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Occupational injuries in South African game parks and nature reserves, 2007-2019

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Abstract

Introduction: *Scientific data concerning the trends, nature, and incidence of occupational injuries (OIs) in the tourism sector specifically in the South African game parks and nature reserves is not easily available thus it is perceived that it is a safe working environment. The purpose of this study was to describe the trends and nature of occupational injuries (OIs) among employees in South African game parks and nature reserves and to investigate the risk of injuries to different body-regions for different demographic variables.* ***Methods:*** *electronic records from the Department of Employment and Labour's Compensation Fund, containing occupational injury cross sectional data of 1531 employees of game parks and nature reserves for a 13-year were analysed. Associations between occupational injuries, body-region of injury and demographic variables were assessed using the Chi-square test of independence and Bayesian analysis.* ***Results:*** *there was gradual increase in the number of OIs over the period under study. There was a weak association between the body regions affected by OIs and the provinces* ($\chi^2_{pearson}(42)=91.95, p<0.001, V_{Cramer}=0.07$)*. The association between the categories of body regions affected by OIs and gender was weak* ($\chi^2_{pearson}(6)=20.51, p<0.05, V_{Cramer}=0.09$)*.* ***Conclusion:*** *the number of OIs recorded by Department of Employment and Labour's Compensation Fund increased over the 13-year period. The body regions affected by an OI were dependent on gender and the province where the game parks and nature reserves were located. There is a need to increase safety and prevention measures that ensure the protection of the body regions that have a high risk of injury based on gender and provinces. Future research should consider more comprehensive work-related variables that can influence OIs.*

Introduction

Injuries are one of the most common causes of morbidity and mortality, globally, and affect all demographic groups [1-3]. Worldwide, among people aged 15-29 years, injuries account for leading causes of death [2,4,5]. Injury currently accounts for 12% of the global burden of disease and is predicted to increase to 20% by 2020 [6,7]. In 2017, an estimated 19.4 million medically treated injuries occurred annually in working-age adults, globally, i.e. 11.7 episodes per 100 persons [7]. Of these, 4.5% suffered from occupational injuries [8]. The employees within the tourism sector are important and, by inference, their wellbeing should be ensured [3,4]. The tourism sector accounts for more than 25% of the (GDP) gross domestic product in some countries [1,2]. Tourism is one of the top two sources of export earnings in 20 of the world´s 48 least developed countries, including those neighbouring South Africa, for example Mozambique and Namibia [3]. In South Africa, the direct contribution of the tourism sector, when it was at its peak, to the GDP was ZAR130.1 billion in 2018 [2]. Despite the tourism sector´s contribution to South Africa´s macro-micro economy and the job losses recorded as of the 4th quarter of 2020, there is generally limited if not a lack of incident reporting on occupational injuries in South Africa´s tourism sector. In comparison, in the mining sector, 2447 and 2406 injuries, were reported in 2018 and 2019, respectively, while there are no records of reported injuries in the tourism sector that available with open access [9].

However, Cooper showed that injuries caused 23% of deaths among employees in the tourism sector, internationally in 2010 [10]. South African legislation, through the Compensation for Occupational Injuries (OIs) and Diseases Act (COIDA) of 1993, requires that injuries are recorded and reported annually to the Department of Employment and Labour [11]. Although mandated in the Constitution of the Republic of South Africa (Section 27(1) (c) [12], this legislation has not been well implemented in the tourism sector [10]. Injuries in the tourism sector (for example, the national parks) are not usually "reported" to the Department of Employment and Labour systematically. As far back as 2010, during routine inspections, the Department of Employment and Labour identified the tourism sector as one of the high risk and problematic sectors in terms of the implementation of the COIDA for the 2010/2011 financial year [13]; yet this sector has the lowest number of occupational injury claims of all economic sectors [14,15]. There are sparse scientific data concerning the nature and incidence of OIs in the tourism sector, specifically in the South African game parks and nature reserves. It is difficult to suggest or implement any appropriate interventions when the nature and incidence of OIs in the tourism sector are not known. Thus, game parks and nature reserves were chosen for the purposes of this study.

Objective: the objective of this study was to describe the trends, nature, and incidence of occupational injuries among employees and to investigate whether the body-part that is injured is associated with gender or age of the employee, or the province in which the injury occurs to improve prevention in South African game parks and nature reserves.

Methods

Study design: the study followed a quantitative descriptive cross-sectional research design to address the research objectives and problem statement. Participants: these were employees from Game Parks and Nature Reserves who received compensation for occupational injuries and recorded by the Department of Employment and Labour´s Compensation Fund, for the period 2007 to 2019.

Variables: the injuries were classified in the database according to the following: type of injury, company province, industry, gender, foreigner status, accident date, year of birth, year of accident, and age. The study period was based on the availability of data that were recorded in a consistent format, therefore no data sampling was considered. The main variables considered were description of OIs, classifications of OIs, province where the injury occurred, gender and age at the time of the accident.

Data sources/measurement: secondary data were collected from the database kept at the Department of Employment and Labour´s Compensation Fund. The Department of Employment and Labour´s Compensation Fund is based in Pretoria, in South Africa. The custodian of the database at the Compensation Fund is the Director-General of Labour for purposes of facilitating the compensation of injured employees on duty. The study used a database with reported and compensated occupational injuries of 1531 employees in Game Parks and Nature Reserves over a 13-year period. Successful claims for compensation that were extracted from the Department of Employment and Labour´s Compensation Fund database for the period 2007 to 2019 for Game Parks and Nature Reserves in the tourism sector.

