African Vision and Eye Health
ISSN: (Online) 2410-1516, (Print) 2413-3183

Prevalence of ocular injuries in construction workers in Mthatha, Eastern Cape, South Africa

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Dates:
Received: 05 Aug. 2024
Accepted: 12 Jan. 2025
Published: 15 Apr. 2025

How to cite this article:
Mpahlwa CK, Chelule PK, Oladimeji O. Prevalence of ocular injuries in construction workers in Mthatha, Eastern Cape, South Africa. Afr Vision Eye Health. 2025;84(1), a983. https://doi.org/10.4102/aveh.v84i1.983

Background: Construction workers face significant risks of ocular injuries because of exposure to hazardous materials, flying debris and dangerous equipment. Understanding the patterns and implications of such injuries is essential to improving workplace safety and preventive measures.

Aim: This study aims to determine the prevalence, patterns and contributing factors of ocular injuries among construction workers in Mthatha.

Setting: This study took place at Mthatha, Eastern Cape, South Africa.

Methods: A descriptive cross-sectional study was conducted among 222 construction workers, selected through convenience sampling. Data were collected using self-administered online questionnaires and analysed using Statistical software suite (SPSS).

Results: The prevalence of ocular injuries was 8.64%, with 19 participants reporting such injuries, while 91.36% had not experienced any. The majority perceived their eye health as good or excellent (90.95%). Sharp trauma (52.11%) was identified as the most common cause of injury. Unsafe working conditions and inadequate protective gear were observed as leading factors making injuries more likely, while 58.56% of participants reported no eye injuries at their workplaces in the previous year. The use of personal protective equipment (PPE) was highlighted as a key preventive strategy though challenges in its availability and use were reported.

Conclusion: Strengthening workplace safety measures, ensuring stricter PPE enforcement, and enhancing safety education are essential to reducing ocular injuries. Incorporating ocular health awareness into workplace protocols can mitigate risks and economic burdens.

Contribution: This study highlights the need for better safety practices and supports future research using clinic-based data.

Keywords: ocular; injuries; construction; occupational health and safety; intraocular damage; visual impairment.

Introduction

The construction industry is the largest and one of the most hazardous industries in the world. Construction workers are exposed to work-related health and safety hazards because this industry is sometimes not well organised, especially in developing countries.[1,2] Construction sites present numerous hazards to workers, as outlined by Albert et al.[3] These dangers include the risks associated with working at great heights and operating power transmission equipment. The constantly changing nature of construction work introduces additional risks, as does the common practice of employing temporary contract workers instead of permanent staff. The presence of multiple, uncoordinated contractors on a single site further complicates safety efforts. Moreover, construction workers are often exposed to harmful environmental factors such as excessive noise, vibration, airborne particles and the physical strain of manual labour. Almaskati et al. emphasised that these challenging working conditions can result in significant negative impacts on the health and well-being of construction workers.[4]

A study has shown that the health consequences of these harmful factors in developing countries are 10–20 times higher than those in industrialised developed countries.[5] About 350 million workers currently work in this industry around the world.[5] While in developed countries, approximately 6%–10% of the workers are employed in the construction industry, about 20%–40% of work-related deaths are attributed to this industry.[6] It seems that injuries among construction workers happen more frequently in developing countries compared with developed countries.[7]

Many construction workers in Africa have been injured while doing their duties. Apart from the severe consequences of such injuries and deaths for individuals, families and communities, substantial unnecessary costs to the industry are incurred.[8]

The South African construction industry is governed by a robust legislative framework, with the Occupational Health and Safety Act playing a central role.[9] This legislation serves multiple important functions. It promotes broader awareness of health and safety concerns among all parties involved in construction work. Furthermore, the Act provides essential protection for everyone engaged in the industry, from labourers to managers. Perhaps most significantly, it establishes a solid foundation upon which more specific and refined health and safety requirements for the construction sector can be developed and implemented. This legislative structure is instrumental in driving continuous improvements in safety standards and practices within South Africa's construction industry. Although South Africa has legislation in place, there is a need for amendments to promote health and safety throughout all phases of a project, during the concept, initiation and detailed design phases.[10]

