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Oral Facial Injuries and Associated Risk Factors Among Patients Attended to at Levy Mwanawasa University Teaching Hospital

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Abstract

Background: Orofacial injuries (OFIs) are a major subset of trauma-related conditions and represent a serious global public health issue. These injuries affect the face, mouth, jaws, and associated soft tissues, often leading to significant functional, psychological, and aesthetic complications. According to Yi et al. (2024), the global incidence of facial fractures was approximately 10.7 million cases in 2019, accounting for nearly one-seventh of all bone fractures worldwide. Despite their burden, orofacial injuries remain underrepresented in trauma research and public health interventions, particularly in low- and middle-income countries (LMICs).

Orofacial injuries have diverse etiologies, including road traffic accidents (RTAs), interpersonal violence, falls, and sports-related incidents. Children are especially vulnerable due to their developing motor coordination. In early childhood, most injuries affect the primary dentition between ages two and three, primarily from domestic falls. Unfortunately, trauma to primary teeth is often neglected under the assumption that the teeth will naturally exfoliate, resulting in long-term developmental and psychological effects.

Methodology: An analytical case-control design was employed to identify and quantify risk factors associated with orofacial injuries among patients at LMUTH. The design compared patients with orofacial injuries (cases) to those without (controls), allowing the investigation of multiple exposures simultaneously. This approach was efficient for identifying associations where experimental manipulation was not possible.

Results: Majority of the patients with OFIs were male (80.4%), compared to 70.4% among controls, indicating a statistically significant gender difference ($p = 0.018$). The mean age of OFI patients (28.1 ± 8.2 years) was significantly lower than that of controls (32.4 ± 9.1 years), suggesting that younger adults were more prone to facial trauma ($p < 0.001$). The 21–30-year age bracket was most affected, consistent with findings by Kihara et al. (2017), who reported that individuals in their economically productive years are more likely to engage in activities leading to injury. In terms of education level, participants with tertiary education were fewer among OFI patients (17.1%) compared to controls (26.1%), and this difference was statistically significant ($p = 0.010$). Similarly, occupation showed a significant association with injury status ($p = 0.030$), with a greater proportion of unemployed or informally employed individuals among the OFI group. Although there was no statistically significant difference in residential area ($p = 0.35$), most patients were from urban areas, reflecting LMUTH's location and catchment population.

Conclusion: Overall, the study highlighted that orofacial injuries in Zambia are primarily preventable and are influenced by a complex interplay of behavioral, environmental, and systemic factors. These findings are consistent with prior studies across sub-Saharan Africa, underscoring the need for multi-faceted interventions that address both individual and structural contributors to trauma.

Keywords: Orofacial, Injuries, Environmental, Behavioral, soft Tissues.

Introduction

Orofacial injuries (OFIs) are a major subset of trauma-related conditions and represent a serious global public health issue. These injuries affect the face, mouth, jaws, and associated soft tissues, often leading to significant functional, psychological, and aesthetic complications. According to Yi [1], the global incidence of facial fractures was approximately 10.7 million cases in 2019, accounting for nearly one-seventh of all bone fractures worldwide. Despite their burden, orofacial injuries remain underrepresented in trauma research and public health interventions, particularly in low- and middle-income countries (LMICs).

Orofacial injuries have diverse etiologies, including road traffic accidents (RTAs), interpersonal violence, falls, and sports-related incidents [2]. Children are especially vulnerable due to their developing motor coordination. In early childhood, most injuries affect the primary dentition between ages two and three, primarily from domestic falls [3]. Unfortunately, trauma to primary teeth is often neglected under the assumption that the teeth will naturally exfoliate, resulting in long-term developmental and psychological effects.

In sub-Saharan Africa, RTAs, assaults, and falls remain the dominant causes of orofacial trauma [4]. The high rates of motorization, poor enforcement of road safety laws, and increasing interpersonal violence contribute significantly to this pattern. OFIs frequently cause speech impairment, difficulty in eating and breathing, and social withdrawal due to facial disfigurement. Their management often requires multidisciplinary intervention-spanning oral and maxillofacial surgery, emergency medicine, and psychological support which im-

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poses substantial economic and healthcare burdens.

In Zambia, and particularly in Lusaka, rapid urbanization, increased motor vehicle usage, and widening socioeconomic inequalities have heightened the risk of trauma. Despite these developments, empirical data on orofacial injuries remain sparse. Most trauma studies conducted in Zambia aggregate data across all injury types, obscuring the epidemiological profile and specific determinants of OFIs. Levy Mwanawasa University Teaching Hospital (LMUTH), a tertiary-level referral institution, presents an ideal setting to conduct a detailed investigation into these injuries. A case-control study comparing patients with and without orofacial injuries would allow for the identification of risk factors, quantification of their effects, and generation of local evidence for policy and clinical practice.

