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The epidemiology of ocular trauma in the Northern Cape, South Africa

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Background: Ocular trauma represents a significant public health burden and has considerable global epidemiological variation. The epidemiology of ocular trauma in the Northern Cape province of South Africa has not been previously described.

Aim: This study aimed to quantify the burden and describe the distribution and determinants of ocular trauma in the Northern Cape province.

Setting: The Northern Cape province is the largest, but least populous, of the nine South African provinces. Published data on the health of the Northern Cape population are scarce. Robert Mangaliso Sobukwe Hospital (RMSH) is the only public ophthalmic referral centre in the province.

Methods: Hospital record review of all adult cases of acute ocular trauma seen at RMSH over a period of one year (August 2018 – July 2019).

Results: Young men comprised the majority of the 240 included cases. Ocular injuries were most likely to occur in the home (n = 115, 47.9%) and on the weekend (n = 159, 66.3%). More than half (n = 135, 56.3%) of all trauma was non-accidental in nature and significantly associated with alcohol use. Accidental trauma (n = 105, 43.8%), predominantly as a result of occupational injuries sustained at work (n = 47, 44.8%) and in the home (n = 45, 42.9%), was deemed largely preventable. Differences in the timing, location and severity of non-accidental and accidental ocular injuries were observed.

Conclusion: Ocular trauma in South Africa follows distinct epidemiological trends and is largely because of interpersonal violence, which places strain on limited state healthcare resources.

Keywords: ocular trauma; epidemiology; ophthalmology; adult; South Africa; Northern Cape.

Introduction

Globally, ocular trauma represents a significant public health burden. By the end of the 20th century it was estimated that more than 20 million people were left blind or visually impaired as a result of injuries to the eyes.[1] The total cost of ocular trauma in the United States alone is estimated to be more than $1 billion per year.[2]

Ocular trauma tends to occur in young, adult men of lower socio-economic status – a likely reflection of underlying occupational and lifestyle factors.[3] In developed countries, occupational and recreational injuries predominate, whereas in developing countries, interpersonal violence and road traffic accidents play a significant role.[3,4,5] Specific risk factors for ocular trauma include certain high-risk industrial environments (such as construction, manufacturing, mining and farming) and occupational activities (especially those involving metalwork and chemicals), especially when combined with a lack of appropriate safety protocols or personal protective equipment (PPE).[6,7] Alcohol use is significantly associated with eye injuries resulting from interpersonal violence.[8]

Previous studies on adult ocular trauma in South Africa have been limited to the Western Cape (Cape Town), Eastern Cape (East London) and KwaZulu-Natal provinces, with no published studies from the Northern Cape.[8,9,10,11,12,13] Findings from these studies suggest that ocular trauma in South Africa occurs predominantly in young, adult men, usually as a result of interpersonal violence and occupational injuries, and is significantly associated with alcohol use. The majority of injuries occur at home and, in cases of assault, the assailant is usually well known or related to the victim.[8,12]

The Northern Cape is South Africa's largest and least populous province (approximately an area of 375 000 km^2 with 1.2 million inhabitants). The main industries are mining and agriculture (comprising one-third of the total provincial economy) with a comparable unemployment rate to the rest of the country.[14] Robert Mangaliso Sobukwe Hospital (RMSH) (formerly Kimberley Hospital Complex) in the city of Kimberley is the only state hospital providing specialised ophthalmology services in the Northern Cape and is the referral centre for all ocular trauma cases that cannot be managed at primary care level. It therefore covers a well-defined population and represents the ideal setting from which to study the burden of ocular trauma in the province.

Describing epidemiological patterns of ocular trauma is essential for the planning and provision of healthcare services and for identifying potential factors that may be amenable to public health interventions. Therefore, the authors aimed to quantify the burden and describe the distribution and determinants of ocular trauma in the Northern Cape province through identification and analysis of eligible RMSH hospital records.

Methods

Study design

This study represents a retrospective review of prospectively identified hospital records of all adult cases of acute ocular trauma presenting to the Department of Ophthalmology at RMSH over one calendar year. All participants were managed by a departmental ophthalmologist as part of their routine clinical duties and according to local protocols.