According to the Occupational Health and Safety statistics presented by Rikhotso et al.,[11] it was determined that the injury and fatality rate in the construction industry is very high in comparison to other sectors of industry in most countries. A report from the South African Department of Labour Inspectorate across the country in 2020[12] further illustrates the state of construction health and safety in South Africa. From the reported findings, 52.5% of construction employers were non-compliant with the Occupational Health and Safety Act and the Construction Regulations.[13]

One of the major injuries that affects construction workers in the course of their operations is ocular injuries.[14] An ocular injury refers to a physical or chemical wound to the eye or eye socket. Ocular injuries are divided into open-globe and closed-globe injuries; however, there may be an overlap in their classification based on the causative agent or inflicting object involved.[15]

The African construction industry continues to face challenges related to ocular injuries because of hazardous working environments. A study by Aghaji et al.[16] emphasises that ocular injuries in industrial settings are not random occurrences but are often the result of increased exposure to hazards or inadequate safety measures. The burden of ocular injuries extends beyond immediate health impacts. In developing countries, limited access to preventive healthcare at all levels exacerbates the situation, particularly for industrial workers who are at higher risk.[17] The economic impact of ocular trauma is substantial, encompassing both loss of income and the high costs of medical treatment and rehabilitation. This economic burden underscores the critical importance of prioritising preventive measures in occupational settings.[18]

Although rules and regulations for eye protection in the workplace exist, injuries continue to occur. Non-compliance with existing guidelines and the high rate of not issuing protective eye devices by employers reflect the lack of adherence to the Occupational Health and Safety Act. Although there is legislation that addresses eye protection in South Africa, there is a need to educate employees and employers about eye safety. Compliance with safety regulations is necessary to improve ocular health and safety among workers.[19]

The study was motivated by the continuous increase in ocular injuries among construction workers. Ocular injuries pose the risk of permanent visual impairment, which will affect the construction workers for life. In South Africa, there are few studies conducted on occupational ocular injury among construction workers. Identifying risk factors and estimating the prevalence of occupational ocular injury is important for the establishment of local and national occupational injury prevention strategies and programmes. Hence, this study was aimed at filling the gap by determining the prevalence and associated factors of occupational ocular injury construction workers in Mthatha, Eastern Cape.

Hence, the study aimed to describe the burden and types of ocular injuries in construction workers in Mthatha.

Research methods and design

This study utilised a quantitative approach to assess ocular injuries among construction workers in Mthatha. The methodology included a descriptive survey design, participant selection criteria, and data collection processes, as outlined below.

Study design

The study employed quantitative research methods, and a descriptive survey design was utilised in the study.

Study population

The study was conducted in Mthatha in selected construction companies that were involved in the construction of buildings and road works. The selected companies were: Mpumalanga Construction, IshVuyo Building Construction, Somana Construction, Triple Action Trading, Bitline Sa 1060, Thubalam Trading, Gcina Sonke Engineering, Intellec Construction, Khwalo Construction, Cycle Civils and Projects, Emleco Holdings, Biza Tyopo trading enterprise, Kula Afrika projects, Kuyazanywa construction and Sinesakhono contractors. The participants of the study consisted of site managers (100), foremen (100), engineers (40), surveyors (24) and manual labourers (200).

Sampling

The study employed a convenience sampling approach to select construction companies and non-probability sampling to recruit individual participants.[20] While non-probability sampling does not provide all elements in the target population an equal chance of selection, it was deemed appropriate given the exploratory nature of the study and the logistical constraints of accessing construction workers across multiple sites. This approach enabled efficient recruitment from a hard-to-reach workforce, ensuring a diverse representation of job roles and experiences within the construction sector.

