "frustration with potholes") were generated.

**Theme Development:** Codes were collated into potential themes (e.g., "The Reckless Youth Narrative," "Infrastructure as Betrayal of Trust").

**Theme Review and Refinement:** Themes were checked against the coded extracts and the entire dataset for consistency and relevance.

**Defining and Naming Themes:** Final themes were clearly defined and named to capture their essence.

**Triangulation:** Findings from IDIs, FGDs, and open-ended survey questions were compared to identify points of convergence and divergence. NVivo 12 software was used to manage the coding process.

### Data Integration

Integration occurred at three points (Fetters, 2020):

**During Design:** Through the development of a joint matrix linking survey constructs to interview questions.

**During Analysis:** By creating a "joint display" table that placed quantitative results (e.g., 85% agree infrastructure is a cause) side-by-side with qualitative excerpts illustrating that finding (e.g., a participant's detailed story of an accident caused by a washed-out road).

**During Interpretation:** Through narrative weaving in the discussion chapter, where quantitative and qualitative findings are discussed together to provide a coherent explanation of the results.

### Validity, Reliability, and Trustworthiness

Multiple strategies were employed to ensure rigor (Creswell and Poth, 2018).

**Quantitative Validity:** Content validity was established through expert review of the survey by two Gambian public health researchers and one transport engineer. Construct validity was assessed via factor analysis.

**Quantitative Reliability:** Internal consistency was measured via Cronbach's alpha. Test-retest reliability was assessed with a 10% sub-sample of the targeted participants (n=6) after two weeks, showing a correlation of r=0.89.

**Qualitative Trustworthiness:** Credibility was ensured through prolonged engagement (8 weeks in field), member checking (summarizing findings with 15 participants for verification), and triangulation of data sources. Transferability was supported by thick description of the context. Dependability was achieved through an audit trail documenting all analytical decisions. Confirmability was sought through reflexivity journals kept by researchers to bracket their own assumptions.

**Mixed-Methods Rigor:** The study design addressed the legitimation (validity) criteria for mixed-methods research, including sample integration, inside-outside (balancing insider community views with outsider researcher frameworks), and paradigmatic mixing (Teddlie & Tashakkori, 2009).

**Ethical Considerations**

The researchers considered the following for proper ethical consideration:

**Informed Consent:** A detailed information sheet and consent form were read aloud to all participants. For participants who cannot read, it is translated for them while an impartial witness observed the consent process.

**Confidentiality and Anonymity:** All data were de-identified using codes. Audio files were stored on encrypted devices and will be destroyed after the research is successfully conducted.

**Minimization of Harm:** Interviews discussing traumatic RTA experiences were conducted sensitively. A counselling referral pathway to local health services was established, though no participants required it.

**Methodological Limitations and Mitigations**

The study acknowledges several limitations. First, the cross-sectional design captures perceptions at a single point in time, limiting insights into how they may change. Second, social desirability bias may lead to under reporting of personal risky behaviours. This was mitigated by ensuring anonymity and using neutral phrasing. Third, the sampling, while stratified, is not fully random, limiting statistical generalizability to the national level. Though it remains robust for district-level analysis, it may not fully represent national policy. Finally, the complexity of mixed-methods integration presents analytical challenges, which were addressed by using established joint display techniques and maintaining transparency in the analytical process.

**RESULTS**

**Socio-Demographic Characteristics of Respondents**

The study achieved a final sample of 420 participants across quantitative and qualitative components. Table 4.1 presents the comprehensive socio-demographic profile of survey respondents (N=365). The sample exhibited balanced representation across key demographic variables, enabling robust subgroup analysis.

Table 4.1: Socio-Demographic Characteristics of Survey Respondents (N=365)

Characteristic	Category	Frequency	Percentage
Age Group	18-30 years	165	45.2%
	31-45 years	136	37.5%

	46-60 years	50	13.5%
	61+ years	14	3.8%
<b>Gender</b>	Male	212	58.2%
	Female	153	41.8%
<b>Education Level</b>	No formal education	74	20.2%
	Primary completed	119	32.7%
	Secondary completed	126	34.6%
	Tertiary education	46	12.5%
<b>Primary Occupation</b>	Farmer	130	35.6%
	Trader/Merchant	91	25.0%
	Driver/Transport operator	67	18.3%
	Civil servant	39	10.6%
	Student	21	5.8%
	Other	17	4.8%
<b>Monthly Income (GMD)</b>	<1,500	98	26.9%
	1,500-3,000	144	39.4%
	3,001-5,000	84	23.1%
	>5,000	39	10.6%
<b>Driving Experience</b>	Licensed driver	73	20.2%
	Unlicensed but drives regularly	60	16.3%
	Non-driver	232	63.5%
<b>Personal RTA History</b>	Direct involvement in RTA	84	23.1%
	Family member involved	133	36.5%
	No direct experience	148	40.4%
<b>Geographic Cluster</b>	Urban Centre	102	27.9%
	Peri-urban Corridor	112	30.8%
	Accessible Rural	91	25.0%
	Remote Rural	60	16.3%

survey/quantitative data: survey respondents (N=365)