Bias: researcher biases was from secondary data analysis.

Study size: a sample of, 1531 OIs claims which were approved and captured by the Department of Labour and Employment in their database.

Quantitative variables: age was analysed through descriptive statistics.

Statistical methods

Data analysis: the data were analysed using (SPSS) Statistical Package for the Social Sciences version 26 and R-package. Demographic characteristics were described using descriptive statistics and frequencies for categorical variables. Table 1 shows the categories of the body region affected by OIs used for analysis. The association between

OIs and province, sex and age were assessed using the Chi-square test of independence and Bayesian analysis. The Pearson Chi-square test of independence is a non-parametric procedure that is used to test whether categorical variables are independent or associated [16]. The hypothesis test for the null hypothesis (H_0) versus the alternative hypothesis (H_a) is given by: H_0: *there is no association between OIs and demographic variables*. H_0: *there is an association between OIs and demographic variables*. Given that the observed value is O, expected value is E and the formulation of the Pearson Chi-square statistic is $\chi^2$is specified as:

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$$

The Cramer´s V is a statistic that is used to quantify the effect size or strength of the association between the categorical variables [16]. Given that the Pearson Chi-square statistic is χ^2, the sample size is n,q is the number of rows and p is the number of columns, Cramer´s V is specified by the following formula:

$$Cramer's\ V = \frac{\sqrt{(\chi^2/n)}}{\min\,(q-1, p-1)}$$

The Pearson Chi-square and Cramer´s V were both reported. The Kruskal-Wallis test is a non-parametric generalised procedure that can be used for the comparison of the medians of two or more independent samples [17]. For n populations where $m_i$is the ith independent sample or category, the procedure test for the following hypothesis: H_0: m_1=m_2=... ...=m_k=0 *vs* H_0: *not all of the* m_i*'s are equal to zero*where $H_0$is the null hypothesis and $H_a$is the alternative hypothesis. Bayesian analysis is an alternative framework to classical statistical analysis and is more desirable for providing probabilistic explanations [18]. For instance, a 95% Bayesian Credible Interval can be interpreted as having a 95% probability that the correct parameter is within the interval. Furthermore, the Bayesian framework is desirable compared to the classical frequentist analysis because decisions are not solely based on the rejection of the null hypothesis [19]. In Bayesian analysis, the Bayes factor is a measure of the evidence for the null hypothesis compared to the alternative hypothesis [20]. The interpretation of the Bayes factor is simple, sound and naturally desirable for statistical inference [21,22]. The formulation of the Bayes Factor which gives evidence for the null hypothesis (H_0) compared to the alternative hypothesis (H_1) for observed data (D) is as follows:

$$Bayes\ Factor, BF_{01} = \frac{P(D|H_0)}{P(D|H_1)}$$

. The Bayes Factor(BFH_{01}) less than or equal to 3 indicates no evidence for H_0compared to H_1, the Bayes Factor greater than 3 but less than or equal to 10 indicates weak evidence, the Bayes Factor greater than 10 indicates strong evidence and the Bayes Factor greater than 30 indicates very strong evidence [21,22].

Ethical consideration: ethical approval for this study was obtained from the University of the Witwatersrand, Human Research Ethics Committee (Medical) (clearance certificate No. M171197), South African National Parks and Department of Employment and Labour´s Compensation Fund.

Results

Participants: the provided cross-sectional data had some minimal errors. Table 2 shows the demographic characteristics of all participants (n=1531). There were 8 employees with missing data for age groups. The age groups were categorised as follows: (18 - 29), (30 - 39), (40 - 49), and >50. Table 2 shows that there were more males (n= 963; 62.9%) than females (n= 568; 37.1%) in the extracted data. The cases were almost evenly distributed among the four age groups (18-29; 30-39; 40-49; >50). The mean age at the time of injury was 36.2 ± 11.09 (range 18 - 75). Most of the employees with OIs claims were South African (n = 1521; 99.3%).

Descriptive data: Figure 1 shows most of the occupational injuries occurred in the Gauteng province (n = 807; 52.7%). Most of the occupational injuries in this province affected the lower extremities (n = 217, 26.9%). The Pearson chi-square test of independence indicated that for the 1531 employees, there was a significant association between the body regions affected by OIs in the provinces. ($\chi^2_{pearson}(10)=48.88, p<0.001$). The effect size of the association was small, $V_{Cramer}=0.11$[16]. The Bayesian analysis revealed that there is very low evidence that there was no association between body regions affected by OIs and the provinces ($ln\ (BF_{01})=-2.28,\ BF_{01}<1$). The association between body regions affected by OIs and the province is 9.78 more likely than no association. Therefore, there is a consensus between the results of the frequentist and Bayesian analysis. Figure 2shows the body regions affected by OIs by gender. The highest number of OIs was recorded amongst males (n=963) over the 12-year period. Only 17 OIs (4 females and 13 males) were on record from 2007 to 2013. Table 3shows the number of occupational injuries by gender for the period, 2007 - 2019.

