69th Annual
Scientific Conference
Indianapolis
Indiana, USA

AAM25

AAAM 69th Annual Conference Poster Abstracts

October 7-10, 2025
Indianapolis, Indiana, USA

Paschalin Basil

Abstract

Public Awareness Campaigns and Policy Enforcement on Impaired Driving in the Public Transport Sector in Lagos, Nigeria and Nairobi, Kenya

Impaired driving remains a critical public health and road safety challenge, particularly in Low- and Middle-Income Countries (LMICs), where over 92% of global road traffic fatalities occur. Nigeria and Kenya, two of Africa's prominent urbanised nations, record high rates of impaired driving incidents, often linked to alcohol and drug abuse, cultural permissiveness, weak enforcement mechanisms, and limited public education. Despite various international and local interventions, the effectiveness of public awareness campaigns and policy enforcement in mitigating impaired driving remains underexplored in African contexts. This study therefore investigates the impact of the effectiveness of public awareness campaigns and policy enforcement interventions on impaired driving in Lagos, Nigeria, and Nairobi, Kenya, two megacities with rising vehicular populations and shared institutional vulnerabilities. This research assesses the current state of impaired driving in Lagos and Nairobi; the successes and limitations of existing public awareness initiatives and law enforcement interventions; the socio-cultural and institutional factors influencing impaired driving behaviour and establish strategies to enhance the effectiveness of public awareness and policy enforcement measures to curb impaired driving in both cities.

Anchored on the Health Belief Model (HBM) and Deterrence Theory, the study adopts a mixed-methods approach. It combines secondary data from police and health records to evaluate trends in impaired driving and related crashes, and primary data collected through structured questionnaires administered to a stratified sample of registered motorists along major traffic corridors. The sampling design involves a multi-stage technique, with less than 0.1% of the registered motorist population ((Nairobi-200 and Lagos-678 = 798) selected using stratified random and systematic sampling during peak hours. The questionnaire captures socio-demographics, exposure to awareness campaigns, perception of enforcement, and behavioural patterns. Quantitative data will be analysed using descriptive statistics and regression modelling to assess the effect of interventions on impaired driving. Pilot testing, expert validation, and Cronbach's alpha (≥ 0.7) will ensure the reliability and validity of the instruments. Ethical approval will be obtained from relevant institutional review boards, with informed consent sought from all participants.

Expected findings will offer comparative understanding into the current state of impaired driving, the performance and limitations of existing awareness campaigns and enforcement efforts, and the socio-cultural and institutional factors perpetuating impaired behaviours in both cities. The study anticipates that while both interventions have had some measurable impacts, gaps remain in targeting, coverage, and enforcement consistency, particularly due to socio-political and infrastructural constraints in African cities. It will propose context-specific strategies for enhancing intervention effectiveness, such as community-based education, technology-enabled enforcement, and inter-agency coordination.

By providing actionable evidence tailored to the African urban experience, this study advances the global road safety agenda and fills a critical research gap in LMICs. The findings will support policymakers, transport authorities and NGOs and international stakeholders such as the AAAM and WHO, in designing and deploying impactful interventions to reduce impaired driving, thereby improving public health, reducing traffic fatalities, and promoting sustainable urban mobility in Lagos, Nairobi, and similar urban centres across Africa.

Sparsh Jain

2025 AAAM Poster Abstract Template

TITLE: Evaluating Driving Exposure and Performance in Habitual Cannabis and Alcohol Users using Naturalistic Driving Data

OBJECTIVES

Driving under the influence of alcohol and cannabis remains a growing public safety concern. In 2022, 13.6 million U.S. drivers reported driving while impaired, with alcohol contributing to over 11,000 roadway deaths annually (Atkins et al. 2024; Stewart 2023). Cannabis-involved driving is also increasing alongside legalization, yet no validated roadside tools or legal thresholds exist to detect cannabis-related impairment, and research findings remain inconsistent (Pearlson et al. 2021).