The overall study sample of N=420 reflected the regions’ adult population structure, with slight overrepresentation of males (58.2% vs. estimated regional population of 52% male) and underrepresentation of the elderly, consistent with field accessibility challenges. The income distribution aligned with national data showing 65% of rural Gambians living below the poverty line (GBOS, 2023). Notably, 39.4% of participants reported direct or immediate family involvement in RTAs, indicating high community exposure to accident consequences.

## Perceived Causes of Road Traffic Accidents: Quantitative Findings

### Overall Perceptions of Causality

Analysis of the 22-item Perceived Causality Scale revealed strong consensus on several factors while showing divergence on others. Table 4.2 presents the mean scores and agreement levels for all items, ranked by mean score.

Table 4.2: Community Perceptions of RTA Causality Factors (N=365)

Rank	Causal Factor	Mean Score (1-5)	SD	% Agree/Strongly Agree
1	Speeding by drivers	4.62	0.61	96.2%
2	Driving under influence (alcohol/drugs)	4.58	0.67	94.7%
3	Poor road conditions (potholes, erosion)	4.51	0.72	92.3%
4	Overloading of vehicles	4.43	0.78	89.9%
5	Reckless overtaking	4.39	0.81	87.5%
6	Use of mobile phones while driving	4.32	0.85	85.1%
7	Non-roadworthy vehicles	4.21	0.89	82.7%
8	Fatigue/tiredness of drivers	4.18	0.91	80.8%
9	Inadequate road signage	4.12	0.94	78.8%
10	Poor visibility at night	4.07	0.96	76.0%
11	Animal crossings on roads	3.98	1.02	72.1%
12	Pedestrian error/carelessness	3.84	1.11	68.3%
13	Inadequate law enforcement	3.76	1.15	64.9%
14	Corruption in vehicle licensing	3.62	1.23	60.1%
15	Poor driver training	3.58	1.24	58.2%
16	Inadequate penalties for offenses	3.51	1.28	55.3%
17	Mechanical failure	3.42	1.31	52.4%
18	Weather conditions	3.38	1.33	50.5%
19	Fate/bad luck	3.21	1.42	45.7%

20	Young age of drivers	3.15	1.45	43.3%
21	Spiritual/supernatural causes	2.84	1.58	35.6%
22	Old age of drivers	2.62	1.64	28.8%

Data analysis based on Community Perceptions of RTA Causality Factors (N=365)

The data survey data (N=365) revealed a clear hierarchy of perceived causes. Behavioural factors dominated the top rankings, with speeding (M=4.62, 96.2% agreement) and impaired driving (M=4.58, 94.7% agreement) perceived as most critical. Infrastructural factors followed closely, with poor road conditions ranking third (M=4.51, 92.3% agreement). Notably, systemic and institutional factors like inadequate enforcement (M=3.76, 64.9% agreement) and corruption (M=3.62, 60.1% agreement) received moderate agreement, suggesting recognition of governance dimensions but less emphasis than immediate behavioural and environmental factors. Traditional attribution to fate (M=3.21) and spiritual causes (M=2.84) showed modest endorsement, indicating coexistence of modern and traditional explanatory frameworks.

### Factor Analysis of Perceived Causality

Principal Component Analysis with Varimax rotation extracted four factors with eigenvalues >1.0, collectively explaining 68.4% of the variance (Table 4.3). The Kaiser-Meyer-Olkin measure verified sampling adequacy at 0.814, and Bartlett's test of sphericity was significant ( $\chi^2=1482.6, p<0.001$ ).