Outcome data: the highest number of OIs in both male and female employees was in the lower extremity. Male employees had a higher proportion of OIs in the lower extremity (n=265; 58%) compared to the female employees. For all categories of OIs, male employees had the highest number of OIs as compared to females regardless of the variation in population size. This indicates that male employees were more likely to be injured compared to female employees. The Pearson chi-square test of independence indicated that for the 1531 employees, there was a significant association between the categories of OIs and gender. ($\chi^2_{pearson}(9)=20.51, p<0.05$). The effect size of the association was very small, $V_{Cramer}=0.09$ 16. The Bayesian analysis revealed that there is very strong evidence that there was no association between categories of OIs and gender ($ln(BF_{01})=10.48,\ BF_{01}>30$).

The Pearson chi-square test of independence indicated that for the 1531 employees, there was a significant association between the categories of body regions affected by OIs and gender. ($\chi^2_{pearson}(6)=18.06, p<0.05$). The effect size of the association was very small, $V_{Cramer}=0.09$[16]. The Bayesian analysis revealed that there is very strong evidence that there is no association between categories of OIs and gender ($\ln(BF_{01})=3.96, BF_{01}>30$). Figure 3 shows category of OIs by age groups. Four age groups were factored in; these are 18-29, 30-39, 40-49 and ≥50. The highest number of OIs was in the lower extremity with a total of 138 cases (30.3%) in the age group 30-39. The age group with the highest total of 455 cases of all OIs was 30-39. There was no fatality recorded in the age group 18-29. The results of the Pearson Chi-square test of independence indicated that for the 1523 employees, there was a no significant association between the categories of OIs and age groups at the 5% significance level. ($\chi^2_{pearson}(27)=31.94, p=0.23$). The results of the Kruskal-Wallis test indicate that for the 1523 employees, there was no significant differences in the ages of employees among the different categories of body regions affected by OIs and were not dependent on age at the 5% significance level. ($\chi^2_{(kruskal\text{-}Wallis)}(6)=5.46,\ p=0.49$). Figure 4 shows the distribution of age at the date of the accident for different categories of the body regions affected by OIs.

Trend analysis of occupational injuries: the trend of OIs that affected the Torso and hand region for the years 2007 to 2019 was done. The Pearson correlation test showed that for the employees that had experienced Torso and Hand OIs that there was a small positive correlation between the number of these injuries and the year that they occurred ($r = 0.12,\ p<0.001$). Similarly, the Bayesian factor also revealed that it is 16.11 times more likely that there was a correlation compared to no correlation between the number of injuries and the years that they occurred. This indicates that there is strong evidence in favour of a correlation. Figure 5shows OIs affecting the Head and Neck Region from 2007-2019. The Pearson correlation test showed that for the employees that had experienced head and neck OIs that there was no statistically significant correlation between the number of these injuries and the year that they occurred ($r = 0.03$, $p=0.36$). Similarly, the Bayesian Factor also revealed that it is 12.55 times more likely that there was no correlation compared to a correlation between the number of injuries and the years that they occurred. This indicates that there is strong evidence in favour of no correlation.

Figure 6 shows trend of OIs that affected the lower extremity from 2007 to 2019. The analysis of the trend of OIs that affected the Lower Extremity for the years 2007 to 2019 was also done. The Pearson correlation test showed that for the employees that had experienced Lower Extremity OIs that there was a small positive correlation between the number of these injuries and the year that they occurred ($r = 0.12$, $p<0.001$). Similarly, the Bayesian Factor also revealed that it is 23.81 times more likely that there was a correlation compared to no correlation between the number of injuries and the years that they occurred. This indicates that there is strong evidence in favour of a correlation. The trend of OIs affecting the multiple body regions from 2007-2019 from The Pearson correlation test showed that for the employees that had experienced lower extremity OIs that there was a small positive correlation between the number of these injuries and the year that they occurred ($r = 0.08$, $p<0.05$). The trend of OIs affecting the Upper Extremity from 2007-2019 from The Pearson correlation test showed that for the employees that had experienced upper extremity OIs, there was no statistically significant correlation between the number of these injuries and the year that they occurred ($r = 0.06$, $p=0.10$). Similarly, the Bayesian Factor also revealed that it is 4.81 times more likely that there was no correlation compared to a correlation between the number of injuries and the years that they occurred. The trend for the other OIs that occurred for the years 2007 to 2019 from The Pearson correlation test showed that for the employees that had experienced other types of OIs that there was a small positive correlation between the number of these injuries and the year that they occurred ($r = 0.09$, $p<0.01$). Similarly, the Bayesian Factor also revealed that it is 2.31 times more likely that there was a correlation compared to no correlation between the number of injuries and the years that they occurred.

Discussion

The aim of the study was to describe the trends, nature, and incidents of occupational injuries among employees in South African game parks and nature reserves. Then, to ascertain whether the body-part that is injured is associated with gender, age of the employee, or to the province in which the injury occurs. The analysis revealed the trends, nature, and absolute number of OIs in South African game parks and national reserves. Most of the OIs occurred in the lower extremities and the nature parks and reserves with the most OIs were in the Gauteng Province. The records obtained from the Department of Employment and Labour´s Compensation Fund only had 8 employees with missing age groups. The number of employees with missing data was low and there was a low risk of misrepresentation for the reported claims of OIs in the tourism sector by dropping these employees from the statistical analysis. Inaccuracies in data capturing and incident reporting also show the lack of compliance in adhering to set procedures of reporting OIs by stakeholders in the game parks and nature reserves. It is possible that some cases were not captured correctly because of the adaptation of a new online system of recording successful claims thus the gradual increase of OI on the trends over the period under study. There the trend analysis of occupational Injuries may not be giving a true reflexion of what happened from 2007 to 2019. However, if nothing is reported, then the assumption is that nothing happened as we do not expect an employee to be injured at work. Inaccuracy in reporting OIs could be because of non-compliance by employers and the lack of legislative enforcement by concerned government departments [5]. There could also be victimisation by employers, which makes it difficult for vulnerable employees to report OIs accurately and state the real cause of the OIs and the body part affected [5,7,19].