While simulator and laboratory studies have established how alcohol and cannabis can impair driving behavior, few have examined these effects in real-world settings (Manning et al. 2024; Miller et al. 2024). This study addresses that gap by leveraging a large-scale naturalistic driving dataset to examine driving behavior following recent alcohol, cannabis, or combined use, aiming to inform future detection strategies and safety interventions through ecologically valid insights.

METHODS

This study analyzed naturalistic driving data from the "Pioneer" cannabis and alcohol naturalistic driving study, which included 41 participants from Washington and Virginia who drove their own personal vehicles while equipped with custom-built in-vehicle data acquisition systems for several months. These systems continuously recorded detailed driving data, including vehicle location, kinematics, speed, acceleration, braking, and other performance-relevant measures.

Participants self-reported recent use of alcohol, cannabis, illicit drugs, and medications through structured surveys completed prior to each driving trip. Trips were categorized into four conditions based on these self-reports: substance-negative (baseline), alcohol-only, cannabis-only, and polysubstance (alcohol + cannabis). Periodic breathalyzer and saliva tests provided additional objective confirmation of substance use.

Consumption and post-consumption driving behavior was compared within subjects across conditions to examine differences in driving decisions, exposure patterns (e.g., roadway type, mileage), and lateral and longitudinal vehicle control. Select driving events were further explored through detailed video annotations to capture contextual factors and behavioral responses.

RESULTS

Several notable trends emerged from the analysis. Compared to substance-negative trips, alcohol-positive trips were more likely to occur during nighttime hours (6 p.m. to 1 a.m.) and on weekends, with reduced highway driving exposure (p=0.0475). Cannabis-positive trips, in contrast, closely resembled baseline driving in terms of timing but were associated with a 5% reduction in speeding relative to mileage (p=0.0371). These trips also showed lower highway mileage exposure and suggested possible declines in lane tracking ability. Polysubstance-positive trips reflected a mix of behavioral patterns observed in both alcohol- and cannabis-positive conditions. Additionally, select video-reviewed events provided valuable context to these patterns, capturing unusual driving behaviors including near-crash incidents during both substance-negative and cannabis-positive trips.

CONCLUSIONS

The data in this study supports a comprehensive naturalistic driving analysis of cannabis- and alcohol-positive drivers, providing real-world insight into substance-positive driving behavior. Results suggest that alcohol and cannabis may influence driving decisions and performance in distinct ways.

Findings remain exploratory given key limitations, including reliance on self-reported substance use, variability in cannabis products and doses, and lack of experimental control. Nonetheless, this work highlights the potential value of naturalistic data in advancing impaired driving research and suggests that future efforts may benefit from integrating

larger sample sizes, pre-drive objective substance confirmation approaches, and explicit exploration of other drugs and emerging impairment-inducing products.

REFERENCES

Atkins RG, Jodon T, Conlon JD, Schick A. 2024. Drug-impaired driving data collection: Report to congress. United States. Department of Transportation. National Highway Traffic Safety Administration.

Manning B, Arkell TR, Hayley AC, Downey LA. 2024. A semi-naturalistic open-label study examining the effect of prescribed medical cannabis use on simulated driving performance. J. Psychopharmacol. (Oxf.) 38(3):247-257.

Miller R, Brown T, Schmitt R, Gaffney G, Milavetz G. 2024. Predicting changes in driving performance in individuals who use cannabis following acute use based on self-reported readiness to drive. Accid. Anal. Prev. 195:107376.

Pearlson GD, Stevens MC, D'Souza DC. 2021. Cannabis and driving. Front. Psychiatry. Volume 12 - 2021.

Stewart T. 2023. Overview of motor vehicle traffic crashes in 2021. United States. Department of Transportation. National Highway Traffic Safety Administration.

Keri-Anne Lue

TITLE: Seat Belt Fit and Use Among Pregnant Vehicle Occupants

OBJECTIVES

Motor vehicle crashes (MVCs) are a leading cause of injury and trauma-related fatalities among pregnant individuals[1]. Despite the significant risks, research on automotive safety for this population remains limited, largely due to unique challenges such as rapidly changing body shape and a narrow recruitment window. While some studies have examined belt fit in lab settings[3] or through surveys,[2,4,6] no prior research has observed seat belt fit in a natural vehicle environment among pregnant individuals. This study addresses that gap by evaluating seat belt fit quality at three anatomical points (clavicle, sternum, abdomen) and investigating how principal components built using anthropometric and vehicle environment variables are associated with belt fit.