Data collection

Eligible records were identified through daily review of clinic and hospital registers. All ophthalmological patients attending RMSH are issued a separate eyecare record and these files were requested and drawn from a dedicated registry housed in the Department of Ophthalmology.

Hospital records of individuals aged ≥ 18 years, with documented ocular trauma to at least one eye and sustained within the previous calendar month, were eligible for inclusion in the study. Individuals < 18 years of age, residing outside the Northern Cape province, or when hospital records were not available, were excluded from the study. Individuals meeting eligibility criteria with previous ocular trauma (sustained > 1 month prior to presentation) were not excluded.

Anonymised demographic and clinical information were extracted from participant records by the study investigators using a standardised data collection tool. Collected information included:

- participant demographics: age, sex and employment status
- injury circumstances: time, date, location, activity, mechanism and cause
- risk factors: alcohol, illicit drugs, and PPE
- injury details: eyes involved, description, classification, severity and other injuries
- management: referral, admission and treatment.

The data collection period spanned from August 2018 to July 2019 and the hospital record data were supplemented by routinely collected departmental and hospital statistics, including the total number of ophthalmological patients and admissions over the study period.

Data analysis

Descriptive statistics were calculated for all variables: frequency and proportion for categorical variables and mean (standard deviation [s.d.]) or median (interquartile range [IQR]) for continuous data. Normality was assessed using the Shapiro–Wilk test and non-parametric statistical descriptors and tests were applied if a variable was not normally distributed. Variables were compared across groups using the Wilcoxon rank-sum test, chi-squared test or Fisher's exact test, as appropriate.

For descriptive purposes, age was grouped into 5-year bands (with the exception of the 18–20-year and > 65-year categories) and median age was calculated using all cases of ocular trauma over the study period. Time of injury was grouped into 4-h bands.

Ocular trauma was classified according to the Birmingham Eye Trauma Terminology (BETT) system as closed globe (contusion or lamellar laceration) or open globe (rupture, penetrating, intraocular foreign body [IOFB] or perforating) injuries.[15,16] The BETT system is best suited to the classification of major mechanical trauma and we therefore classified burns and minor injuries (extraocular foreign body [EOFB] or corneal abrasion) separately, as these injuries do not fit well into the classification system. Severity was graded according to the Ocular Trauma Score (OTS) on a scale from 1 (most severe, worst prognosis) to 5 (least severe, best prognosis).[17] The OTS is based on presenting clinical features, including visual acuity (VA) and the presence or absence of a relative afferent pupillary defect (RAPD), globe perforation, globe rupture, endophthalmitis and/or retinal detachment. Visual acuity was categorised according to the World Health Organization (WHO) classification of visual impairment.[18]

Cases were selected and analysed as individuals. For bilateral injuries, the assigned classification and severity were based on the worse-affected eye.

All analyses were conducted using Microsoft Excel (Microsoft Corp. 2019. Redmond, WA, US) and Stata 16.0 (StataCorp LLC. 2019. College Station, TX, US). Statistical tests were two-tailed and a value of $p < 0.05$ was considered significant.

Ethical considerations

This research adhered to the tenets of the Declaration of Helsinki and the study protocol was approved by RMSH, Northern Cape Department of Health. Ethical clearance was

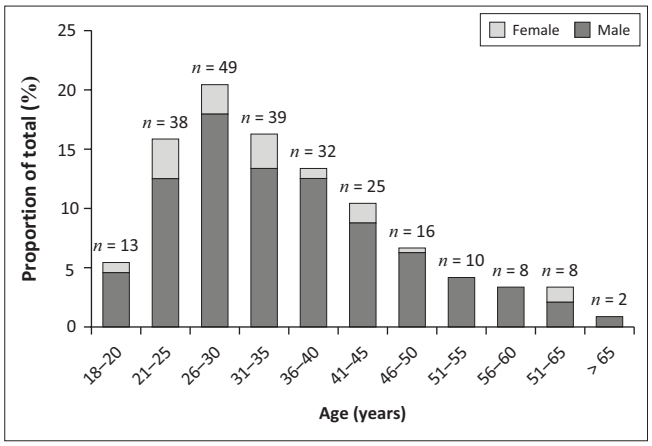


FIGURE 1: Frequency and distribution of ocular trauma (n = 240) according to age and sex.

obtained from the Health Sciences Research Ethics Committee, University of the Free State (UFS-HSD2018/0774/3107). The need for participant consent was waived given the study design and low participant risk.