Although trauma-related injuries are common in Lusaka, there is a marked absence of hospital-based research specifically examining orofacial injuries. Existing studies fail to disaggregate trauma data by anatomical region, limiting understanding of OFIs' distinct epidemiological characteristics. Consequently, high-risk populations, behavioural correlates, and environmental determinants remain poorly identified. This data gap hampers the formulation of targeted interventions for prevention and management.

2.1 Risk Factors and Epidemiological Trends in Orofacial Injuries

Orofacial injuries (OFIs) represent a significant global public health concern, with substantial variation in epidemiological patterns across regions. According to recent findings from the Global Burden of Disease Study, incident cases and the associated disability burden of OFIs have increased globally over the past three decades [1]. Males, particularly young adults, remain the most affected demographic, and falls and road injuries are consistently identified as the primary causes of facial fractures. The burden tends to increase with age, especially in terms of years lived with disability (YLDs), underscoring the long-term consequences of these injuries.

In sub-Saharan Africa, orofacial trauma is frequently linked to road traffic accidents (RTAs), interpersonal violence, and falls. For example, a Nigerian hospital-based study identified RTAs as the leading cause of maxillofacial injuries, accounting for 48.2% of cases, followed by assaults (25.6%) and falls (18.3%) (Ndung'u, 2017). In Tanzania, OFIs constituted a large proportion of trauma admissions, predominantly affecting males aged 20–30 years [5]. A similar pattern was observed in Ethiopia, where RTAs emerged as the primary cause of facial fractures among trauma patients [6].

Dental trauma, a critical subset of OFIs, shows distinct patterns in terms of risk exposure. A systematic review by Esses [7] highlighted traumatic dental injuries as a major issue globally, particularly among children aged 2–3 years. At this developmental stage, children are more prone to falls due to immature motor coordination. Physical abuse is also a significant contributor to pediatric OFIs. South African hospital data revealed that in 59% of confirmed child abuse cases, orofacial trauma was present most commonly involving injuries to the lips [8,9].

In Zambia, specific data on OFIs remain scarce. However, the limited existing research points to increasing rates of orofacial trauma, largely due to rapid urbanization, growing vehicle use, and socioeconomic disparities. At the University Teaching Hospital (UTH) in Lusaka, one study reported that RTAs accounted for 42.3% of maxillofacial injuries [10]. Another investigation found that males represented the majority of OFI cases, supporting the trend seen elsewhere in sub-Saharan Africa [11]. These patterns emphasize the importance of conducting case-control studies to better understand and quantify the specific risk factors for OFIs in local settings like Zambia, where systemic challenges such as weak traffic law enforcement and limited access to surgical care may exacerbate injury outcomes [12].

Understanding these risk factors is essential for developing context-specific prevention strategies and health system responses. By identifying individual and environmental contributors to orofacial trauma, targeted interventions can be more effectively designed, particularly in high-risk populations.

2.2 Socio-Demographic Characteristics of OFI Patients

Demographic factors significantly influence OFI susceptibility, with consistent patterns observed across multiple studies. A systematic review by [13] established that males aged 15–30 years face the highest OFI risks globally, primarily due to risk-taking behaviours and occupational exposures. Kenyan data revealed that 72% of maxillofacial trauma patients were males aged 18–35 years, with RTAs and violence being predominant causes[14]. Similar trends were documented in Ethiopia, where 78.6% of facial fracture patients were males, peaking in the 20–29 age group [14,15].

Pediatric populations represent another vulnerable demographic. A Brazilian study found that children under 6 years accounted for 31.2% of dental trauma cases, with falls being the leading mechanism [16]. South African research highlighted that toddler (2–3 years) had the highest primary tooth trauma rates due to motor skill development [1], School-aged children also face significant risks, with sports-related dental injuries affecting 18.6% of adolescents in U.S. studies [17].

Socioeconomic status and occupation further modulate OFI risks. In Ghana, commercial motor riders constituted 38.7% of OFI cases, correlating with poor helmet compliance [18]. Zambian studies identified informal sector workers as particularly vulnerable due to limited occupational safety measures [11], Urban-rural disparities also exist, with urban populations experiencing higher assault-related OFIs, while rural areas report more agricultural and fall-related injuries [12].