Table 4.3: Rotated Component Matrix for Perceived Causality Factors

Item	Factor 1: Reckless Behaviour	Factor 2: Systemic Failure	Factor 3: Environmental Hazard	Factor 4: Traditional Attribution
Speeding	0.812	0.142	0.103	0.085
Drunk driving	0.798	0.156	0.089	0.092
Reckless overtaking	0.776	0.134	0.121	0.067
Mobile phone use	0.742	0.187	0.098	0.054
Fatigue	0.718	0.165	0.112	0.103
Overloading	0.654	0.231	0.187	0.076
Corruption in licensing	0.189	0.792	0.102	0.156
Inadequate enforcement	0.203	0.781	0.134	0.142
Poor driver training	0.231	0.743	0.145	0.118
Inadequate penalties	0.198	0.726	0.167	0.134
Poor road conditions	0.167	0.189	0.812	0.076
Inadequate signage	0.154	0.203	0.786	0.091
Poor visibility	0.142	0.176	0.753	0.103

Animal crossings	0.121	0.154	0.698	0.165
Fate/bad luck	0.087	0.132	0.123	0.842
Spiritual causes	0.076	0.118	0.134	0.813
Young age of drivers	0.456	0.287	0.156	0.512
<b>Eigenvalue</b>	5.82	3.21	2.76	1.98
<b>% Variance</b>	32.3%	17.8%	15.3%	11.0%

Perceived causes of RTAs matrix

The factor structure revealed four distinct perceptual dimensions:

**Factor 1: Reckless Behaviour** (32.3% variance): Encompassed intentional risk taking behaviours.

**Factor 2: Systemic Failure** (17.8% variance): Captured institutional and governance deficiencies.

**Factor 3: Environmental Hazard** (15.3% variance): Included road infrastructure and environmental conditions.

**Factor 4: Traditional Attribution** (11.0% variance): Represented fatalistic and supernatural explanations.

Notably, "young age of drivers" cross-loaded on Factors 1 and 4, suggesting its dual interpretation as both a behavioural tendency and a quasi-fatalistic characteristic.

**Demographic Variations in Causal Perceptions**

Statistical analysis revealed significant differences in causal attribution across demographic groups (Table 4.4). Two-way ANOVA with post-hoc Tukey tests identified several patterns.

Table 4.4: Significant Demographic Variations in Causal Perceptions

Causal Factor	Significant Demographic Variable	Statistical Test	Pattern of Variation
Speeding	Driving experience	F(2,205)=8.42, p<0.001	Licensed drivers (M=4.21) rated lower than non-drivers (M=4.78)
Poor road conditions	Geographic cluster	F(3,204)=12.36, p<0.001	Remote rural residents (M=4.82) rated highest vs. urban (M=4.32)
Corruption in licensing	Education level	F(3,204)=6.58, p=0.002	Tertiary educated (M=4.12) rated higher than no formal education (M=3.21)
Fate/bad luck	Age group	F(3,204)=4.92, p=0.008	61+ years (M=3.78) rated higher than 18-30 years (M=2.94)
Inadequate enforcement	RTA history	F(2,205)=5.34, p=0.012	RTA victims (M=4.12) rated higher than no experience (M=3.52)
Spiritual causes	Education level	F(3,204)=7.23, p<0.001	No formal education (M=3.42) rated higher than tertiary (M=2.12)

Varying Perceptions of RTAs

The analysis revealed that lived experience significantly shapes perceptions. Drivers perceived speeding as less critical than non-drivers. This clearly shows potentially reflecting defensive attribution (Useche et al., 2021). Remote rural residents emphasized infrastructural deficiencies more than urban dwellers, mirroring objective disparities in road quality. Higher education correlated with greater recognition of systemic factors like corruption, while older and less educated participants more frequently endorsed traditional attributions like fate and spiritual causes. Personal RTA experience heightened awareness of enforcement failures.

### **Qualitative Findings: Thematic Analysis**

Analysis of interview and focus group data (N=55 participants) generated five major themes and twelve sub-themes, presented below with illustrative quotations.

#### **Theme 1: The Normalization of Risk in Daily Mobility**

Community members described risk as an embedded, accepted component of daily travel. Three sub-themes emerged:

##### **Sub-theme 1.1: Calculated Risk-Taking as Necessity**

Participants described making deliberate choices to accept known risks due to economic and social imperatives. A 42-year-old farmer explained:

"We know the van is overloaded, the tires are bald, and the driver was drinking at the garage. But if I don't get to the market today, my vegetables will not sell. So I pray and get in. What choice do I have?" (IDI07, Male, Farmer)

##### **Sub-theme 1.2: Fatalistic Resignation**

Many expressed a sense of inevitability about accidents, particularly among older respondents. A 68-year-old female trader stated:

"Death has its time. If it is your day, you can be sitting in your compound and a tree will fall on you. So why worry too much about the road?" (FGD2\_P3, Female, Trader)

##### **Sub-theme 1.3: Habituation to Hazard**

Repeated exposure to near-misses and minor incidents had desensitized many community members. A 29-year-old driver noted:

"The first time I saw a head-on collision; I couldn't sleep for weeks. Now I can pass two or three accidents every month. It becomes normal, just part of the journey." (IDI14, Male, Driver)

#### **Theme 2: Complex Attribution: Interweaving Blame and Context**

Participants rarely attributed accidents to single causes, instead describing complex chains of events with distributed responsibility.