Results

Study population

Over the course of the study, 291 cases of acute ocular trauma were identified, representing 3.2% of all patients seen in the Department of Ophthalmology at RMSH over the same time period. Of these, 149 cases (51.2%) required hospitalisation, comprising 13.8% of all ophthalmic admissions and equating to a crude annual incidence of 12 per 100 000 for the Northern Cape. This included 240 cases (82.5%) of adult ocular trauma, which comprised the study population.

Participant demographics

The vast majority of injuries (n = 207, 86.3%) occurred in men with a gender ratio of 6.3:1. The median age was 30 years (range 18–71 years), with the highest frequency of injuries (n = 49, 20.4%) observed in the 26–30-year age group (Figure 1). Approximately two-fifths (n = 100, 41.7%) of individuals were unemployed. There was a significant difference in age (men, median 32 years; women, median 24 years; $p < 0.01$) and unemployment (men, 38.7%; women, 60.6%; $p = 0.02$) between genders.

Time and location of injury

Two-thirds of all injuries (n = 159, 66.3%) occurred between Friday and Sunday, with a quarter (n = 62, 25.8%) occurring on a Saturday alone. From Monday to Thursday, most injuries were sustained between 12:00 and 15:59 or 16:00 and 19:59, whereas from Friday to Sunday most injuries were sustained between 20:00 and 23:59 or 00:00 and 03:59. Injuries between 00:00 and 03:59 occurred almost exclusively at the weekend (Figure 2). There was no observable trend by week, month or season.

Most ocular injuries occurred in the home (n = 115, 47.9%), followed by at work (n = 50, 20.8%), in the street (n = 39, 16.3%) and at a bar or tavern (n = 24, 10.0%). Sport- and recreation-related injuries accounted for only three cases (1.3%) of all ocular trauma.

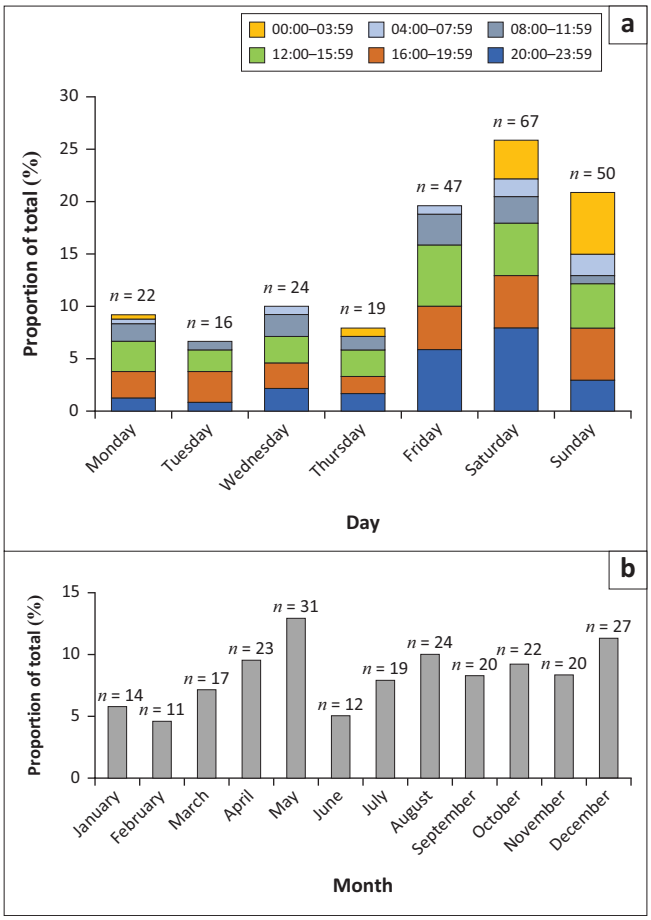


FIGURE 2: Frequency and distribution of ocular trauma (n = 240) according to (a) time, day and (b) month.