Although non-probability sampling introduces subjectivity and limits the mathematical estimation of sampling error, it provides a practical framework for generating meaningful insights into ocular injuries among construction workers in Mthatha. This methodology serves as a foundation for future studies employing more representative sampling techniques.[21,22]

To determine the sample size, OpenEpi software was employed, leveraging its robust statistical capabilities for sample size calculation. Given the lack of existing data on the prevalence of ocular injuries among construction workers in the Eastern Cape, South Africa, an assumed prevalence of 50% was adopted. This assumption is commonly used in the absence of prior data as it provides the most conservative and inclusive estimate, ensuring adequate sample size for meaningful analysis.

Key parameters were set to achieve reliable results: an effect size of 5%, a confidence level of 95% and a power of 80%. Consequently, a sample size of 222 construction workers was calculated and enrolled, providing sufficient statistical power to identify meaningful patterns and associations.

Inclusion criteria

People who were employed full time or permanently by the construction companies and were willing to participate in the study were included. The researcher obtained a list of workers from the companies and randomly selected them. After selecting them, the researcher called the participants inviting them to take part in the study.

Exclusion criteria

Workers on temporary contracts or hired specifically for short-term site-based work were excluded from the study. This included contracted surveyors and labourers recruited only for specific projects.

Data collection tool

The study utilised short Google form-based questionnaires to collect data from the respondents. These were self-administered questions and were completed by the respondents themselves without the assistance of an interviewer. The questionnaire was a weblink that is encrypted, which means it is only the researcher could access it. It was also found online and is accessible in both English and Xhosa https://forms.gle/nDYB3TeT6fDivmT88. The researcher provided the participants with a link that assisted them in accessing the questionnaire and taking part in the study. The questionnaire was specifically developed for this study, drawing on insights from previous studies in occupational health and safety to ensure relevance and alignment with the research objectives. The questions in the questionnaire were carefully selected to ensure the inclusion of only the questions that made meaningful contributions to the focus of the study. The key variables in the questionnaire were sections on the demography (age, sex, marital status, academic qualification and health status), perception of participants on the prevalence of ocular injuries among construction workers in Mthatha, types of ocular injuries among construction workers in Mthatha and the participant's experience on the visual outcome after the occurrence of ocular injuries.

Field test of the data collection instrument

The researcher did a dry run test of the online questionnaire. This process enabled the researcher to verify the suitability of the questions with respect to the flow, skip patterns, branching logic and any other issues of concern. The information obtained was used to construct the final questionnaire schedule, which was used in the main survey.

Data collection

Each participant was allocated a unique number to enforce confidentiality. Data were retrieved using Google Form online questionnaires after a preliminary review of questionnaires that were adopted. A link to the questionnaire was made available to all consented respondents, and participation is voluntary. The electronic consent section was attached to the questionnaire, and the participants were encouraged to save (keep) a copy of the e-consent. The consent was the first page of the questionnaire, which explained all the necessary details about the study. At the bottom, it was asked 'Do you want to participate in the study?' Interested participants clicked 'yes' to take part. Those who do not wish to participate selected 'No'.

Data management and analysis

Data were downloaded via the encrypted CSV file from Google Forms and the data were cleaned and exported to SPSS software for data analysis. Descriptive results were presented in both tables and charts. Inferential analysis was carried out where appropriate with the level of statistical significance set at 0.05.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Walter Sisulu University Faculty of Health Sciences Human Research Committee (reference no.: 134/2021). A consent form was included in the proposal, and all participants signed it before participating. An information leaflet summarising the study was also included to ensure that all participants understand what the study is about. Participants were informed that they were anonymous and that the researcher would guarantee the confidentiality of their responses and were only accessible to the researcher to ensure *Protection of Personal Information Act* (POPIA) was adhered to.