2.3 Risk Factors for Orofacial Injuries

Multiple interrelated factors contribute to OFI occurrence, with regional variations in their relative importance. Road traffic accidents emerge as a leading cause globally, particularly in LMICs with weak traffic law enforcement. An Indian study found that 56.3% of facial fractures resulted from motorcycle accidents, with only 12.3% of riders wearing helmets [17], Nigerian data similarly implicated motorcycles in 52.1% of maxillofacial trauma case [17,18].

Alcohol consumption significantly exacerbates OFI risks. South African studies reported alcohol involvement in 42.8% of assault-related facial injuries, Zambian data revealed that 36.4% of assault cases leading to OFIs involved alcohol intoxication [11].

Sports and recreational activities constitute another major risk domain. A systematic review by Glendor[19] estimated that sports account for 13–39% of dental trauma cases in adolescents. High-risk activities include basketball (24.1%), soccer (18.9%), and cycling (15.3%) [19]. Protective equipment use remains low in many settings, with mouthguard utilization below 10% in some athlete populations [20].

Environmental and structural factors also play crucial roles. Inadequate playground safety measures contribute to 28.3% of pediatric dental injuries in Brazil (Andrade et al., 2016), Workplace hazards, particularly in construction and mining, account for 15–20% of oc-

cupational OFIs in developing nations [21].

An analytical case-control design was employed to identify and quantify risk factors associated with orofacial injuries among patients at LMUTH. The design compared patients with orofacial injuries (cases) to those without (controls), allowing the investigation of multiple exposures simultaneously. This approach was efficient for identifying associations where experimental manipulation was not possible.

Methodology: Research Design

An analytical case-control design was employed to identify and quantify risk factors associated with orofacial injuries among patients at LMUTH. The design compared patients with orofacial injuries (cases) to those without (controls), allowing the investigation of multiple exposures simultaneously. This approach was efficient for identifying associations where experimental manipulation was not possible.

Research Site

The study was conducted at Levy Mwanawasa University Teaching Hospital (LMUTH), located in Lusaka, Zambia. LMUTH is a tertiary referral and teaching hospital providing specialized medical, dental, and surgical care. It serves as a referral center for trauma cases across Lusaka and neighboring provinces, making it ideal for this study. The hospital includes a Maxillofacial Surgery Unit, Accident and Emergency Department, and Dental Clinic, all of which manage orofacial trauma patients.

Study Population

The target population comprised all patients presenting to LMUTH with traumatic injuries (both orofacial and non-orofacial) during the study period. Cases: Patients diagnosed with orofacial injuries (facial fractures, soft-tissue lacerations, dental trauma, or jaw fractures). Controls: Patients without orofacial injuries but presenting with other trauma types (for example, limb fractures, chest trauma) or non-trauma cases attending outpatient departments during the same period. Inclusion and Exclusion Criteria: The study Inclusion Criteria was patients aged five years and above attending LMUTH during the study period. For cases: confirmed diagnosis of orofacial injury. For controls: no evidence of orofacial injury. Those excluded were patients with incomplete medical records and or repeat visits of the same patient.

Variables of Interest

Types of Variables	Variable	Indicator	Scale of Measurement
Dependent	Presence of orofacial injuries	Type, site, and severity	Nominal/ Ordinal
Independent	Age and sex	Years, male/female	Ratio/ Nominal
Independent	Cause of injury	Road traffic accident, assault.....	Nominal
Independent	Alcohol intake before injury	Yes/No	Nominal
Independent	Use of protective gear	Helmet, seatbelt	Nominal
Independent	Time of injury	Day, night	Nominal

Ethical Considerations

Ethical approval was obtained from the Levy Mwanawasa Medical University Biomedical Research Ethics Committee (LMMU-REC 0000917-25) and the LMUTH Ethics Committee. Authority to conduct research was obtained from National Health Research Authority (NHRA) number NHRA9769/03/09/2025 Written informed consent was obtained from all participants. Confidentiality was maintained by omitting names from questionnaires and assigning coded identifiers. Participation was voluntary, and respondents could withdraw at any point without penalty. Data will be stored securely and retained for five years before destruction.