METHODS

This study (IRB-HSR230523) includes pregnant female volunteers ($N \geq 60$) aged 18–45 at any gestational stage, participating in a one-hour session involving in-vehicle measurements. Data collected includes anthropometric and vehicle-specific metrics (e.g., abdomen circumference, distance from sternum to steering wheel), along with photos and video recordings for validation. All measurements are taken with the participant seated in their own vehicle.

To perform belt fit coding, a team of three coders used photos collected during the participants' visit to determine whether the observed belt fit was consistent with NHTSA recommendations for pregnant automobile occupants.[5] The coders recorded binary (0/1) fit outcomes at the clavicle, sternum, and abdomen. Discrepancies were resolved through discussion. PCA was used to reduce the dimensionality of 15 anthropometric and vehicle environment variables while maximizing the percentage of total variance explained. A logistic regression was estimated to assess the relationship between the leading Principal Components (PCs) and belt fit outcomes.

RESULTS

Belt fit was consistent with NHTSA recommendations for 65.38% at the clavicle, 30.77% at the sternum, and 46.15% at the abdomen. The PCA identified 4 leading PCs that explained 66% of the total variation among 15 measurements. The first PC was deemed to represent "abdomen size" (35% of total variance explained); the second PC was deemed "distance between the shoulder belt and neck" (11%); the third PC was "roundedness of seated shoulder posture" (10%); and the fourth PC was "space between the lower extremities and the vehicle interior" (9%). PC1 was associated with lower odds of correct belt fit at the sternum ($p<0.001$); PC2 was associated with higher odds of correct belt fit at the sternum ($p<0.001$); PC4 was associated with lower odds of correct belt fit at the clavicle ($p=0.022$). None of the 4 leading PCs were associated with correct belt fit at the abdomen in the multivariable model.

CONCLUSIONS

Most pregnant participants did not wear their seat belts in the recommended way at the sternum and lap. This worse-than-recommended fit can contribute to worse belt performance and put the occupant at risk for injury during a crash. Principal Components constructed using measurements taken on the participants can be used to predict poor belt fit at the sternum and clavicle, but not at the abdomen.

REFERENCES

1. Beck LF, Shults RA, Gilbert BC. Pregnant Women and Safety Belts: What Do We Know? In: Transportation Research Board Conference Proceedings. 2005 [accessed 2024 Oct 15]. https://trid.trb.org/View/773151

2. Brown HL, Harris B, Grotegut CA. Seatbelt use during pregnancy. The Am J Emerg Med. 2016;34(2):326–328. doi:10.1016/j.ajem.2015.11.029

3. Klinich KD. Seated anthropometry during pregnancy: final report. 1999 [accessed 2024 Oct 15]. http://deepblue.lib.umich.edu/handle/2027.42/1287

4. Koppel S, Bugeja L, Zou X, McDonald H, Lue K-A, Forman J, Zonfrillo MR, Baker GH, Kidd DG, Cripton PA, et al. Assessing seatbelt use among pregnant drivers in Australia: Correct seatbelt positioning, discomfort, knowledge and information sources. J Safety Res. 2025;93:15–23. doi:10.1016/j.jsr.2025.02.015

5. pregnant-seat-belt-use.pdf. [accessed 2024 Oct 15]. https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/pregnant-seat-belt-use.pdf

6. Taylor AJ, McGwin G, Sharp CE, Stone TL, Dyer-Smith J, Bindon MJ, Rue LW. Seatbelt use during pregnancy: a comparison of women in two prenatal care settings. Matern Child Health J. 2005;9(2):173–179. doi:10.1007/s10995-005-4906-2

TABLES AND FIGURES:

Table 1 Description of measured variables and their corresponding labels.