Results

Socio-demographic characteristics

The socio-demographic characteristics of the study population (*N* = 222) reveal a youthful to middle-aged cohort, with a significant male predominance and a diverse range of educational backgrounds and job categories. The study achieved a response rate of 100%, with all 222 invited participants consenting to participate and completing the questionnaire.

To achieve this exceptional response rate, the researcher ensured effective communication and follow-up with participants. Clear instructions and assurances of confidentiality were provided, which fostered trust and encouraged participation. Recruitment was conducted independently of employers, ensuring that participants felt no undue pressure or perceived threats. No incentives were offered, underscoring the voluntary nature of participation.

The analysis presents the following key findings:

The population is relatively young, with a mean age of 32.36 years (s.d. = 6.48), predominantly falling within the 30–39 years age bracket (101, 45.70%). This is followed by the 20–29 years (82, 37.10%) and 40–49 years (38, 17.19%) age groups, indicating a workforce that is largely in their early career stages (Table 1).

Males are higher than females, comprising 163 (73.76%) of the sample, while females account for 58 (26.24%). This gender disparity may reflect sector-specific trends.

The participants show a variety of marital statuses, with the majority being single (107, 48.20%), followed by married (69, 31.08%) and cohabiting individuals (39, 17.57%). A smaller proportion of the sample is either divorced (4, 1.80%) or widowed (3, 1.35%), showcasing the diverse personal backgrounds of the workforce.

The educational level is varied, with the largest portion having completed Grades 8–11 (102, 45.95%). This is followed by those with a Grade 12 education (71, 31.98%) and tertiary-level qualifications (44, 19.82%), indicating a workforce with a significant level of formal education.

The sample primarily comprises manual labourers (130, 59.36%), underscoring the practical nature of the workforce. Other represented roles include foremen (23, 10.50%), drivers (18, 8.22%) and site managers (15, 6.85%), among others. Given the job titles listed, this distribution highlights a workforce engaged in a range of occupations, likely within the construction, engineering or related sectors (Table 1).

TABLE 1: Socio-demographic characteristics (*N* = 222).

Variables	Frequency	%
Age (*n* = 221)		
20–29 years	82	37.10
30–39 years	101	45.71
40–49 years	38	17.19
Gender (*n* = 221)		
Male	163	73.76
Female	58	26.24
Marital status		
Single	107	48.20
Married	69	31.08
Co-habiting	39	17.57
Divorced	4	1.80
Widower	3	1.35
Academic qualification		
Grade 3	1	0.45
Grade 4–7	4	1.80
Grade 8–11	102	45.95
Grade 12	71	31.98
Tertiary level	44	19.82
Job category		
Manual labourer	130	59.36
Foreman	23	10.50
Driver	18	8.22
Site manager	15	6.85
Engineer	9	4.11
TLB operator	8	3.65
Surveyor	7	3.20
Banker	1	0.46
Chief works inspector	1	0.46
Cleaner	1	0.46
Construction project manager	1	0.46
Home inspector	1	0.46
Quantity surveyor	1	0.46
Sales representative	1	0.46
Supervisor	1	0.46
Works inspector	1	0.46

Note: Age = Mean ± standard deviation, (32.36 ± 6.48); Range (20–49).
TLB, Tractor-Loader-Backhoe.

Eye health

Eye Health among a study population of 222 individuals provides insights into eye health conditions, the prevalence of eye injuries at work and the frequency of such injuries per year, as shown in Table 2.

Conditions of eye health

Most participants rated their eye health as excellent, accounting for 80 individuals (36.20%). The majority of the sample perceives their eye health as good, with 121 respondents (54.75%). A smaller group, totalling 19 participants (8.60%), reported their eye health condition as fair. Only a single individual (0.45%) described his eye health as poor, indicating that adverse eye health conditions are relatively uncommon in this population.

Sustained eye injury at work

A small fraction of the participants reported sustaining eye injuries at work, amounting to 19 (8.64%), while the vast

TABLE 2: Eye health (N = 222).