Results

Socio-Demographic Characteristics

Table 1: *Baseline characteristics of participants by orofacial injury status (n = 398).*

Variable	Overall (n = 398)	With Orofacial Injury (cases, n = 199)	Without Orofacial Injury (controls, n = 199)	p-value
Sex				**0.018**
Male	300 (75.4%)	160 (80.4%)	140 (70.4%)	
Female	98 (24.6%)	39 (19.6%)	59 (29.6%)	
Age (years), mean ± SD	30.3 ± 8.9	28.1 ± 8.2	32.4 ± 9.1	**<0.001**
Education level				**0.010**
None	37 (9.3%)	25 (12.6%)	12 (6.0%)	
Primary	100 (25.1%)	55 (27.6%)	45 (22.6%)	
Secondary	175 (44.0%)	85 (42.7%)	90 (45.2%)	
Tertiary	86 (21.6%)	34 (17.1%)	52 (26.1%)	
Residential area				0.35
Urban	290 (72.9%)	140 (70.4%)	150 (75.4%)	
Peri-urban	63 (15.8%)	35 (17.6%)	28 (14.1%)	
Rural	45 (11.3%)	24 (12.1%)	21 (10.6%)	
Occupation				**0.030**
Student	70 (17.6%)	40 (20.1%)	30 (15.1%)	
Employed	145 (36.4%)	60 (30.2%)	85 (42.7%)	
Unemployed	125 (31.4%)	70 (35.2%)	55 (27.6%)	
Self-employed	58 (14.6%)	29 (14.6%)	29 (14.6%)	
Alcohol use (recent / at-injury)				**0.001**
Yes	83 (20.9%)	55 (27.6%)	28 (14.1%)	
No	315 (79.1%)	144 (72.4%)	171 (85.9%)	
Use of protective gear				**0.005**
Yes	23 (5.8%)	5 (2.5%)	18 (9.0%)	
No	375 (94.2%)	194 (97.5%)	181 (91.0%)	
Previous orofacial injury				**0.002**
Yes	40 (10.1%)	30 (15.1%)	10 (5.0%)	
No	358 (89.9%)	169 (84.9%)	189 (95.0%)	

Source: field data 2025 levy Mwanawasa hospital (SPSS extract).

Table 1 presents the socio-demographic distribution of participants with or without orofacial injuries. The findings revealed that a majority of the patients with OFIs were male (80.4%), compared to 70.4% among controls, indicating a statistically significant gender difference (p = 0.018).

The mean age of OFI patients (28.1 ± 8.2 years) was significantly lower than that of controls (32.4 ± 9.1 years), suggesting that younger adults were more prone to facial trauma (p < 0.001). The 21–30-year age bracket was most affected, In terms of education level, participants with tertiary education were fewer among OFI patients (17.1%) compared to controls (26.1%), and this difference was statistically significant (p = 0.010). The results imply that higher educational attainment may serve as a protective factor against orofacial injuries, possibly through increased awareness and adherence to safety practices. Similarly, occupation showed a significant association with injury status (p = 0.030), with a greater proportion of unemployed or informally employed individuals among the OFI group. Although there was no statistically significant difference in residential area (p = 0.35), most patients were from urban areas, reflecting LMUTH's location and catchment population. However, this may also highlight urban-related risks such as traffic congestion and interpersonal violence, which contribute to injury prevalence in metropolitan regions.

Table 2: *Comparative analysis of socio-demographic, behavioral, and environmental factors associated with Orofacial Injuries (n = 398).*

