Original Paper

Considerations on Patients' Quality of Life Following Hand and Forearm Trauma in the Oltenia Region

ALEXANDRA FLORINDA GHIȚAN[1], VICTOR GHEORMAN[2], ION UDRIȘTOIU[2], MARIUS EUGEN CIUREA[3]

[1]*Ph.D. Student, University of Medicine and Pharmacy of Craiova, Romania*

[2]*Department of Psychiatry, University of Medicine and Pharmacy of Craiova, Romania*

[3]*Department of Plastic Surgery, University of Medicine and Pharmacy of Craiova, Romania*

ABSTRACT: Hand and forearm trauma is a significant public health concern that has notable physical, psychological, and socioeconomic implications. Understanding the variations in occurrence and characteristics of injuries across different regions is crucial for effective implementation of preventive measures, management strategies, and resource allocation. The study involved 86 cases, with a range of ages from 18 to 70 years old. The participant group consisted of 11 females and 75 males. A series of clinical parameters were analyzed, including gender, age, environment, and cause of trauma. The study requested that participants provide information regarding if they reintegrated into their professional lives and complete the WHOQOL-BREF assessment, which is a tool used to evaluate quality of life. The current investigation has determined that the primary etiologies for hand and forearm injuries are crush and sharp cuts. The results of the investigation indicate a noteworthy association among Age and Cause, Gender and Age, Age and Professional reintegration, as well as between WHOQOL-BREF scores and different parameters. The procurement of epidemiological data plays a crucial role in broadening our comprehension of acute hand and forearm injuries in the Oltenia region.

KEYWORDS: *Hand trauma, WHOQOL-BREF, quality of life.*

Introduction

The hand and forearm trauma issue is a noteworthy matter of public health, which carries considerable physical, psychological, and socioeconomic consequences.

Comprehending the regional disparities in the frequency and attributes of such injuries is imperative for efficacious prevention, handling, and allocation of resources.

The Oltenia region, situated in the southwestern portion of Romania, comprises a number of counties, namely Dolj, Gorj, Mehedinti, Olt, and Vâlcea.

The region exhibits a heterogeneous demographic composition, encompassing both agrarian societies and metropolitan hubs of manufacturing and commerce.

The distinct incidence patterns of hand and forearm trauma in the region may be attributed to its unique sociodemographic and occupational landscape.

As per the findings of the World Health Organization (WHO), trauma stands out as a significant and pervasive issue on a global scale.

There is a growing recognition of the significance of prioritizing patient-centered outcomes as a means of enhancing non-fatal outcomes.

The concept of Quality of Life (QoL) is multidimensional in nature, encompassing various positive and negative aspects of an individual's life.

It takes into account their physical health, psychological well-being, level of independence, social relationships, personal beliefs, and their relationship with significant environmental factors [1].

Quality of life measures are utilized to assess a patient's self-reported evaluation of their level of functioning in accordance with their personal expectations.

The management of upper limb trauma remains a challenging therapeutic endeavor, owing to the diverse range of cases that present with multiple external factors including the traumatic mechanism, duration of injury, anatomical site, previous functional status, and time of ischemia.

This variability generates a spectrum of cases that range from simple to complex.

The significance of timely intervention in such instances is further underscored by the occurrence of these injuries in young and physically active individuals, which have both personal and societal implications in terms of social and functional outcomes, as well as the economic and public health burden associated with upper limb complications [3,4].

The objective of the current study is to evaluate the quality of life of individuals who suffered injuries to their hands and forearms.

10.12865/CHSJ.49.02.18

Additionally, the study aims to determine whether there are any associations between the patients' socio-demographic factors and their quality-of-life scores.

The research also seeks to identify any unique characteristics of patients in this particular population.

Material and Methods

A prospective study was conducted at the Plastic Surgery, Reconstructive Microsurgery and Burns Clinic of the Emergency County Clinical Hospital in Craiova, from 1st April 2022 to 31st March 2023.

The primary inclusion criterions chosen for our study pertained to the occurrence of trauma to the hand and/or forearm and to fall within the age range of 18 to 70 years at the time of surgical intervention.

Patients presenting with chronic conditions were excluded from the study.

At the two-month post-discharge follow-up, participants were requested to report whether or not they had been able to successfully reintegrate into their professional lives and complete a questionnaire.

The data that was analyzed comprised of various factors such as demographics, injury context and evaluation scale scores.

The assessment utilized the WHOQOL-BREF evaluation scale [1], which encompassed four domains: Physical, Psychological, Social Relationships, and Environment.

Upon enrollment in the study, all patients provided their signature on the informed consent, and the agreement of the Local Ethics Committee was obtained before pursuing the analysis.

The surveys were administered to all participants without any time constraints, and responses were offered where there were uncertainties in the questions.

The data underwent processing and statistical analysis in order to identify any potential correlations between the parameters.

The statistical analysis used in this study involved the utilization of the Chi square comparison test ($\chi 2$) and Pearson's correlation coefficient. The level of significance was set at $p<0.05$.

Results

The research encompassed a total of 86 cases, with ages ranging from 18 to 70 years old at the time of diagnosis.

The mean age was calculated to be 46 years old, with a standard deviation of 14.38.

The study population consisted predominantly of male patients, comprising 87.21% of the sample.

The remaining 12.79% of the sample were female patients.

The study found that the majority of patients were in their fourth decade of life, comprising 27.91% of the sample.

The third decade followed with 19.77%, while the second, fifth, and sixth decades accounted for 18.60%, 16.3%, and 17.44% respectively.

Gender was found to have an impact on the distribution of patients across age groups (Figure 1).