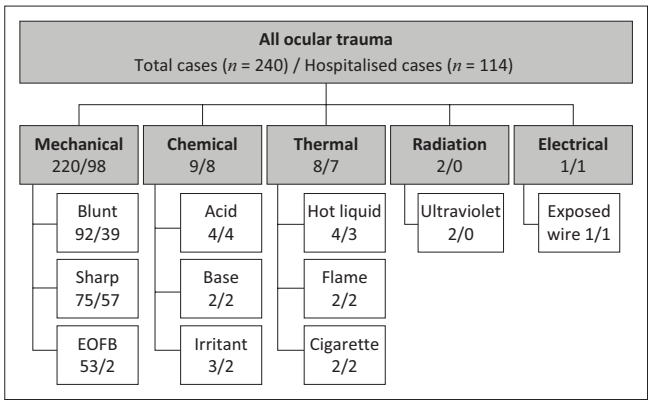
Men were significantly more likely to be injured between 08:00 and 11:59 (14.0% vs 0.0%, $p = 0.02$) and at work (23.7% vs 3.0%, $p = 0.01$), whilst women were significantly more likely to be injured between 20:00 and 23:59 (36.4% vs 20.3%, $p = 0.04$) and in the home (78.8% vs 43.0%, $p < 0.01$). Of all female ocular trauma, more than half (n = 18, 54.5%) were because of non-accidental injuries inflicted in the home.

Mechanism, type and cause of injury

Mechanical trauma was by far the most common mechanism of ocular injury, accounting for > 90% of all ocular trauma in this study. Chemical, thermal, radiation and electrical injuries were far less common (Figure 3).

Non-accidental injuries

More than half of all injuries (n = 135, 56.3%) were non-accidental in nature. The majority of these occurred between 16:00 and 03:59 (n = 104, 77.0%) and from Friday to Sunday (n = 102, 75.6%). Half of all non-accidental injuries (n = 68, 50.4%) occurred in the home, followed by in the street (n = 30, 22.2%) and at a bar or tavern (n = 24, 17.8%). The perpetrator was known or related to the victim in 69.6%



Note: Reported figures represent *n* (total cases)/*n* (hospitalised cases).
EOFB, extraocular foreign body.

FIGURE 3: Mechanism of injury responsible for ocular trauma in all participants (*n* = 240) and hospitalised participants (*n* = 114).

of all non-accidental injuries. The most commonly used weapons were glass bottles (*n* = 24, 17.8%), knives (*n* = 23, 17.0%), fists (*n* = 19, 14.1%) and bricks or stones (*n* = 10, 7.4%).

Accidental injuries

Accidental injuries accounted for the remaining 105 injuries (43.7%) seen during the study period. The majority of these occurred between 08:00 and 19:59 (*n* = 91, 86.7%). Although a majority also occurred from Friday to Sunday (*n* = 57, 54.3%), this distribution was less marked compared to non-accidental injuries. Accidental ocular trauma occurred mostly in the home (*n* = 47, 44.8%), at work (*n* = 45, 42.9%) and in the street (*n* = 9, 8.6%). Work-related injuries predominated (*n* = 45, 42.9%), followed by injuries sustained during household activities (e.g. chopping, sawing, cutting, grinding, cleaning and do-it-yourself [DIY]) (*n* = 33, 31.4%) and motor vehicle accidents (*n* = 6, 5.7%). Foreign bodies associated with grinding were responsible for 46 cases (43.8%) of accidental injury, with shrapnel from hammering and chopping (*n* = 10, 9.5%), motor vehicles (*n* = 6, 5.7%), sticks (*n* = 5, 4.8%), chemicals (*n* = 4, 3.8%) and wire (*n* = 4, 3.8%) responsible for far fewer injuries.

Significant differences between accidental and non-accidental ocular trauma are highlighted in Table 1. No significant differences by age, sex, month, season or mechanism of injury were observed.

Associated risk factors

Alcohol use by the perpetrator and/or victim was reported in 72.6% (*n* = 98) of all non-accidental injuries versus 7.6% (*n* = 8) in accidental injuries ($p < 0.01$). Sixty-five cases (61.9%) of accidental ocular trauma in our study were deemed avoidable had appropriate PPE been used. Of these cases, PPE was either not worn at all (*n* = 39, 60.0%) or was inappropriate or not correctly worn (*n* = 26, 40.0%).