Variables	Frequency	%
Conditions of eye health (*n* = 221)		
Excellent	80	36.20
Good	121	54.75
Fair	19	8.60
Poor	1	0.45
Sustained any eye injury at work (*n* = 220)		
Yes	19	8.64
No	201	91.36
How many times do eye injuries occur per year at your workplace?		
0	130	58.56
1–5	87	39.19
6–10	5	2.25

majority, 201 (91.36%), have not experienced eye injuries while at work, suggesting that workplace conditions may generally be safe for eye health or that protective measures are effectively implemented.

Frequency of eye injuries per year at the workplace

Most respondents, 130 (58.56%), reported no occurrence of eye injuries at their workplace annually. A significant number, 87 participants (39.19%), indicated that eye injuries occur between one and five times a year, highlighting a moderate risk of eye injuries. Only a small group, five individuals (2.25%), reported a higher frequency of eye injuries, ranging from 6 to 10 times per year.

Ocular injuries

Table 3 focusses on a study population of individuals and delves into the various aspects of ocular injuries, including their causes, perceived risks, conditions conducive to such injuries at work, awareness of the types of ocular injuries and the perceived causes or hazards leading to these injuries.

Causes of ocular injuries at the workplace

The predominant cause of ocular injuries is identified as sharp trauma, such as from a stick, with 99 workers (52.11%) having experienced this type of injury. Penetrative injuries are also a significant concern, reported by 68 individuals (35.79%). Chemical-related injuries account for 20 cases (10.53%), indicating the presence of hazardous materials that pose risks to eye health. More severe conditions like hyphemas and orbital blowout fractures are less common, with only three instances (1.58%).

Risk of sustaining an ocular injury

A considerable number of workers, 69 (31.08%), believe they are at risk of sustaining an ocular injury, highlighting concerns about workplace safety. The majority, 153 (68.92%), do not perceive themselves as at risk, which may reflect confidence in safety protocols or a lack of awareness of potential hazards.

TABLE 3: Ocular injuries (N = 222).

Variables	Frequency	%
What were the causes of ocular injury of workers at your workplace (*n* = 190)?		
Sharp trauma such as a stick	99	52.11
Penetration	68	35.79
Chemical trauma	20	10.53
Hyphemas and orbital blowout fractures	3	1.58
Are you at risk of sustaining an ocular injury?		
Yes	69	31.08
No	153	68.92
What are the conditions that make it easy to get injured at work (*n* = 221)?		
Unsafe working conditions	91	41.18
Construction workers are operating without proper protective equipment	46	20.81
Inadequate full-face shield is most appropriate as it also protects the skin	23	10.41
Poor understanding of the type of PPE required to be used for their personal protection	23	10.41
All of the above	38	17.19
What are the major types of ocular injuries that you know (*n* = 221)?		
Blunt	47	21.27
Stabbing	44	19.91
Splashing	39	17.65
Sharp	36	16.29
Indirect	24	10.86
Chemical	19	8.60
Brushing	10	4.52
Twitching	2	0.90
In your own view, what are the causes-hazards of ocular injuries at your workplace (*n* = 221)?		
Inappropriate working conditions in terms of exposure to various harmful factors	116	52.49
Grinding activities and hacking	56	25.34
Use of a hammer and chisel	26	11.76
Working at high altitude	12	5.43
Working with power transmission equipment	11	4.98

Conditions facilitating ocular injuries at work

Unsafe working conditions were identified by 91 workers (41.18%) as a leading factor making injuries more likely. Another 46 respondents (20.81%) cite operations without adequate protective gear (lack of proper protective equipment) as a significant risk factor. Twenty-three workers (10.41%) note the lack of full-face shields as a concern. Another 23 respondents (10.41%) point out a lack of knowledge regarding necessary personal protective equipment (PPE). While 38 workers (17.19%) believe that all the above conditions contribute to the risk of ocular injuries.