Results showed that there was no association between OIs and the age of the employee in the game parks and nature reserves. This shows that occupational injuries are independent of the age groups of the employees. This indicates occupational injuries affect the body regions of employees similarly despite their age groups. This may be caused by factors affecting the work environment that affect all employees similarly, such as lack of occupational safety training and provision of protection and prevention equipment. Furthermore, the perceptions of the risks inherent in work tasks may be similar for all the age groups, which may result in employees being affected similarly by OIs [23]. In contrast to these findings, OIs are related to the subject´s age [24]. In the heavy metal industry, it was found that the younger the employee, the more likely they are to be victims of OIs [25]. For a sample of 1681 employees of companies in Finland who reported OIs in a three-year period, it was revealed that younger employees under the age of 25 years were more likely to have OIs compared to older employees with ages above 55 years [26]. Similarly, research conducted in several African countries revealed that OIs were similar across all ages [14]. The contrasting findings in other studies indicate that there is a variation in the findings for the nature of the association between age and nature of occupational injuries in different research settings. The contrast in the findings indicates that it will be difficult to generalise our findings beyond the employees in the game parks and nature reserves in South Africa.

There was an association between OIs and gender. Males had more OIs compared to their female counterparts. The higher number of injuries may potentially be a result of that males are about twice more likely to be employed in the game parks and nature reserves of South Africa compared to females [27]. The occupations in the game parks and nature reserves includes roles such as lifeguards, maintenance personnel, mountaineering guides, craftsmen, general park rangers, forest workers, forest firefighters, ranger aids and technicians, forestry aids, and smoke jumpers [28,29]. The nature of these occupations is more attractive to males, expose the head, neck, torso, and hand region to injuries and usually require the use of hands which increases their exposure to risks. There is a need to closely monitor and mitigate the risks that may lead to head, neck, torso, and hand regions. Furthermore, safety and prevention measures that avoid and protect male employees from these types of injuries must be increased. There was a weak association between the body part region affected and the province where the OIs occurred. The weak association is possibly because occupational injuries are not usually influenced by worker´s demographic location but occur because of the work conditions and environmental risks present [30]. There are no documented studies available that consider the association between the region where OIs were experienced and the area where the OIs occurred.

The OIs affected different parts of the body. Employees who are employed in game parks and nature reserves in the Western Cape were found to have a higher risk of having OIs in the upper extremity. This may indicate that upper extremity body regions are exposed and there is low attention of safety measures to protect and prevent such injuries. There is a need to increase safety and prevention measures to protect and reduce the chances of the upper extremity injuries from occurring [31]. The findings may provide guidance for employers and occupational professionals to make informed decisions on prevention and safety measures to ensure the protection of vulnerable body regions for employees in the game parks and nature reserves. It is important to ensure that upper body regions such as head and neck regions that are exposed while working and torso and hand regions that are essential for conducting work are protected from injuries.

Limitations: the observations showed that some sections were missing from the database at the compensation fund. The Department of Employment and Labour´s Compensation Fund records which informed the dataset do not provide the nature of accidents that contributed to occupational injuries and the type of occupation which could be used to explain the possible reasons for the OI. It was challenging to get accurate epidemiological data on OIs, as the information on cases was difficult to obtain and the analysis may be difficult due to reporting issues at the workplace [5,32]. Records reviewed were for successful claims only and there were no denominator data available that could be used to calculate incidence rates. There were missing sections in the reviewed data set. The missing data suggest that there is a possibility that some OIs were reported and not approved, due to a lack of supporting documents. The researcher used secondary data, therefore was limited to what was available from the dataset from the Department of Labour and Employment, Compensation Fund.

Interpretation: in conceding the above limitations and shortcomings in both the data sets used and scope of the study, there is a need for future studies to focus on the reporting strategies of the Department of Employment and Labour´s Compensation Fund from all sectors. There is need for empirical studies on the type of accidents that result in the approved OIs and how the body regions are affected. Although the study did not provide a calculation on the incidence rate, the findings point to the urgent need to closely monitor the incidence rate of OIs, and types of injuries recorded in the South African game parks and national reserves in particular as well as the tourism sector. The prevalence of risk and harm at the workplace is evident in the dataset despite the legislative instruments and safety health policies in South Africa. There is a need to collect data that give more accurate and more comprehensive information that could lead to better workplace safety measures.

Generalisability: understanding the trends and nature of OIs in South African game parks and nature reserves is important, not only for the affected employees but also for planning, budgeting, and prioritising in the sector. The body region that is affected by OIs had a weak association with the gender of the employees and the province where the game parks and nature reserves are located. Male employees had a higher number of occupational injuries compared to the females over the 13-year period. For both male and female employees, the highest numbers of OIs were in the lower extremity, torso, and hand regions. The Gauteng province and the Western Cape had the highest number of OIs which were also predominately in the lower extremity, torso, and hand region. The body regions affected by OIs were not independent of the age of the employees. This may be caused by the similar work environment and risk perceptions of employees amongst the different age groups. Male employees had a higher risk of OIs in the head, neck, torso, and hand region. Employees who are employed in game parks and nature reserves in the Western Cape had a higher risk of having OIs in the upper extremity. Employees in the Western Cape and other provinces were less likely to have OIs in the upper and lower extremity compared to only the lower extremity injuries.