Description, classification and severity of injury

Of the 240 cases of ocular trauma, 42.9% (*n* = 103) involved the right eye, 50.8% (*n* = 122) involved the left eye and 6.3% (*n* = 15) involved both eyes. Bilateral injuries occurred

TABLE 1: Comparison of accidental versus non-accidental ocular trauma (*n* = 240).

Variable	Description	Accidental (*n* = 105)		Non-accidental (*n* = 135)		*p*
		n	%	*n*	%	
Employment	Employed	70	66.7	45	33.3	***
	Unemployed	21	20.2	79	58.5	***
Injury time	00:00–03:59	3	2.9	23	17.0	***
	08:00–11:59	24	22.9	5	3.7	***
	12:00–15:59	45	42.9	15	11.1	***
	20:00–23:59	8	7.6	46	34.1	***
Injury day	Weekend	33	31.4	79	58.5	***
Injury place	Work	45	42.9	5	3.7	***
	Tavern/bar	0	0.0	24	17.8	***
Classification	Open	14	13.3	45	33.3	***
Associated injuries	None	81	77.1	25	18.5	***
	Periocular	12	11.4	69	51.1	***
	Orbital/facial	12	11.4	41	30.4	***
Laterality	Right	53	50.5	49	36.3	*
	Left	46	43.8	77	57.0	*
Alcohol	Yes	8	7.6	98	72.6	***
Presenting VA	6/6–6/18	84	80.8	55	40.7	***
	6/24–6/60	2	1.9	13	9.6	*
	HM–LP	11	10.6	32	23.7	**
	NLP	4	3.8	25	18.5	***
RAPD	Yes	5	4.8	39	28.9	***
Admission	Inpatient	33	31.4	81	60.0	***
Management	Medical	84	80.0	62	45.9	***
	Surgical	19	18.1	71	52.5	***
OTS category	5	81	77.9	49	36.3	***
	4	4	3.9	18	13.3	*
	2	5	4.8	26	19.3	***
	1	0	0.0	12	8.9	**

Note: Only variables with significant differences are displayed.
VA, visual acuity; HM, hand movements; LP, light perception; NLP, no light perception; RAPD, relative afferent pupillary defect; OTS, ocular trauma score.
*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

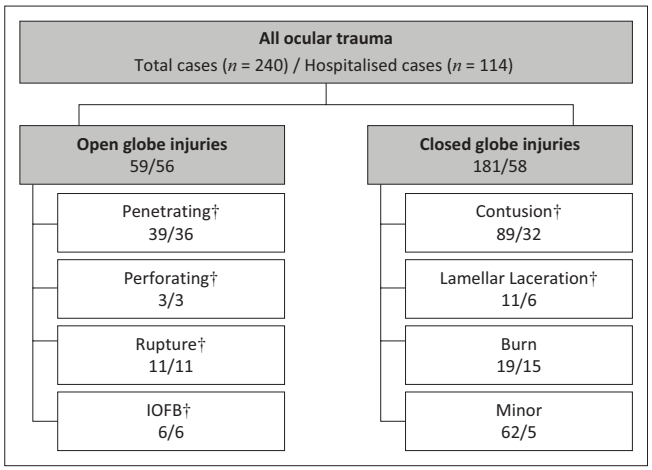
exclusively as a result of burns, road traffic accidents and assault with fists. The globe alone was injured in 44.2% (*n* = 106) of cases, with additional involvement of the periocular region (eyelids and superficial periocular tissue) in a further 33.8% (*n* = 81). More extensive facial and/or orbital involvement was observed in 22.0% (*n* = 53) of cases. Significant differences in the description and severity of injury between accidental and non-accidental ocular trauma are highlighted in Table 1.

Closed globe injuries

Closed-globe injuries accounted for the majority of injuries (*n* = 181, 75.4%) seen over the study period. The frequency and distribution of these injuries are summarised in Figure 4. Of note, three initially minor injuries were complicated by bacterial keratitis and required inpatient management. Of the 11 lamellar lacerations, four cases necessitated the removal of an intramural foreign body from the substance of the cornea or sclera.