Major types of ocular injuries recognised

Respondents are aware of various injury types, including blunt (47, 21.27%), stabbing (44, 19.91%), splashing (39, 17.65%), sharp (36, 16.29%), indirect (24, 10.86%), chemical (19, 8.60%), brushing (10, 4.52%) and twitching (2, 0.90%) injuries.

Perceived causes-hazards of ocular injuries

The most cited cause of ocular injuries is inappropriate working conditions, with 116 workers (52.49%) emphasising this risk. Grinding activities and hacking were identified by 56 workers (25.34%) as hazardous. An additional 26 individuals (11.76%) note the risks associated with using hammer and chisel tools. High altitude work was stated by 12 workers (5.43%) as a danger, working at elevated heights. Also, 11 respondents (4.98%) pointed out the risks associated with operating power equipment.

Ocular injuries

Table 4 explores the implications of ocular injuries for workers, prevention strategies and reasons why injuries occur despite the availability of PPE.

Implications of ocular injuries

Blindness was a significant concern, with 66 individuals (29.73%) identifying it as a potential outcome of ocular injuries, highlighting the severe impact such injuries can have on life quality.

Close in frequency, 65 respondents (29.28%) mention the loss of income as a major implication, underlining the economic impact on affected workers. Poor access to health services for some construction workers is noted by 48 participants (21.62%), indicating disparities in healthcare access. The loss of the ability to perform tasks independently is a concern for 43 workers (19.37%), reflecting the personal and emotional toll of ocular injuries.

Prevention of ocular injuries

Making PPE available to all employees is seen as crucial by 110 individuals (50.69%), suggesting an emphasis on equipping workers with necessary safety gear. Wearing goggles is recommended by 86 workers (39.63%), pointing to the importance of eye-specific protection. A smaller group, 19 respondents (8.76%), advocates for face shields made of polycarbonate to protect against low-velocity projectiles. Emphasising the correct use of PPE and the need for frequent supervision is mentioned by one respondent (0.46%), alongside another single mention (0.46%) for a comprehensive approach combining all mentioned measures.

TABLE 4: Ocular injuries (*N* = 222).

Variables	Frequency	%
What are the implications of ocular injuries to you or other workmates?		
Blindness	66	29.73
Burdens such as loss of income	65	29.28
Poor access to health services for some construction workers	48	21.62
Loss of the ability to do things on your own	43	19.37
What should be done to prevent ocular injuries (*n* = 217)?		
Personal protective equipment (PPE) should be made available to the employees	110	50.69
Workers should wear goggles	86	39.63
Face shields made of polycarbonate to stop low-velocity projectiles	19	8.76
Workers need to be reminded frequently about the consequences of not using PPE correctly and they need frequent supervision	1	0.46
All the above	1	0.46
Why are ocular injuries occurring yet there is PPE (*n* = 221)?		
Inadequate protection practices	101	45.70
Lack of knowledge among workers about the dangers of operating machines without the use of PPE	96	43.44
It may also be because of inappropriate channelling of available resources that are meant to improve workplace safety	22	9.95
Workers saying they have done the work without PPE for years	1	0.45
In most cases, workers have a tendency not to use PPE even though provided. They would say this will just take a few seconds and in most cases, injuries occur in those instances	1	0.45

Reasons for ocular injuries despite personal protective equipment

About 101 workers (45.70%) cite insufficient protection practices as a key reason for the occurrence of ocular injuries, stressing the need for more effective safety protocols. A lack of awareness about the dangers of operating machines without PPE is noted by 96 individuals (43.44%), highlighting the critical role of education and training. A small number of 22 respondents (9.95%) believe that the inappropriate allocation of resources for workplace safety contributes to the problem. There are single mentions (0.45% each) of workers not using PPE because of long-standing habits or underestimating the risk for tasks believed to take 'just a few seconds', illustrating attitudes that compromise safety.