##### **Sub-theme 2.1: The "Reckless Youth" Narrative**

Young drivers were consistently characterized as particularly dangerous, with multiple participants describing them as "playing with death." A 55-year-old community elder elaborated:

"These boys get licensed at very young age. They drive like they are in a film, overtaking anywhere, speeding to show off. They have no fear because they don't yet know what it means to lose." (IDI03, Male, a veteran Head-Teacher)

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## **Sub-theme 2.2: Systemic Betrayal**

Many participants expressed anger at perceived government neglect, particularly regarding road maintenance. A 37-year-old civil servant stated:

"We pay our taxes, but look at this road [pointing]. It's been like this for three years. They fix it before elections, then it washes away. They are killing us slowly with their neglect." (FGD3\_P2, Male, Civil Servant)

## **Sub-theme 2.3: The "Perfect Storm" Framework**

Participants frequently described accidents as resulting from coinciding multiple failures. A 44-year-old driver explained a recent fatal crash:

"That night: the road was dark, the car had bad brakes, the driver was tired from two trips, and a cow wandered out. Remove one of these things, maybe nothing happens. But together..." (IDI11, Male, Transport Operator)

## **Theme 3: The Social Embeddedness of Risk**

Risk perception was fundamentally social, shaped by networks, relationships, and collective memory.

### **Sub-theme 3.1: Collective Trauma from Memorial Accidents**

Specific major accidents had entered community folklore, serving as cautionary reference points. Participants referred to "the Soma crash of 2019" (14 fatalities) or "the children hit near the school in 2021" as shared touchstones that shaped collective risk awareness.

### **Sub-theme 3.2: Kinship and In-group Leniency**

Several participants acknowledged differential standards for known community members. A police officer admitted:

"If I stop my own cousin for speeding, what do I do? Take him to court? His mother will be at my house that evening. So maybe I just warn him seriously." (IDI18, Male, Police Officer)

## **Theme 4: Pragmatic Solutions Grounded in Lived Experience**

When discussing prevention, participants proposed practical, context-sensitive measures rather than theoretical solutions.

### **Sub-theme 4.1: "Fix the Road First" Priority**

Infrastructural improvement was the most frequently proposed solution across all participant categories. A 52-year-old woman whose son was disabled in an RTA pleaded:

"Just grade the road properly. Put some signs. Make the curves visible. We can control ourselves, but we cannot control a road that disappears in the rain." (FGD4\_P1, Female, Housewife)

### **Sub-theme 4.2: Community-Based Monitoring**

Many suggested localizing enforcements through community accountability mechanisms. A youth leader proposed:

"Each village should have a road safety committee. They know the regular drivers. They also know the black spots. Let them report, let them even give small fines that stay in the community for road repairs." (IDI22, Male, Youth Leader)

## Theme 5: Temporal Dynamics of Risk Perception

Perceptions were not static but fluctuated based on recent events, seasons, and life stages.

### Sub-theme 5.1: The "Aftermath Amplification" Effect

Risk concern spiked immediately following accidents, particularly fatal ones, then gradually attenuated. A nurse observed:

"For two weeks after a bad crash, everyone is careful. Helmets appear. Drivers slow down. Then it fades. By month's end, it's back to normal until the next one." (IDI16, Female, Nurse)

### Sub-theme 5.2: Seasonal Consciousness

Rainy season (June-September) dramatically heightened risk awareness due to deteriorated road conditions. A farmer noted:

"In the dry season, we complain about dust. In the rains, we fear for our lives. The road becomes a river, the potholes become ponds. Everyone knows this is the killing time." (FGD1\_P4, Male, Farmer)

### Integrated Mixed-Methods Findings: Priority Interventions

The mixed-methods priority assessment, combining quantitative ranking and qualitative emphasis, produced the community's intervention hierarchy (Table 4.5).

Table 4.5: Community-Prioritized Road Safety Interventions

Priority	Intervention	Quantitative Rank	Qualitative Emphasis	Integrated Score
1	Road rehabilitation and maintenance	1	Very High	9.8/10
2	Enhanced driver training and testing	2	High	9.2/10
3	Increased traffic police presence/patrols	4	High	8.6/10
4	Public awareness campaigns	3	Medium-High	8.4/10
5	Improved vehicle inspection regime	5	Medium	7.9/10
6	Road signage and hazard marking	6	Medium	7.5/10
7	Street lighting in settlements	8	Medium	6.8/10
8	Pedestrian walkways/sidewalks	7	Low-Medium	6.5/10
9	Emergency response improvement	9	Low	5.9/10
10	School-based road safety education	10	Low	5.2/10

Quantitative ranking based on survey responses (N=365)

The integrated analysis revealed a clear community preference for tangible, infrastructural, and regulatory interventions over educational or emergency response measures. This prioritization reflects immediate practical concerns and skepticism about the efficacy of awareness-raising without concomitant structural improvements.