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Conclusion

There is a need for the game parks and nature reserves to increase safety and prevention measures for the protection of body regions of employees who are at a high risk of injury. Future research should include other factors that can potentially have a significant effect on the occurrence of an OI such as working conditions or environment, type or nature of the occupation, provision of protective and prevention equipment, contract category and working hours. Furthermore, future studies should include accurate and comprehensive information on incidence rates and a detailed description of how body regions are affected.

What is known about this topic

- *Occupational injuries occur mostly in the mining, construction, and manufacturing sectors, and receive media attention because they often result in fatalities;*
- *Legislation regarding occupational injuries is very comprehensive and clear in South Africa.*

What this study adds

- *The findings from this study presents the number of occupational injuries that occur in the game parks and nature reserves;*
- *The study also shows the trends and nature of injuries that affect all body parts and recommendation to target the protection of body regions of employees who are at a high risk of injury.*

Competing interests

The authors declare no competing interests.

Authors' contributions

The conceptualizing of the research, collecting, analysing the data, and drafting of paper was done by Martha Chadyiwa, editing of manuscript Aimee Stewart, and Juliana Kagura: methodology, Martha Chadyiwa, Aimee Stewart, and Juliana Kagura. Contributors Martha Chadyiwa designed the study. Martha Chadyiwa collected data and conducted data analysis and drafted the manuscript. Martha Chadyiwa, Aimee Stewart, Juliana Kagura contributed to the interpretation of the data, revising the manuscript and final approval. Aimee Stewart, Juliana Kagura supervised the write-up of the project. All the authors have read and agreed to the final manuscript.

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Tables and figures

Figure 5: trend for head and neck region OIs 2007 to 2019

Figure 6: trend for lower extremity OIs from 2007 to 2019

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Table 1: description of affected body region categories	
Affected body region	Affected body parts
Head and neck region	Head, eyes, face, neck, thorax, nose, lips
Torso and hand region	Torso, hands, fingers, elbow, shoulders, wrist, upper arm
Upper extremity	Abdomen, lower back, pelvis, spine, chest, stomach
Lower extremity	Leg, hip, thigh, angle, foot, toes
Multiple body injuries	Head, eyes, face, neck, thorax, nose, lips Torso, hands, fingers, elbow, shoulders, wrist, upper arm Abdomen, lower back, pelvis, spine, leg, hip, thigh, angle, foot, toes
Other Injuries	Both upper and lower extremity, bite, burn, unspecified, fatality

Table 2: demographic characteristics of all participants (n = 1531)		
Category	**n**	**%**
Sex		
Female	568	37.1
Male	963	62.9
Age group (years)		
18 - 29	418	27.3
30 - 39	455	29.7
40 - 49	364	23.8
>50	286	18.6
Country of origin		
South African	1521	99.3
Non South African	10	0.7
Province of injury		
Gauteng	807	52.7
Western Cape	454	29.7
KwaZulu-Natal	199	13.0
Mpumalanga	42	2.7
Free State	16	1.0
North West	8	0.5
Eastern Cape	4	0.3
Limpopo	1	0.07

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Table 3: number of occupational injuries by gender for the period, 2007 - 2019

Year	Gender				
	Female		Male		Total
	n	%	n	%	n
2007-2013	4	0.7	13	1.3	17
2014	6	1.1	18	1.9	24
2015	27	4.8	68	7.1	95
2016	86	15.1	173	18.0	259
2017	211	37.1	333	34.5	544
2018	194	34.2	309	32.1	503
2019	40	7.0	49	5.1	89
Total	568	100	963	100	1531