Open globe injuries

Although open globe injuries (*n* = 59, 24.6%) were far less common (Figure 4) than closed-globe injuries, the vast majority (*n* = 56, 94.9%) required inpatient management and



Note: Reported figures represent *n* (total cases) / *n* (hospitalised cases).

IOFB, intraocular foreign body.

†, Indicates categories classified according to the Birmingham Eye Trauma Terminology (BETT) system.

FIGURE 4: Classification of ocular trauma in all participants (*n* = 240) and hospitalised participants (*n* = 114).

these injuries constituted 49.1% of all hospitalised ophthalmic trauma in our study.

Significant differences between open- and closed-globe injuries are reported in Table 2. No significant differences by sex, time, month or season of injury were observed.

Referral, management and outcomes

In accordance with local protocols, all participants presented to a primary healthcare facility prior to referral to RMSH. Nearly half (*n* = 111, 46.3%) of participants had to travel more than 100 km and a quarter (*n* = 59, 24.6%) had to travel more than 300 km to reach the hospital for assessment and further management. Figure 5 illustrates the location of Kimberley and various larger cities within the Northern Cape province. Only 13.3% (*n* = 32) of participants reached RMSH and were assessed within 24 h of their injury. The proportion assessed within 48, 72 and 120 h were 47.1% (*n* = 113), 66.3% (*n* = 159) and 81.7% (*n* = 196), respectively. Of all included individuals, 15.8% (*n* = 38) were not referred at the time of their initial presentation to a primary healthcare facility, with referral only happening on subsequent visits.

Radiological imaging (X-ray, ultrasound and/or computed tomography scan) was performed in 45.4% (*n* = 109) of all study participants and 37.1% (*n* = 89) required surgical management for their ocular injuries. Hospitalisation was required in 47.5% (*n* = 114) of cases with a median duration of admission of three days (IQR: four days). Non-accidental cases comprised 71.1% (*n* = 81) of all hospitalised ocular injuries. Radiological imaging and surgical management were indicated in 64.9% (*n* = 74) and 66.7% (*n* = 76) of all hospitalised cases, respectively.

Discussion

Demographics

Young men made up the majority of participants with ocular trauma in this study, mirroring the trend described in other

TABLE 2: Comparison of open versus closed ocular trauma (*n* = 240).

Variable	Description	Open (*n* = 59)		Closed (*n* = 181)		*p*
		n	%	*n*	%	
Employment	Employed	19	32.3	96	53.0	**
	Unemployed	32	54.2	68	37.6	*
Injury day	Saturday	21	35.6	41	22.7	*
Injury place	Work	4	6.8	46	25.4	**
Mechanism	Mechanical	59	100.0	161	89.0	**
Alcohol	Yes	38	64.4	68	37.6	***
Presenting VA	6/6–6/18	4	6.8	135	75.0	***
	HM–LP	26	44.1	17	9.4	***
	NLP	26	44.1	3	1.7	***
Laterality	Bilateral	0	0.0	15	8.3	*
RAPD	Yes	36	61.0	8	4.4	***
Admission	Outpatient	2	3.4	120	66.3	***
	Inpatient	56	94.9	58	32.0	***
Management	Medical	3	5.1	143	79.0	***
	Surgical	55	93.2	35	19.3	***
OTS category	5	3	5.1	127	70.6	***
	3	17	28.8	27	15.0	*
	2	25	42.2	6	3.3	***
	1	12	20.3	0	0.0	***

Note: Age (years): Open – median (IQR) = 27 (16); closed – median (IQR) = 33 (20). Age difference was significant at $p < 0.01$. Only variables with significant differences are displayed.

IQR, interquartile range; VA, visual acuity; HM, hand movements; LP, light perception; NLP, no light perception; RAPD, relative afferent pupillary defect; OTS, ocular trauma score.