Discussion

This study aimed to describe the burden and types of ocular injuries among construction workers in Mthatha, Eastern Cape, South Africa. The findings reveal significant challenges in workplace safety, particularly concerning eye protection and injury prevention.

Prevalence and types of ocular injuries

Our study found that 8.64% of participants reported they sustained an eye injury at work, with sharp trauma being the most common cause (52.11%). This prevalence is lower than that reported in some recent studies. For instance, Mengistu et al. found a 31.4% prevalence of occupational eye injuries among small-scale industry workers in Ethiopia.[23] The lower prevalence in our study could be attributed to differences in workplace safety practices or reporting mechanisms.

The types of injuries reported in our study align with recent literature. Sharp trauma, penetration and chemical injuries were the most common, consistent with findings from Kyriakaki et al., who reported that foreign bodies, blunt trauma and chemical injuries were the most frequent causes of work-related eye injuries.[19]

Risk factors and workplace conditions

Our study identified unsafe working conditions (41.18%) and lack of proper protective equipment (20.81%) as major factors facilitating ocular injuries. This finding is supported by recent research emphasising the importance of workplace safety measures. Fresenbet et al. found that lack of safety training and non-use of PPE were significant risk factors for occupational eye injuries in Ethiopia.[24]

The perception of risk among workers is an important factor. In our study, 31.08% of participants believed they were at risk of sustaining an ocular injury. This awareness is crucial, as Belete et al. found that workers who perceived their jobs as risky were more likely to use PPE.[25]

Prevention strategies and barriers

Our findings highlight the importance of making PPE available to all employees, with 50.69% of participants identifying this as a key prevention strategy. This aligns with recent recommendations from occupational health studies. For example, Mengistu et al. emphasised the effectiveness of proper eye protection in reducing occupational eye injuries in the construction industry.[23]

However, our study also revealed that injuries occur despite the availability of PPE, with 45.70% citing insufficient protection practices. This suggests that merely providing PPE is not enough; proper training and enforcement of safety protocols are essential. Almahmoud et al. found that comprehensive safety programmes, including regular training and strict enforcement of PPE use, significantly reduced eye injury rates in industrial settings.[26]

Implications of ocular injuries

The study participants identified blindness (29.73%) and loss of income (29.28%) as major implications of ocular injuries. These findings underscore the severe personal and economic consequences of workplace eye injuries. Recent economic analyses, such as that by Omar et al., have highlighted the substantial costs associated with occupational eye injuries, including medical expenses, lost productivity and long-term disability.[27]

Recommendations

The findings of this study highlight the critical need for comprehensive interventions to reduce the risk of ocular injuries among construction workers. A key priority is ensuring the consistent availability of high-quality PPE, such as safety goggles and face shields. Employers must provide these protective devices and ensure they are comfortable for prolonged use to encourage compliance among workers.

The study also underscores the importance of enforcing safety regulations within construction sites. Companies should establish clear policies mandating the use of PPE and implement strict monitoring systems to ensure adherence. Penalties for non-compliance could be an effective deterrent against unsafe practices. Additionally, regular training sessions should be conducted to educate workers on the risks of ocular injuries and the correct usage of protective equipment. These training programmes should address knowledge gaps and dispel misconceptions about workplace safety.

Routine workplace audits are essential to identify hazards and evaluate the adequacy of existing safety measures. These audits can help construction companies implement necessary corrective actions promptly, minimising potential risks. Raising awareness about the severe consequences of ocular injuries, including blindness and economic losses, is another critical component. Awareness campaigns should use practical demonstrations and engaging materials to resonate with workers and reinforce the importance of eye safety.

The study findings also point to the need for stronger legislative frameworks and compliance mechanisms. Revising Occupational Health and Safety regulations to ensure robust eye protection standards can enhance worker safety. Employers should be held accountable for adherence to these standards, promoting a culture of safety within the construction industry.