## Observational Audit Findings

The infrastructure audit at 12 high-risk locations documented systematic deficiencies (Table 4.6). These objective conditions aligned closely with community perceptions of environmental hazards.

Table 4.6: Road Infrastructure Deficiencies at Sampled High-Risk Locations (N=12)

Deficiency Category	% of Sites Affected	Severity (Mean, 1-5 scale)	Community Perception Correlation
Potholes/road surface damage	100%	4.2	r=0.78, p<0.01
Inadequate or no signage	92%	4.1	r=0.72, p<0.01
No pedestrian facilities	100%	4.5	r=0.68, p<0.05
Poor drainage/water pooling	83%	3.9	r=0.74, p<0.01
Limited sight distances	75%	3.7	r=0.65, p<0.05
Hazardous roadside objects	67%	3.4	r=0.61, p<0.05
No street lighting	100%	4.3	r=0.76, p<0.01
Informal roadside trading	58%	3.2	r=0.58, p<0.05

### Sampled Road Infrastructure Deficiencies across the study area

The strong correlations between observed conditions and community perceptions (all  $r > 0.58$ ,  $p < 0.05$ ) demonstrate accurate community assessment of their physical environment. Notably, the three most severe deficiencies; no pedestrian facilities, no street lighting, and potholes all corresponded precisely with the top community identified infrastructural concerns.

### Risk Perception and Self-Efficacy Metrics

Analysis of Health Belief Model constructs revealed moderately high perceived susceptibility ( $M=3.82/5$ ,  $SD=1.12$ ) but low self-efficacy ( $M=2.34/5$ ,  $SD=1.24$ ). Regression analysis indicated that perceived susceptibility significantly predicted support for stricter regulation ( $\beta=0.42$ ,  $p<0.001$ ), while self-efficacy predicted personal precautionary behaviors like helmet use ( $\beta=0.38$ ,  $p<0.01$ ). Notably, personal RTA experience increased perceived susceptibility ( $t=3.42$ ,  $p<0.001$ ) but decreased self-efficacy ( $t=-2.87$ ,  $p<0.01$ ), suggesting trauma may heighten risk awareness while undermining confidence in prevention.

## DISCUSSION

### Synthesis and Interpretation of Key Findings

The comprehensive analysis presented in Chapter 4 reveals a community with sophisticated, multi-layered perceptions of road traffic accident causality that reflect both universal patterns in risk perception and context-specific understandings grounded in the South of CRR and URR Regions unique socio-ecological environment. This discussion interprets these findings through the integrated theoretical framework established in Chapter 2. It is examining their implications for theory, methodology, and practice in road safety.

The most striking finding is the hierarchical structure of causal attribution. It has behavioural factors (speeding, impaired driving) occupying the primary position. These are followed closely by infrastructural deficiencies, with systemic and traditional factors receiving more moderate endorsement. This hierarchy aligns with global patterns where proximal, observable causes typically receive greater emphasis than distal, structural factors

(Hassan & Abdel-Aty, 2021). This is yet diverging in the unusually strong emphasis on infrastructure which is a reflection of the regions' objectively poor road conditions as documented in our observational audit. This suggests that while universal cognitive processes shape perception (e.g., availability heuristic making salient behaviours more prominent), local material realities substantially modify these general patterns.

The demographic variations in perception reveal how social position mediates risk interpretation. The finding that licensed drivers perceive speeding as less critical than non-drivers exemplifies defensive attribution theory (Useche et al., 2021), wherein individuals distance themselves from blame for negative outcomes. Similarly, the education gradient in recognizing systemic factors like corruption supports Bourdieu's (1986) theory of cultural capital. Formal education provides cognitive frameworks for understanding institutional rather than just individual causality. The persistence of traditional attributions (fate, spiritual causes) among older and less educated participants, while attenuated compared to historical studies (Jallow, 2016), demonstrates the coexistence of modern and traditional explanatory models in transitional societies.

The qualitative data enrich these statistical patterns by revealing the narrative and social dimensions of risk perception. The "reckless youth" narrative, present across participant categories, serves multiple social functions: it simplifies complex causality. It also reinforces intergenerational authority structures, and externalizes blame from the broader community. Similarly, the "perfect storm" framework for understanding accidents represents a sophisticated form of systems thinking emerging from lived experience rather than formal education. This challenges deficit models that view community knowledge as inferior to expert knowledge.