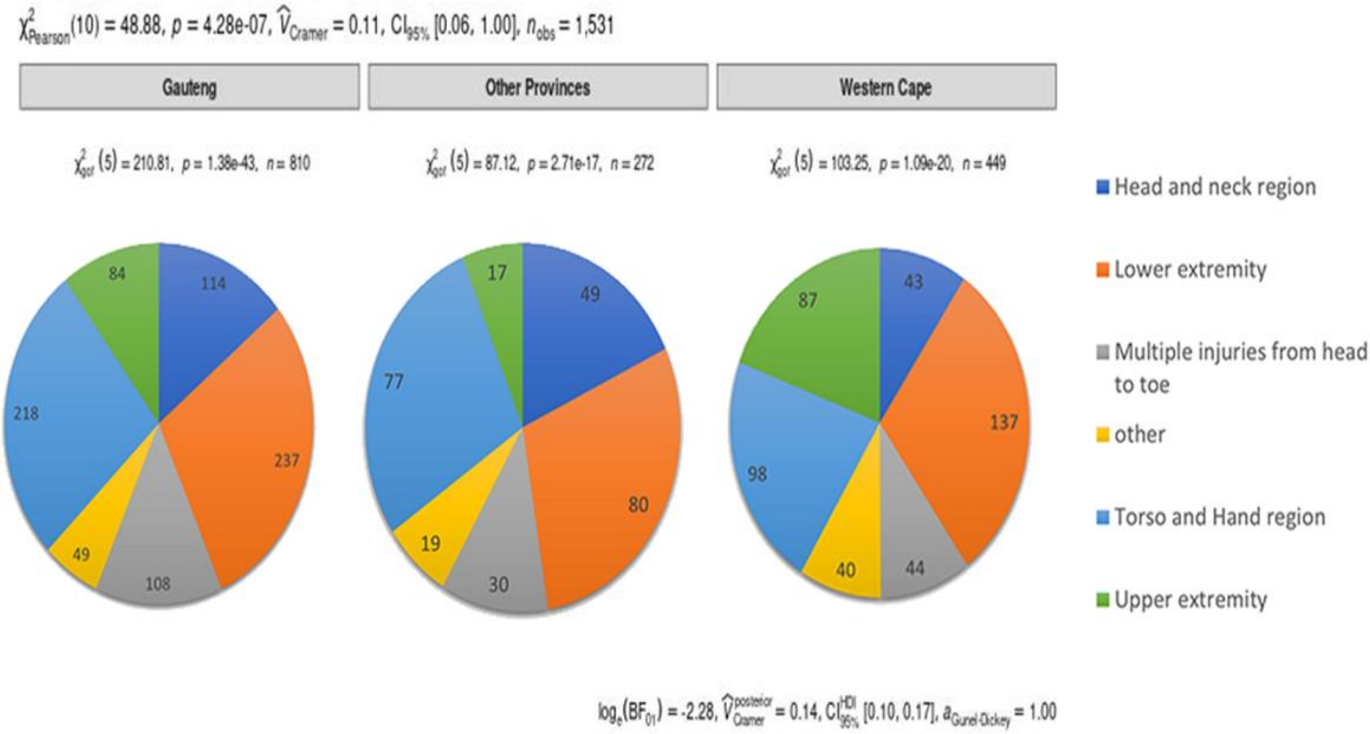

Figure 1: occupational injuries (OIs) by province

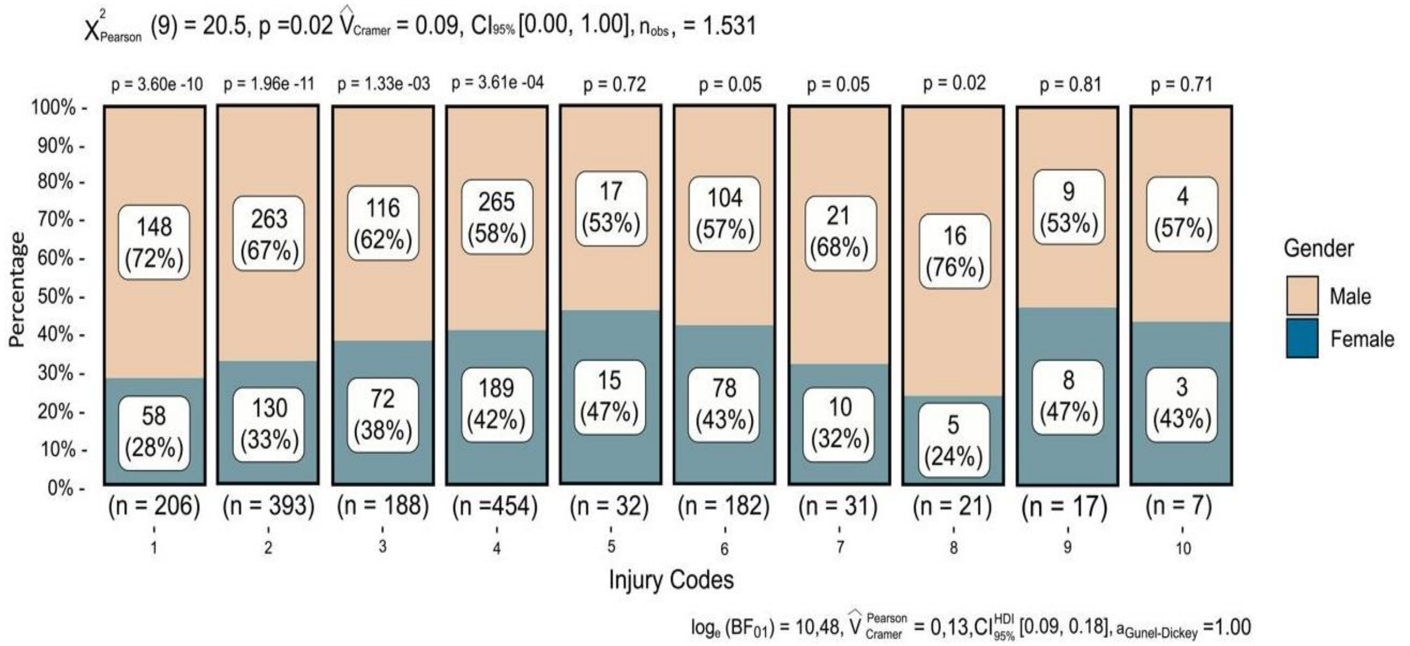

Figure 2: occupational injuries (OIs) by gender