Type	Label	Variable
Anthropometric	X9	Abdomen Circumference (mm)
	X10	Hip Circumference (mm)
	X11	Fundal Height (mm)
	X12	Seated Shoulder Breadth (mm)
	X13	Seated Abdomen Depth (mm)
	X14	Seated Shoulder Height (mm)
Vehicle Environment	X24	Shortest Distance from Knee to Dashboard (mm)
	X31	Tension in Shoulder Belt at the Shoulder D-ring (lbf)
	X32	Tension in Lap Belt at the Outboard (lbf)
	X33	Tension in Shoulder Belt at Buckle (lbf)
	X35	Distance from Top of Sternum to Top Edge of Shoulder Belt (mm)
	X36	Distance from Shoulder Belt to Belly Button (mm)
	X37	Distance from Belly Button to Top of Edge of Lap Belt (mm)
	X38	Length of Lap Belt (mm)
	X39	Length of Shoulder Belt (mm)

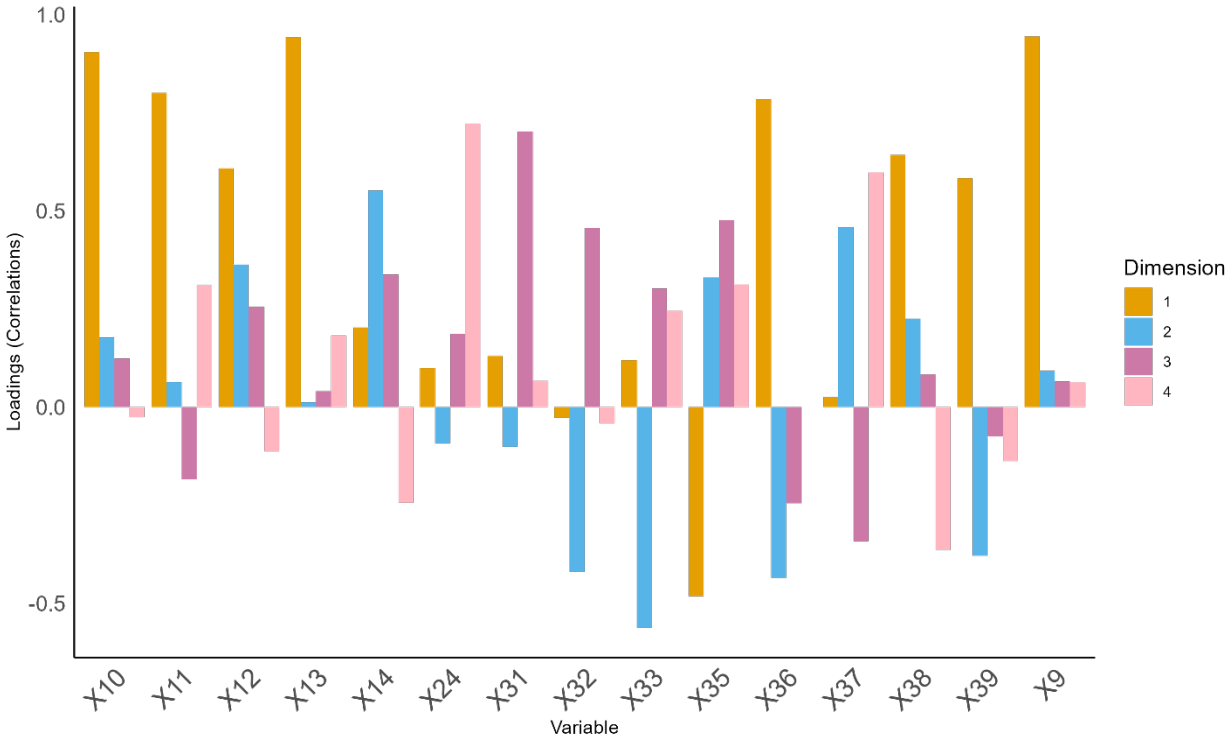

Figure 1 Loadings for each variable onto the four leading principal components.