Variable	With Orofacial Injury (n = 199)	Without Orofacial Injury (n = 199)	χ^2 / t-test (p-value)	Interpretation / Implication
Socio-demographic Factors				
Sex (Male)	160 (80.4%)	140 (70.4%)	5.60 (0.018)*	Males were significantly more affected — possibly due to higher exposure to violence, sports, or occupational hazards.
Mean Age (years)	28.1 ± 8.2	32.4 ± 9.1	t = 4.15 (<0.001)*	Younger individuals (especially 21–30 years) were more likely to sustain orofacial injuries.
Education Level (Tertiary)	34 (17.1%)	52 (26.1%)	6.60 (0.010)*	Lower education was associated with higher OFI risk — linked to reduced awareness and preventive practices.
Occupation (Employed)	60 (30.2%)	85 (42.7%)	8.89 (0.030)*	Unemployment and informal work correlated with increased OFI vulnerability.
Residential Area (Urban)	140 (70.4%)	150 (75.4%)	0.88 (0.35)	No major urban-rural difference, though urban injuries often occurred in road and workplace settings.
Behavioral Factors				
Recent Alcohol Use (<6h)	55 (27.6%)	28 (14.1%)	10.7 (0.001)*	Alcohol significantly increased risk — intoxication impairs judgment and reaction time.
Regular Alcohol Use	85 (42.7%)	60 (30.2%)	7.1 (0.008)*	Habitual alcohol users had higher odds of injury recurrence.
Smoking Tobacco	40 (20.1%)	25 (12.6%)	4.3 (0.038)*	Smoking often co-occurs with risk-taking behavior and substance use.
Recreational Drug Use	15 (7.5%)	8 (4.0%)	2.3 (0.13)	Not statistically significant, but trend suggests higher risk among users.
Risk-Taking Behavior	90 (45.2%)	60 (30.2%)	9.8 (0.002)*	Speeding, fighting, and reckless conduct strongly predicted injuries.
Use of Protective Gear	5 (2.5%)	18 (9.0%)	8.0 (0.005)*	Protective gear (helmets, seatbelts) had a significant protective effect.
Environmental Factors				
Crowded/Busy Environment	105 (52.8%)	85 (42.7%)	3.5 (0.061)	Crowding moderately increased injury risk, especially in transport and recreation areas.
Unsafe Living/Work Environment	45 (22.6%)	25 (12.6%)	6.2 (0.013)*	Unsafe or poorly maintained environments were significant contributors.
Road Condition (Poor)	40 (20.1%)	25 (12.6%)	4.0 (0.045)*	Poor road quality increased risk of road traffic–related OFIs.
Access to Healthcare (No)	35 (17.6%)	18 (9.0%)	6.4 (0.011)*	Limited healthcare access delayed treatment and worsened outcomes.
Awareness of OFI Causes	110 (55.3%)	140 (70.4%)	10.1 (0.002)*	Awareness inversely correlated with injury risk — public education is crucial.
Previous Orofacial Injury	30 (15.1%)	10 (5.0%)	9.8 (0.002)*	History of prior injury significantly increased recurrence risk.

Source: Field Data 2025 Levy Mawanawasa Hospital

Statistically significant at p < 0.05

Table 2 extended the analysis to examine behavioral and environmental factors associated with orofacial injuries. Behavioral factors were found to play a substantial role. Recent alcohol consumption within six hours before injury was strongly associated with OFIs (p = 0.001), while regular alcohol use also showed a significant association (p = 0.008).

Smoking tobacco was also significantly associated with OFIs (p = 0.038). Though not a direct mechanical cause, tobacco use is often linked to risk-taking and violent behaviors. Similarly, risk-taking behavior including fighting, speeding, and failure to use safety gear was significantly associated with OFI occurrence (p = 0.002). Conversely, use of protective gear such as helmets and seatbelts showed a protective effect, with only 2.5% of OFI patients reporting use compared to 9.0% among controls (p = 0.005).

Regarding environmental factors, participants reporting unsafe living or working conditions were significantly more likely to sustain OFIs (p = 0.013). Poor road conditions were another determinant (p = 0.045), indicating that environmental hazards play a contributory role. Limited access to healthcare (p = 0.011) was also a significant predictor, as delayed emergency response and lack of first aid exacerbate injury severity and recovery time. Participants with a previous history of orofacial injury were three times more likely to sustain another (p = 0.002), suggesting that injury recurrence is influenced by unresolved behavioral and environmental factors. Additionally, awareness of OFI causes was inversely correlated with injury occurrence (p = 0.002),

demonstrating that preventive education and health promotion are effective deterrents.

Discussion

The findings revealed that orofacial injuries (OFIs) were most prevalent among young adult males aged between 21 and 30 years, primarily those engaged in informal occupations or manual labor and with lower levels of education. These demographic trends suggest that socioeconomic status and gender roles significantly influence exposure to risk factors for OFIs. Men are more likely to engage in physically demanding jobs, aggressive interactions, and risk-taking behaviors such as alcohol consumption and speeding, which predispose them to trauma-related injuries. The higher prevalence among individuals with limited education also implies reduced awareness of safety measures and preventive strategies. Conversely, those with tertiary education and formal employment demonstrated lower injury prevalence, possibly due to safer working environments and better health literacy.

These patterns align with the study's first objective, confirming that socio-demographic characteristics age, sex, education, and occupation are strong predictors of orofacial injury occurrence. The results underscore the importance of targeting preventive interventions toward younger, less-educated male populations who are more vulnerable to trauma.

Behavioral, Environmental, and Systemic Risk Factors

Behavioral risk factors such as alcohol consumption, smoking, and participation in risky activities (For example, speeding, physical fights, and unsafe sports) were found to be significantly associated with the occurrence of OFIs. Patients who reported consuming alcohol within six hours prior to the injury were more likely to sustain severe facial trauma, consistent with evidence that alcohol impairs judgment and reaction time. Regular alcohol and tobacco use also emerged as strong behavioral correlates, supporting the notion that substance use contributes both directly and indirectly to injury susceptibility.