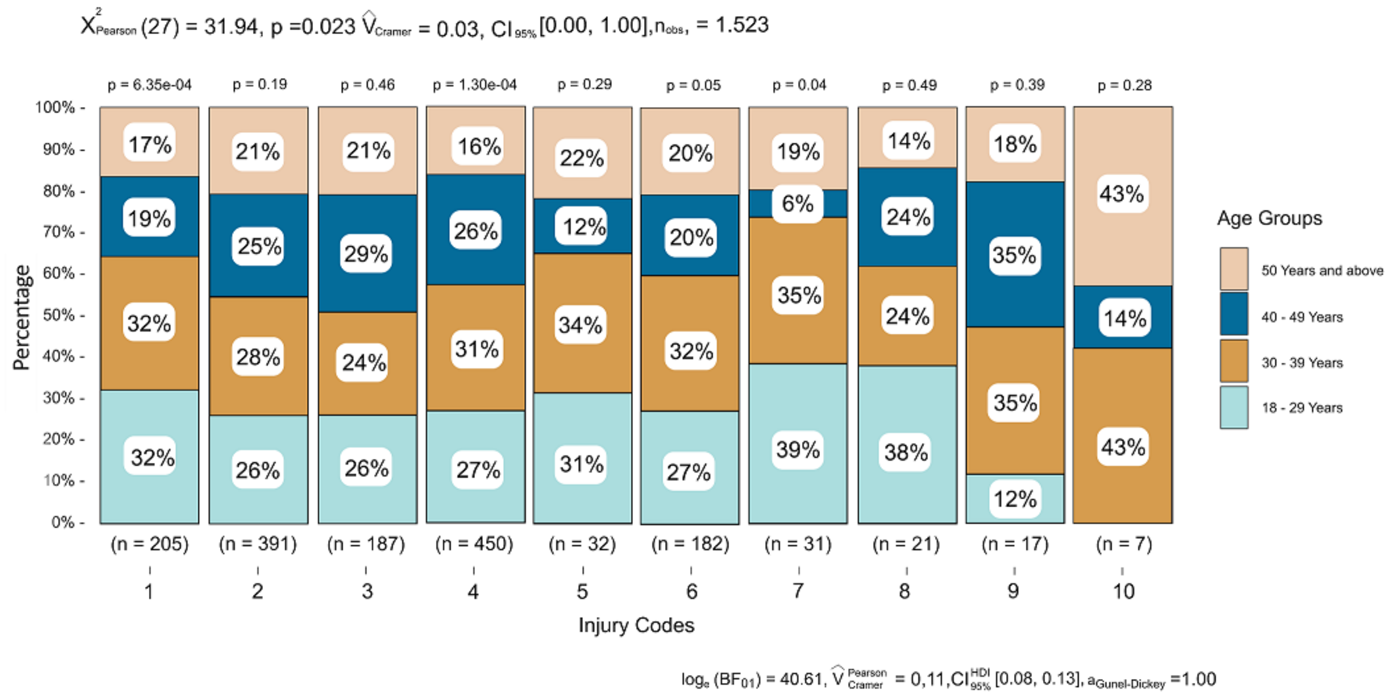

Figure 3: occupational injuries (OIs) by age group

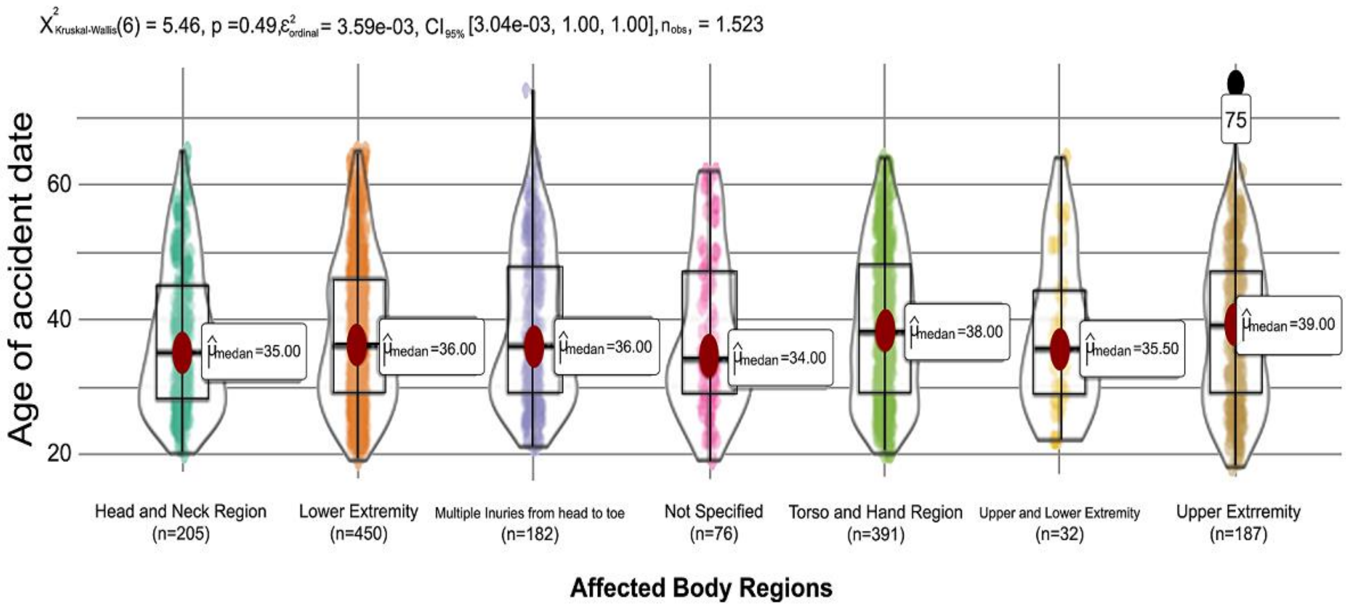

Figure 4: body regions affected by occupational injuries across age groups