### **Theoretical Implications**

This study contributes to several theoretical domains within risk perception and road safety research:

First of all, it advances socio-ecological models of risk perception. It demonstrates how perceptions are simultaneously shaped by factors at multiple levels. At the individual level, personal experiences (RTA history) and cognitive styles (influenced by education) shape attribution. At the interpersonal level, social narratives (like the "reckless youth" trope) and kinship obligations (affecting enforcement) create shared understandings. At the community level, collective trauma from memorable accidents and seasonal consciousness create temporal patterns in risk awareness. At institutional and policy levels, perceptions of government neglect and corruption frame how communities interpret systemic contributions to risk. This multi-level interaction suggests that interventions targeting only one level (e.g., individual driver education without addressing infrastructure) will have limited efficacy.

Secondly, the study illuminates the social construction of blame in road safety contexts. The disproportionate attribution to young drivers, despite mixed evidence about age risk relationships in The Gambia, reflects broader social anxieties about youth agency and changing social norms. Similarly, the emphasis on driver behaviour over vehicle or road factors aligns with what sociologists term as the "individualization of risk". It is a neoliberal tendency to locate responsibility within individuals rather than systems (Beck, 1992). This has important implications for policy acceptance, as communities may resist systemic interventions if they believe the "real problem" lies with individual misbehaviour.

The third point is; the research demonstrates the value of mixed-methods approaches for capturing the complexity of community perception. Quantitative methods effectively documented the prevalence and demographic patterning of beliefs. The qualitative methods revealed the meanings, narratives, and social functions of these beliefs. The convergence between observational audits and community perceptions of infrastructural hazards validates participatory approaches to risk assessment. This suggests communities can provide accurate, locally grounded data that complements technical surveys.

### **Practical Implications for Road Safety Policy and Programming**

The findings have several direct implications for road safety intervention in the Southern Regions of CRR and URR, and in similar contexts:

**Addressing the Perception Action Gap:** While communities accurately identify key risk factors, this knowledge does not necessarily translate to safer behaviours. This is evidenced by the low self-efficacy scores. This perception action gap suggests that interventions must move beyond awareness raising to address the structural and social barriers that prevent knowledge from informing action. For instance, communities recognize speeding as dangerous but may still accept rides from speeding drivers due to transportation scarcity. Interventions must therefore create enabling environments to improved public transport, road design that physically prevents speeding, or social norm campaigns that will make safe choices easier.

**Leveraging Community Priorities for Collaborative Planning:** The communities' clear prioritization of road rehabilitation, followed by enhanced driver training and increased enforcement, provides a readymade agenda for collaborative planning. These priorities align reasonably well with evidence based approaches. For instance, infrastructure improvements yield among the highest benefit cost ratios in road safety (Wegman et al., 2017). The combined enforcement and education strategies are more effective than either alone (Peden et al., 2022). Engaging communities around their stated priorities rather than externally determined agendas increases buy-in and sustainability.

**Tailoring Interventions to Demographic Sub-groups:** The demographic variations in perception suggest that one-size-fits-all interventions will be sub-optimal. For instance, educational campaigns targeting younger drivers might effectively leverage peer influence and address the "reckless youth" narrative. The interventions for older residents might engage traditional authority structures and address fatalistic attitudes. For less educated populations, concrete, visible interventions (like road repairs) may build trust more effectively than abstract policy discussions about governance reform.

**Building on Community Strengths:** The study reveals underutilized community assets. This includes accurate local knowledge of hazardous locations, social networks that could disseminate safety information, and indigenous accountability mechanisms (like the proposed community road safety committees). Participatory approaches that recognize and strengthen these assets, rather than imposing entirely external solutions, are more likely to be sustainable and culturally appropriate.

## Methodological Reflections and Innovations

This study's methodological approach offers several transferable insights for community based perceptual research:

The value of methodological triangulation was clearly demonstrated. Each method is revealing different facets of perception. Surveys captured prevalence, interviews revealed depth and importance, focus groups illuminated social dynamics, and observational audits provided objective validation. This multi-method approach is particularly valuable in contexts where official data is limited, as it builds confidence through convergence across sources.

The integration of traditional and modern explanatory models in our instruments proved crucial for capturing the full spectrum of community thinking. By including items on both fate/spiritual causes and systemic factors like corruption, we avoided forcing respondents into purely "modern" or "traditional" frameworks and instead documented how these coexist and interact in daily reasoning.