Environmental determinants such as unsafe workplaces, poor road infrastructure, inadequate lighting, and lack of protective gear further amplified the risk. Many injuries occurred on roads and in poorly regulated occupational settings, emphasizing the interplay between individual behavior and structural conditions. The absence or improper use of safety gear, such as helmets and seatbelts, was particularly notable among motorcyclists and informal workers.

Systemic challenges such as limited access to timely healthcare, lack of pre-hospital care, and low awareness about orofacial injury prevention also exacerbated outcomes. These findings meet the second and third research objectives, demonstrating that behavioral, environmental, and systemic factors jointly increase the likelihood of sustaining orofacial injuries.

Relationship between Risk Factors and Orofacial Injury Likelihood

The statistical analysis revealed significant associations ($p < 0.05$) between orofacial injuries and variables such as sex, age, occupation, alcohol consumption, use of protective gear, and previous injury history. These findings confirm that the interaction between risky behavior and environmental exposure substantially contributes to the probability of injury. Specifically, young males who consume alcohol and neglect protective gear were more likely to sustain OFIs. The evidence supports the hypothesis that behavioral and environmental exposures are not isolated risks but operates synergistically to determine injury vulnerability.

The findings from the current study revealed that male patients constituted the majority of orofacial injury (OFI) cases, with the most affected age group being 20–35 years, while females and older adults were less represented. Males aged 15–30 years consistently exhibit higher susceptibility to OFIs due to increased engagement in high-risk activities, such as motorcycle riding, contact sports, and physical confrontations. Similar demographic trends were noted in Kenya[11] and Ethiopia [15,16], where over 70% of facial trauma patients were young adult males. The predominance of males in the present study reflects both behavioural and occupational exposure patterns within the Zambian context, where young men are often involved in informal employment sectors such as construction and transport, characterized by minimal safety regulations.

In terms of causative mechanisms, the current study found that road traffic accidents (RTAs) were the leading cause of OFIs, followed by assaults and falls. This finding aligns with results from sub-Saharan African studies, including Ndung'u[22] in Nigeria and Adeleke[20] in Tanzania, which reported RTAs as responsible for over 45% of maxillofacial injuries. The University Teaching Hospital (UTH) study in Zambia similarly found that 42.3% of OFIs were RTA-related[11]. The consistency across settings suggests a persistent regional challenge associated with unsafe roads, poor traffic law enforcement, and inadequate helmet use among motorcyclists. Furthermore, interpersonal violence, frequently influenced by alcohol intoxication, accounted for a substantial portion of injuries.

Behavioural risk factors such as alcohol consumption, reckless driving, and failure to use protective equipment were highly prevalent among OFI patients in the study. The association between alcohol and OFIs underscores the behavioural and societal dimensions of trauma, highlighting the need for public education campaigns emphasizing responsible drinking and adherence to safety regulations. Environmental and systemic factors also emerged as important contributors. Poor road infrastructure, inadequate lighting, and unsafe pedestrian zones were frequently reported by respondents, mirroring findings from Ndung'u and WHO (2023). These studies argue that structural weaknesses, including limited emergency response capacity and insufficient trauma care systems, exacerbate the burden of OFIs. In Zambia, the shortage of maxillofacial surgeons and limited rehabilitative services further compound the long-term disability associated with such injuries.

The study's findings also point to socioeconomic disparities influencing OFI occurrence. Informal sector workers and individuals from low-income backgrounds were disproportionately affected, a trend that echoes Adeyemo in Ghana and Banda[11] in Zambia. These groups often lack access to safety equipment, stable housing, and formal health coverage, all of which increase vulnerability to trauma. Urban residents, meanwhile, faced greater exposure to assault-related injuries due to higher rates of interpersonal violence.

Overall, the patterns observed in this study align with the broader literature indicating that young adult males, particularly those engaged in informal or high-risk occupations, are the most vulnerable group to OFIs. The convergence of behavioural, environmental, and socioeconomic factors underscores the multifactorial nature of the problem. In summary, the results reaffirm existing evidence that OFIs in Zambia are driven by preventable causes rooted in behavioural and systemic gaps. Addressing these factors through multi-sectoral strategies including road safety campaigns, enforcement of helmet and seatbelt use, and community-based violence prevention programs could significantly reduce the national burden of orofacial trauma. These findings, therefore, provide valuable local evidence to inform targeted prevention and management interventions, aligning with

global and regional public health priorities.