*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

epidemiological studies on the topic.[8,12,13,19,20,21,22] The observed high unemployment rate is a reflection of the underlying provincial unemployment rate and is likely biased by the fact that people of lower socio-economic status often have no other option but to access public healthcare services.[14] The proportion of unemployed women who presented with ocular trauma was far higher than that of men, which may in part be attributed to the fact that women in the Northern Cape province have a higher rate of unemployment than men (35% vs 27%, respectively).[14] The significant association between employment and accidental ocular injuries is indicative of the risk associated with many forms of manual occupation in the province. Similarly, the association between unemployment and non-accidental trauma is a recognised pattern globally, possibly related to various high-risk activities and behaviours that are more prevalent in unemployed individuals or lower socio-economic strata.[3]

Non-accidental injuries

A majority of injuries, and in particular non-accidental injuries, occurred over weekends and at night. Non-accidental ocular trauma was also significantly associated with alcohol use, a trend previously reported by South African researchers.[8] More than three-quarters of these injuries occurred between 16:00 and 03:59, pointing to the time that alcohol is being consumed and people are most at risk. The most commonly used weapons (knives and glass bottles) have previously been implicated as the leading causes of open globe and non-accidental ocular injuries in South Africa.[8,13] Indeed, open globe injuries in this study were significantly associated with non-accidental trauma and alcohol use.

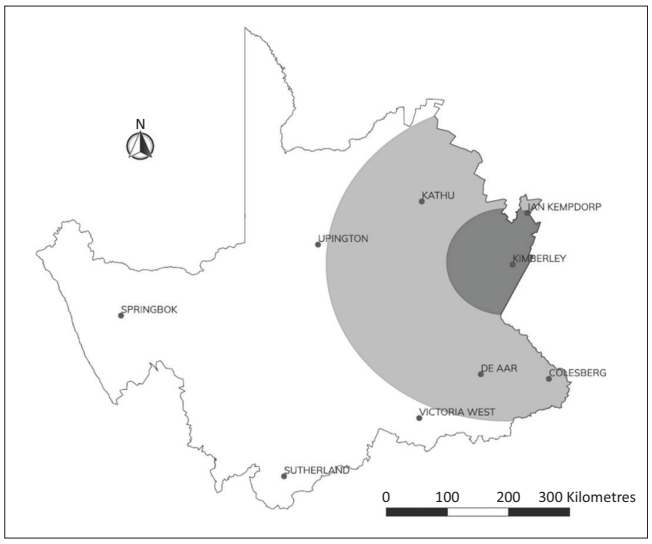


FIGURE 5: Map of the Northern Cape province illustrating the location of Kimberley and other major towns within the province. The dark grey and light grey areas represent distances of 100 km and 300 km, respectively.

The rate of non-accidental trauma in this study is a likely reflection of the high levels of interpersonal violence in the province and is a consistent finding across similar studies from South Africa.[8,13] This similarity also extends to the fact that the majority of injuries were inflicted by a person known to the victim.[8] Nearly half of all ocular injuries included in this study occurred in the home and women made up a significantly higher percentage of those injured at home than men. This may again not only reflect provincial unemployment rates and geography but also point to high levels of gender-based violence in the province, with more than half of all female ocular trauma as a result of non-accidental injuries inflicted in the home.

Accidental injuries

It stands to reason that the majority of accidental injuries occurred during working hours and on weekdays, regardless of whether they were associated with occupational or home-based tasks, as the activities are typically undertaken during the week. These injuries were seldom associated with alcohol use and were predominantly caused by extraocular foreign bodies and shrapnel from stone and metalwork, reflecting the predominant industries of the province. The number of accidental injuries could have been substantially reduced with the use of PPE, which was lacking or inappropriate in more than half of all cases. Other researchers have also commented on the fact that many accidental ocular injuries, especially those sustained during occupational tasks, are largely preventable.[6,7]

In contrast to findings from developed countries, an extremely small proportion (only three cases) of ocular trauma was associated with sport and recreational activities. Although this may point to the type of sports played in the province – large balls used in soccer, rugby and netball are less likely to cause direct ocular injury than small projectiles used in racquet sports – it may also suggest a lack of sport and recreational facilities available to the people of the Northern Cape.