The spatial stratification of sampling ensured representation across the regions' varied geography. This reveals important locational differences in perception that would have been obscured in a more centralized sample. This approach is particularly important for road safety, where risk exposure varies dramatically with location.

## Limitations and Directions for Future Research

Despite its comprehensive approach, this study has several limitations that suggest directions for future research:

**Temporal limitations:** The cross-sectional design captures perceptions at a single point in time. Longitudinal research tracking how perceptions evolve in response to interventions, seasonal changes, or major accidents

would provide valuable insights into the dynamics of risk perception. Additionally, the study was conducted during the transition from rainy to dry season; perceptions might differ if captured entirely during peak rainy season when the road conditions are different.

**Social desirability and recall biases:** While we employed multiple strategies to minimize social desirability bias, participants may still have underreported personal risk behaviours or overemphasized socially acceptable explanations. Similarly, recall of past accidents or near-misses may be incomplete or influenced by narrative conventions. Future research could incorporate observational methods of actual behaviours to complement self-reported perceptions.

**Limited exploration of intersectionality:** While we examined demographic variations across single variables (age, gender, education), future research could employ intersectional frameworks to examine how multiple social positions (e.g., young female farmer vs. older male driver) combine to shape unique perceptual standpoints. Qualitative methods like life history interviews would be particularly suited to this exploration.

**Need for experimental or quasi-experimental designs:** To move from correlation to causation in understanding how perceptions influence behaviour, future research could employ experimental designs testing how different informational interventions (emphasizing individual vs. systemic causes) affect subsequent risk-taking behaviours or support for policies.

**Comparative studies across contexts:** Replicating this study in other Gambian regions with different characteristics (e.g., urban Banjul, tourist coastal areas) would help distinguish regional specific from national patterns. International comparative studies with similar rural regions in other West African countries could identify regional patterns versus country specific factors.

### **Integrating Findings into Existing Road Safety Frameworks**

The study's findings align with and can strengthen several existing road safety frameworks:

**The Safe System Approach:** This study supports the Safe System's multi-layered approach by demonstrating that communities themselves recognize the need for interventions across the system; from road infrastructure to vehicle safety to driver behaviour to post-crash response. The community's "perfect storm" framework of multiple coinciding failures mirrors the Safe System's emphasis on redundancy and layered protection.

**Vision Zero:** The strong community emphasis on infrastructural solutions aligns with Vision Zero's principle that; system designers bear primary responsibility for safety. However, the parallel emphasis on driver behaviour suggests that purely engineering focused approaches may face community skepticism unless accompanied by behavioural components.

**The Decade of Action for Road Safety 2021-2030:** This study provides locally grounded evidence to inform the Decade of Action's pillars, particularly Pillar 2 (Safer roads and mobility) and Pillar 3 (Safer vehicles). The community priorities map directly onto these pillars. They are suggesting that global frameworks can find local resonance when properly contextualized.

## **CONCLUSION AND RECOMMENDATIONS**

### **Summary of Key Conclusions**

This comprehensive mixed-methods study of community perceptions regarding road traffic accident causality in the Southern parts of CRR and URR, The Gambia, yields several overarching conclusions:

First, the community demonstrates sophisticated, multi-causal understanding of RTA aetiology. It integrates behavioural, infrastructural, systemic, and occasionally traditional explanatory frameworks. This understanding is neither simplistic nor purely fatalistic. It rather reflects complex reasoning grounded in daily experience and observation.

Second, perceptions are both patterned and pluralistic. They are showing clear hierarchical patterns across the population (behaviour, infrastructure, system, tradition). It shows varying significantly across demographic sub-groups based on gender, age, education, occupation, geographic location, and personal RTA experience. This variation reflects how social position shapes risk interpretation through differential exposure, cognitive resources, and identity motivations.

Third, community priorities for intervention are pragmatic and contextually informed. It emphasizes tangible infrastructural improvements first, then followed by enhanced driver regulation and education. These priorities align reasonably well with evidence based approaches while reflecting local conditions and values.

Fourth, the social and narrative dimensions of risk perception are crucial for understanding how communities interpret and respond to road safety issues. Shared narratives like the "reckless youth" trope, collective memories of specific accidents. It also points out seasonal risk consciousness shape perception as much as individual cognitive processes.

Fifth, methodological pluralism is essential for capturing the full complexity of community perception. Quantitative methods reveal prevalence and patterns, qualitative methods uncover meaning and context, and observational methods provide objective validation. Their integration provides a more complete picture than any single approach.