Finally, support systems for workers who sustain ocular injuries should be prioritised. Access to affordable healthcare and rehabilitation services is essential to address the health and economic impacts of these injuries. Employers should explore initiatives such as income protection programmes to alleviate the financial burdens faced by injured workers.

Implementing these measures, rooted in the findings of this study, can significantly improve workplace safety and reduce the prevalence of ocular injuries in the construction sector. By fostering a proactive approach to occupational health, the construction industry can safeguard its workforce and promote long-term well-being.

Study limitations

This study has several limitations that should be considered when interpreting the findings. Data were collected from a single local government area in Mthatha, which restricts the generalisability of the results to the broader population of construction workers in South Africa or other regions. Additionally, the reliance on self-reported data introduces the potential for recall bias, as participants may not accurately remember or may underreport incidents because of fear of employer repercussions or other factors, affecting the reliability of the findings.

Although the sample size was determined to be statistically sufficient for the study area based on the methodology used, it may not fully capture the diversity of the construction workforce in other regions. Future studies should consider employing more representative sampling methods and expanding the geographic scope to improve the generalisability of findings.

Further limitations include the potential for respondents to misunderstand certain questions despite efforts to ensure clarity, which could have influenced their responses. The descriptive analytical approach used in this study, without examining relationships between variables or adjusting for potential confounders, limits the depth of insights regarding causal factors or associations.

Despite these constraints, the study offers valuable insights into the prevalence and patterns of ocular injuries among construction workers in Mthatha, providing a foundation for targeted interventions and further research.

Conclusion

Occupational eye injuries remain a significant cause of morbidity and disability among construction workers, encompassing severe conditions such as globe ruptures, corneal foreign bodies, lamellar lacerations and traumatic cataracts. Addressing these injuries underscores the complexity of ensuring proper eye protection. Challenges include the unavailability or inadequacy of PPE, which may not be suited for specific tasks or environmental conditions. Additional barriers, such as lack of awareness, poor education, underestimation of risks and inertia, further influence workers' decision-making regarding safety precautions.

The findings of this study reveal that most ocular injuries could be prevented through the consistent use of appropriate PPE. Educational initiatives focussing on the types of injuries, recovery timelines and the risk of permanent damage are critical in fostering awareness and compliance among workers.

This study provides valuable insights into the prevalence, types and risk factors associated with ocular injuries among construction workers in Mthatha. It highlights the urgent need for improved workplace safety measures, enhanced access to suitable PPE and the implementation of comprehensive eye safety programmes. Future research should prioritise the integration of clinic- or hospital-based injury data to validate findings and explore the effectiveness of these interventions in reducing eye injury rates within the construction industry. These efforts are essential to safeguarding the health and well-being of workers in high-risk environments.

Acknowledgements

Competing interests

The content is solely the responsibility of the authors and does not necessarily reflect the official views of the sponsors, which may be influenced by the research reported in the enclosed publication. The authors have fully disclosed their interests and have implemented an approved plan for managing any potential conflicts arising from their involvement. The terms of these funding arrangements have been reviewed and approved by the affiliated university in accordance with its policy on objectivity in research.

Authors' contributions

O.O. and C.K.M. both contributed to the conceptualisation, methodology and the writing of the original draft. C.K.M. contributed to the formal analysis and project administration under O.O's guidance. O.O. and P.K.C. both contributed to the reviewing and editing of the manuscript. O.O. supervised C.K.M postgraduate research project.

Funding information

The authors reported that O.O.'s research-protected time was partially funded by the Incentive Funding for Rated Researchers' Grant from the National Research Foundation (No: 132385), the South African Medical Research Council Research Capacity Development Initiative Programme (award number: RCDI1002).

Data availability

Interview recordings and scripts for this study are not publicly available. However, this could be shared by the corresponding author, O.O., upon reasonable request and with the permission of Walter Sisulu University.

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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