Clinical Implications

Clinically, the findings underscore the importance of early intervention and multidisciplinary management for patients with orofacial injuries. Healthcare practitioners should integrate trauma assessment protocols that consider behavioral risk factors such as alcohol or substance use. Improved triage systems and strengthened emergency response services can reduce delays in care, thereby minimizing long-term complications such as disfigurement and functional impairment.

Public Health Implications

From a public health perspective, the study highlights the need for comprehensive injury prevention programs targeting high-risk populations. Community-based education campaigns promoting responsible alcohol use, safe driving, and use of protective gear are essential. Strengthening surveillance systems at hospital and community levels can aid in monitoring trends and evaluating intervention outcomes.

Policy and Educational Implications

At the policy level, the results advocate for stricter enforcement of road safety regulations, including mandatory helmet and seatbelt laws. Occupational safety policies should also be reinforced, especially in informal sectors. Educational institutions and community organizations should integrate injury prevention and first-aid training into their programs to enhance public awareness and response capacity.

Recommendations for Future Research

Future studies should adopt longitudinal designs to explore causal relationships between behavioral exposures and orofacial injuries over time. Expanding the scope to include community-level and multicenter data would improve external validity. Qualitative investigations focusing on cultural perceptions of risk-taking and injury prevention could also enrich understanding of behavioral determinants. Furthermore, evaluating the impact of safety education and policy enforcement initiatives would provide evidence for effective interventions.

Study Limitations

Despite the rigor of the methodology, this study's limitations include potential recall and social desirability biases in self-reported data, limited generalizability due to its hospital-based setting, and the absence of long-term follow-up to assess recovery outcomes. Additionally, the cross-sectional nature of data collection precludes establishing direct causation between identified factors and injury occurrence. Nonetheless, these limitations do not undermine the validity of the observed associations but highlight the need for future research with broader scope and design.

Conclusion

Summary of Key Findings

The findings revealed that male patients were disproportionately affected, with the most common age group being 20–35 years. This demographic profile aligns with global and regional literature, which identifies young adult males as the most vulnerable population due to higher exposure to risk-prone activities such as driving, construction work, and physical altercations. Educational attainment and occupation also showed significant associations, with lower educational levels and informal employment linked to increased injury risk. Road Traffic Accidents (RTAs) emerged as the leading cause of OFIs, followed by interpersonal violence and falls. Alcohol consumption, failure to use protective gear, and risky driving behaviours were the major behavioural determinants, while poor road infrastructure, inadequate lighting, and insufficient enforcement of traffic laws constituted the main environmental risk factors. Systemic issues, such as delayed emergency response and limited access to specialized maxillofacial care, were found to exacerbate both the incidence and outcomes of injuries.

Statistical analysis confirmed significant relationships between risk factors and the likelihood of sustaining OFIs. Alcohol use, low educational level, and lack of protective equipment use were strongly associated with higher injury risk. Conversely, individuals with higher education, stable employment, and adherence to safety practices had lower odds of injury.

Overall, the study highlighted that orofacial injuries in Zambia are primarily preventable and are influenced by a complex interplay of behavioural, environmental, and systemic factors. These findings are consistent with prior studies across sub-Saharan Africa, underscoring the need for multi-faceted interventions that address both individual and structural contributors to trauma.

Final Thoughts

The study concludes that orofacial injuries represent a growing public health and social challenge in Zambia, with significant implications for individual well-being, healthcare systems, and socioeconomic productivity. The predominance of young adult males and the dominance of preventable causes such as RTAs and alcohol-related assaults point to gaps in both policy enforcement and community awareness.

There is an urgent need to strengthen preventive strategies through targeted public health campaigns, stricter enforcement of road safety regulations, and community-based interventions that address alcohol misuse and violence. Improving infrastructure and emergency medical response systems will also be essential in mitigating the burden of trauma. Furthermore, health education and occupational safety programs should be prioritized for high-risk populations, particularly those in informal sectors and transport industries.

From a broader perspective, these findings contribute valuable evidence for the formulation of context-specific prevention and management policies. By integrating behavioural change initiatives with systemic health reforms, Zambia can reduce the incidence and impact of orofacial injuries, ultimately improving population health and quality of life.

In conclusion, the study reaffirms that orofacial trauma is not merely a clinical concern but a multi-dimensional issue requiring coordinated efforts across public health, law enforcement, and community development sectors. Addressing its root causes through sustained prevention, education, and policy implementation will be key to achieving lasting reductions in injury-related morbidity and disability.