Management

Prompt referral, assessment and management of ocular trauma, especially in cases of open globe injury, are particularly important. Apart from the risk of endophthalmitis, zone 1 open globe injuries have been associated with poorer visual outcomes if surgery is delayed beyond 72 h.[10] Reliance on state-provided patient transporters and ambulances, a shortage of staff trained in primary eye care and the vast size of the province are all possible reasons for the patterns and delays in referral observed in this study.

Non-accidental trauma was significantly associated with injuries to the left eye (a likely consequence of a right-handed assailant) and more severe injuries (poorer presenting VA, lower OTS category and a higher proportion of RAPD, open globe, periocular, orbital and facial injuries) compared with accidental injuries. The severity of these injuries is a direct result of targeted, forceful blows to the eyes with both blunt and sharp objects. These injuries often require a greater use of limited state resources and funds and result in significant long-term visual morbidity.[10]

Limitations

It is important to acknowledge several limitations of this study. Although RMSH is the only public ophthalmic referral hospital in the province, this study did not include ocular injuries managed at primary healthcare facilities or in the private sector. Approximately 85% of South Africans rely on public healthcare facilities and there are vast inequities in access to healthcare, largely divided along racial and socio-economic lines.[23] Consequently, our findings are certainly an underestimation of the true burden of ocular trauma in the province and are likely biased by the socio-economic status of the population utilising public healthcare facilities. This underestimation may be further exacerbated by anecdotal weaknesses in provincial transport and referral networks, which likely hindered many patients from reaching RMSH for assessment. Regional differences in access to healthcare, available resources and management protocols (including radiological imaging, hospitalisation and surgery) may also make direct comparison with other centres difficult. Another limitation was the inability to assess pre-existing visual complaints in participants included in the study. Prior ocular disease or trauma was not an exclusion criterion and this may have influenced the grading of the severity of ocular trauma. Lastly, follow-up data were available in < 30% of all participants, largely because of poor follow-up rates. Although a common scenario in the South African setting,[8,10] this severely limited our ability to report meaningful long-term visual outcomes and were therefore excluded. The determinants of paediatric ocular trauma are significantly different from those observed in adults and this age group was therefore excluded from a detailed analysis in this study.[24,25]

Recommendations

Aside from the immediate health and vision-related implications, ocular trauma also places a significant financial burden on an already strained public health system in South Africa. The costs associated with transport, hospitalisation, medical and surgical management of eye injuries may be largely avoidable and draw scarce resources away from essential provincial and national health programmes. The long-term economic consequences of ocular trauma are not only difficult to quantify but are also likely to be substantial.[2] The majority of eye injuries in this study were related to alcohol-associated interpersonal violence or the lack of appropriate PPE when performing high-risk occupational and recreational tasks. Ocular trauma in the Northern Cape province therefore represents both a health and a societal challenge, which would require an intersectoral management approach. Public health policies should focus on addressing risky drinking behaviours, interpersonal violence and the awareness and availability of appropriate PPE, whilst medical systems should aim to improve referral and transport networks and allocate relevant resources.

Conclusion

This study highlights the significant burden of ocular trauma in the Northern Cape province of South Africa, which represents both a health and a societal challenge. Certain findings mirror global demographic patterns, but it also reinforces and offers new insight into the epidemiology of ocular injuries in the country. In particular, high rates of non-accidental trauma draw attention to the significant strain that interpersonal and gender-based violence place on the South African public healthcare system. It also highlights important environmental and occupational factors associated with ocular trauma that may be amenable to public health interventions. The role of alcohol in non-accidental injuries and the lack of appropriate PPE in accidental injuries should be of particular importance when addressing potentially preventable causes of ocular trauma and blindness. In addition, the management of these injuries may be improved by the strengthening of referral and transport systems and appropriate resource allocation. Provincial health authorities should adopt an intersectoral approach to address these factors, which may serve to alleviate the significant burden of eye injuries in the province.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

K.V.S., C.D. and D.P.v.d.W. conceptualised the project. K.V.S. designed and directed the study. All authors contributed to data curation and validation. K.V.S. conducted the formal analyses with input from all authors. K.V.S., C.D. and S.d.V. wrote the manuscript with input from all authors.

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Data availability

Raw data were generated at RMSH as part of the routine patient care. Anonymised derived data supporting the findings of this study are available from the corresponding author, K.V.S., upon reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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