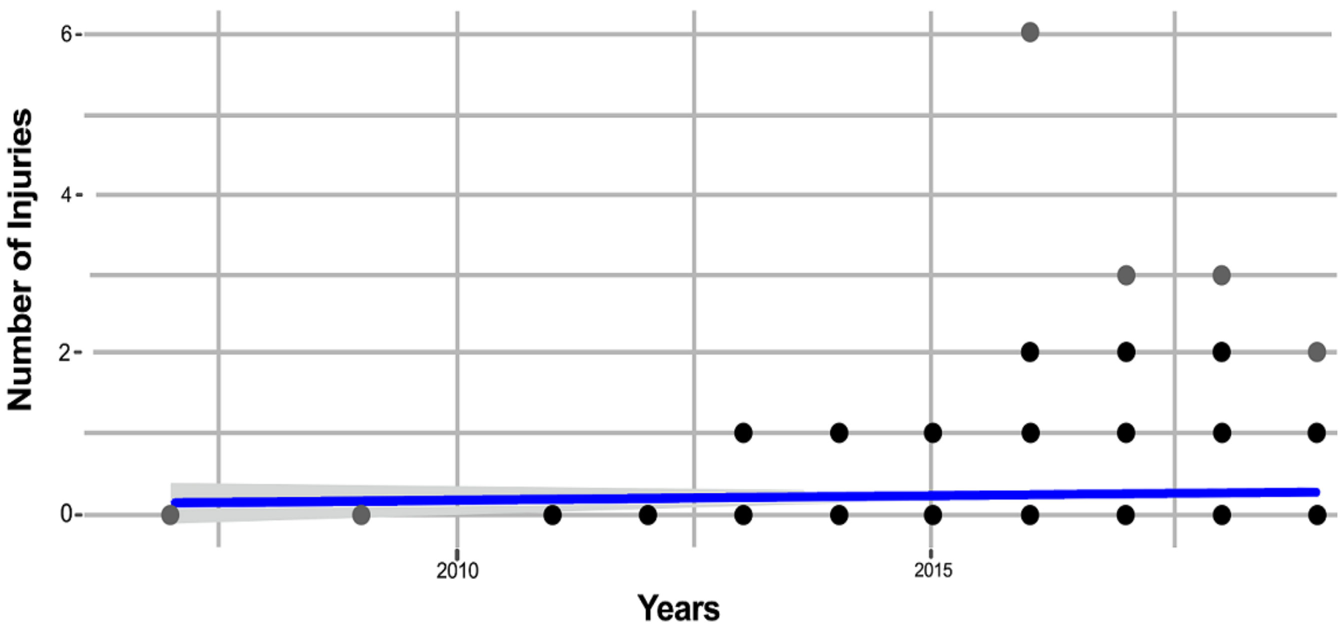

Figure 5: trend for head and neck region OIs 2007 to 2019

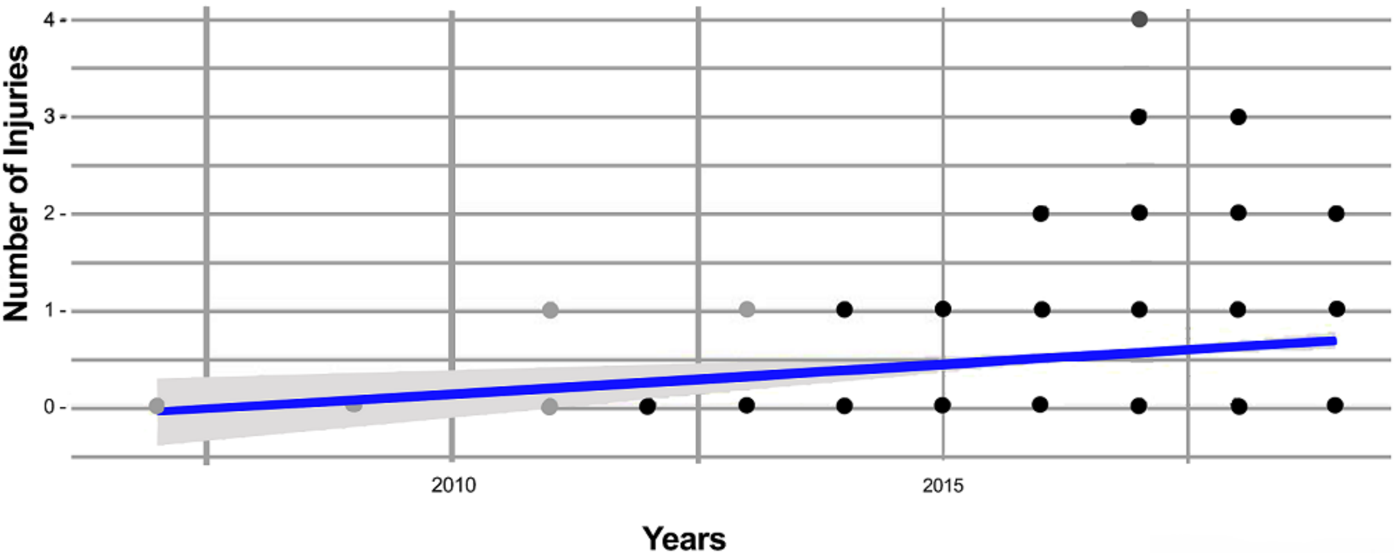

Figure 6: trend for lower extremity OIs from 2007 to 2019