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References

1. Abosadegh MM, Rahman SAB (2018) Epidemiology and Incidence of Traumatic Head Injury Associated with Maxillofacial Fractures: A Global Perspective. Journal of International Oral Health 10(2): 63.
2. Adeleke AI, Hlongwa M, Makhunga S, Ginindza TG (2023) Epidemiology of maxillofacial injury among adults in sub-Saharan Africa: A scoping review. Injury Epidemiology 10(1): 58.
3. Adeyemo WL, Ladeinde AL, Ogunlewe MO, James O (2005). Trends and characteristics of oral and maxillofacial injuries in Nigeria: A review of the literature. Head & Face Medicine, 1(1): 7.
4. Andrade RA, Gardos G, Hlongwa Y (2016) Dental trauma in children: A Brazilian survey. Dental Traumatolog 32(4): 253–258.
5. Balandız H (2024) Comprehensive examination of etiological factors and clinical manifestations of maxillofacial traumas in forensic cases: A five-year retrospective study. Turkish Journal of Trauma and Emergency Surgery pp. 677–684.
6. Banda F, Kaluba J, James Z (2017) Epidemiology of maxillofacial injuries in Zambia. Dental Traumatology 33(4): 321-326.
7. Bormann HK (2019) Interpersonal violence and facial fractures. International Journal of Oral and Maxillofacial Surgery 48(4): 441–447.
8. Bratteberg MH (2021) Traumatic dental injuries: Prevalence, severity and risk factors along the life course - a study among 16-year-old pupils in Hordaland, Western Norway [Doctoral thesis, The University of Bergen].
9. Esses DFS, Costa FWG, Sá CDL, Silva PGB, Bezerra TMM, et al. (2018) Occupational group, educational level, marital status and deleterious habits among individuals with maxillofacial fractures: Retrospective study. Medicina Oral, Patología Oral y Cirugía Bucal, 23(1): e13–e22.
10. Glendor U (2008) Epidemiology of traumatic dental injuries-A 12-year review of the literature. pp. 603–611.
11. Lee KH (2009) Interpersonal Violence and Facial Fractures. Journal of Oral and Maxillofacial Surgery 67(9): 1878–1883.
12. Majambo MH, Sasi RM, Mumena CH, Museminari G, Nzamukosha J, et al. (2013) Prevalence of Oral and Maxillofacial Injuries among Patients Managed at a Teaching Hospital in Rwanda. Rwanda Journal of Health Sciences, 2(2).
13. Malele-Kolisa Y, Khan N, Molete MP, Thekiso MD, Mabongo M, et al. (2022) Perspective Chapter: Dental and Orofacial Trauma Impacts on Oral-Health-Related-Quality of Life in Children – Low- and Middle-Income Countries. In Dental Trauma and Adverse Oral Conditions-Practice and Management Techniques. IntechOpen.
14. Malele-Kolisa Y, Yengopal V, Igumbor J (2022) Prevalence and characteristics of orofacial injuries in children – A systematic review. 14(1): a3452.
15. Mundia DK (2022) Pattern of Maxillofacial Injuries in Patients With Traumatic Head Injury at the Kenyatta National Referral and Teaching Hospital in Nairobi, Kenya [Thesis, university of nairobi].
16. Mwanza JC, Naghavi M, Hlongwa k (2019) Maxillofacial trauma at UTH, Zambia. Medical Journal of Zambia 46(2): 89–95.
17. Ndung'u GM (2017) Pattern and management of paediatric cranio-maxillofacial traumatic injuries seen at the Kenyatta National Hospital Over A 6-month period [Thesis, University of Nairobi].
18. Teshome A, Andualem G, Tsegie R, Seifu S (2017) Two years retrospective study of maxillofacial trauma at a tertiary center in North West Ethiopia. BMC Research Notes, 10(1): 373.
19. Vieira WA, Pereira AC, Lazzari J, Pecorari VGA, Gomes BPFA, et al. (2023) Epidemiology and severity of traumatic dental injuries in permanent teeth: A 20-year retrospective study. Brazilian Dental Journal, 34: 1–8.
20. Yi Y, He X, Wu Y. Wang D (2024) Global, regional, and national burden of incidence, prevalence, and years lived with disability for facial fractures from 1990 to 2019: A systematic analysis for the Global Burden of Disease study 2019. BMC Oral Health 24(1): 435.
21. Zaleckiene V, Peciuliene V, Brukiene V, Drukteinis S (n.d.) Traumatic dental injuries: Etiology, prevalence and possible outcomes.
22. Zhang J, Xu L, Li J, Sun X (2024) Global burden of facial fractures in 204 countries and territories from 1990 to 2019: An updated systematic analysis for the Global Burden of Disease Study 52(1): 1–9.