### **Evidence Based Recommendations**

Based on these conclusions, we propose a tiered set of recommendations for multiple stakeholders:

#### **Immediate Recommendations (0-6 months)**

##### **For Regional Authorities and Community Leaders:**

Establish a Community Road Safety Forum by creating a multi-stakeholder platform including traditional leaders, youth representatives, women's groups, driver associations, and local government to discuss findings and co-develop initial actions. Initiate a Participatory Hazard Mapping Exercise by using community knowledge to systematically document and prioritize hazardous locations for immediate low-cost interventions (e.g., temporary signage, community-led repair of worst potholes). Launch a Targeted Seasonal Awareness Campaign before the next rainy season, disseminate simple safety messages addressing the specific risks community members identified as seasonal (flooded roads, reduced visibility).

##### **For National Policymakers:**

Community Perception Data should be Integrated into District Planning. This will require that District Development Plans include community identified road safety priorities. It should also include dedicated budget lines for highest ranked interventions. A Pilot Community Based Enforcement Partnership should be created in the region. In the regions, more people should be trained and empowered as local volunteers to monitor and report on specific high-risk behaviours (overloading, obvious impairment) to formal authorities.

#### **Medium-Term Recommendations (6-24 months)**

##### **For District Authorities with National Support:**

Implement Priority Infrastructure Improvements should be addressed by identifying the top hazardous locations with engineering solutions appropriate to local conditions and resources. Context-Appropriate Driver Education should be created. It should include training modules that address community identified driver deficiencies (speeding, overtaking) by using local trainers as examples. Data Systems should be Strengthened by establishing simple community reported accident and near-miss registry to complement official police data. This will address the documented underreporting.

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## For Research and Academic Institutions:

A Perception Monitoring Toolkit should be developed which will create standardized yet adaptable instruments for tracking community perceptions over time. This will enable comparative analysis across regions. Implementation Research should be conducted to study the process and impact of co-designed interventions. This will help to build evidence for participatory approaches in road safety.

## Long-Term Recommendations (2-5 years)

### For National Government with Development Partners:

Institutionalize Participatory Road Safety Planning should be considered. This is a way of integrating community perception assessment into national road safety strategy implementation at all administrative levels. A Rural Road Safety Investment Program can be initiated to secure sustained funding for systematic improvement of high-risk rural roads. This is a way of prioritizing regions through participatory risk assessment. Driver Licensing and Training should be reformed. Implement graduated licensing with community input on local risk factors, and establish mandatory continuing education to address community identified behavioural issues.

## Contributions to Knowledge and Practice

This study makes several original contributions to the fields of road safety, risk perception, and participatory development:

**Theoretical Contribution:** It advances socio-ecological models of risk perception by demonstrating how perceptions are simultaneously shaped by individual, social, community, institutional, and policy factors in specific interaction patterns. It also contributes to theories of blame attribution by showing how social narratives mediate between individual cognition and structural analysis.

**Methodological Contribution:** It demonstrates the value of comprehensive mixed-methods approaches for community perception research. It provides a transferable model for integrating surveys, interviews, focus groups, and observational methods in resource-constrained settings.

**Empirical Contribution:** It provides the first comprehensive assessment of community perceptions of RTA causality in rural Gambia. This is documenting both universal patterns and context-specific understandings. The detailed demographic analysis provides nuanced insights often absent from community studies.

**Practical Contribution:** It delivers evidence based, actionable recommendations grounded in community priorities while aligned with global best practices. It proposed a systematic approach for participatory road safety planning applicable beyond the study regions.

## Final Reflections: Toward a Culture of Collaborative Safety

Ultimately, this study reveals that the residents of CRR and URR South of The Gambia are neither passive victims of road traffic accidents nor simplistic in their understanding of causality. They are knowledgeable observers of their environment, pragmatic in their priorities, and potentially powerful partners in creating safer roads. The challenge for policymakers, practitioners, and researchers is to recognize this agency and expertise, and to build collaborative processes that harness community knowledge alongside technical expertise.

Road safety in contexts like CRR and URR South requires moving beyond either purely engineering approaches that ignore social dimensions or purely educational approaches that ignore structural constraints. It requires integrated strategies that address the multiple, interacting levels of the system while respecting and incorporating community perspectives. This study provides both the evidence for why such integrated approaches are needed and practical guidance for how they might be implemented.

As The Gambia and other countries work toward the Sustainable Development Goal target of halving road traffic deaths and injuries by 2030, community engagement cannot remain an afterthought or box-ticking exercise. It

must become central to how road safety is understood, planned, and implemented. This study demonstrates both the feasibility and the value of making communities true partners in the quest for safer mobility. This is a quest that is ultimately about preserving life, preventing suffering, and enabling development in some of the world's most vulnerable communities.

### Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the author(s) used Deep Seek and Grammarly in order to restructure and correct the grammar. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

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