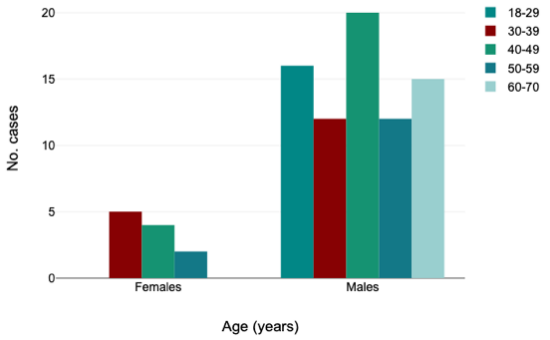

Figure 1. Distribution of cases depending on age and gender.

In terms of the individuals' environmental background, 61.73% originated from a rural environment while 38.37% came from an urban environment.

The research findings indicate that the leading causes of trauma were crush (31.40%), grinder (26.74%), circular saw (15.12%), glass shards (8.14%), knife (4.66%), cutter (4.65%), chainsaw (3.49%), electric scissors (2.33%), axes (2.33%), and road accident (1.16%).

Gender differences were observed in the distribution of these causes.

In terms of professional reintegration, it was found that 48.84% of the patients reported successful return to work, while 51.16% indicated either lack of success or absence of intention to do so.

The present study investigated the potential association between various socio-demographic factors, the cause of injury, and the extent of professional reintegration among patients following an injury (Table 1).

10.12865/CHSJ.49.02.18

Table 1. Statistical associations between socio-demographic factors, cause of injury and professional reintegration.

Parameters	Cause	Gender	Age
Gender	*p=0.001*	-	*p=0.036*
Age	*p=<0.001*	*p=0.036*	-
Environment	*p=0.041*	p>0.05	p>0.05
Professional reintegration	p>0.05	p>0.05	*p=0.028*

We found a significant association between Gender and Cause (p<.001, χ^2 test). The strength of the association was moderate, with a Cramér's V coefficient of 0.58 (Figure 2).

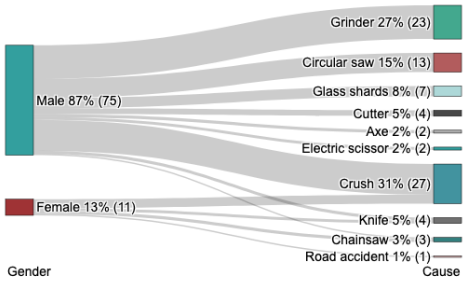

Figure 2. Distribution of trauma causes based on gender.

The results indicate a significant association between Age and Cause (p <0.001, χ^2 test, Cramér's V=0.8).

We found a significant correlation between the patients' Environment and Cause (p=0.041, χ^2 test).

The strength of the association was moderate, with a Cramér's V coefficient of 0.45.

The study revealed a statistically significant association between Gender and Age (p=0.036, χ^2 test).

The strength of the relationship was further supported by the calculated Cramér's V coefficient of 0.79.

The analysis revealed a significant association between Age and Professional reintegration (p=0.028, χ^2 test) and a large effect size indicated by Cramér's V of 0.8.

The study did not find any statistically significant correlations between Cause and Professional reintegration, Gender and Environment, Gender and Professional reintegration, or Age and Environment (p>0.05, $\chi 2$ test).

Upon administering the WHOQOL-BREF assessment tool to the study participants, we proceeded to graphically represent the distribution of scores across the four domains under evaluation, namely physical, psychological, social relationships, and environment (Figure 3).

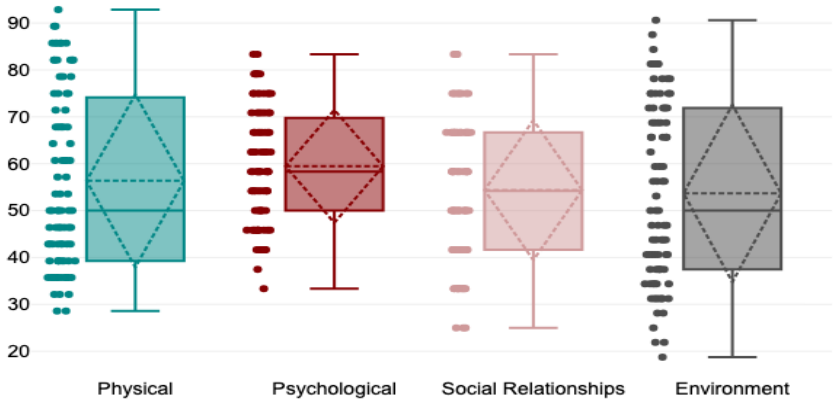

Figure 3. Characteristics of the four domains evaluated by the WHOQOL-BREF evaluation scale.

The results indicate that the physical domain scores vary between 28.57 and 92.86, with an average value of 56.35 and a standard deviation of 18.54.

The data pertaining to the psychological domain scores indicates a distribution ranging from 33.33 to 83.33, with an average of 59.45 and a standard deviation of 12.10.

The social relationship scores ranged from 25.00 to 83.33, with a mean score of 54.36 and a standard deviation of 15.00.

The study observed a range of environmental scores spanning from 18.75 to 90.63.

The mean environmental score was calculated to be 53.67, with a standard deviation of 19.00.

We examined the relationship between different parameters and scores of WHOQOL-BREF (Table 3).

Table 3. Statistical associations between socio-demographic factors, cause and professional reintegration and scores of WHOQOL-BREF.

Parametres	Gender	Age	Environment	Cause	Professional reintegration
Physical	p>0.05	p>0.05	p>0.05	p>0.05	***p<0.001***
Psychological	p>0.05	p>0.05	p>0.05	***p=0.009***	p>0.05
Social Relationships	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
Environment	p>0.05	p>0.05	***p<0.001***	p>0.05	p>0.05

The results indicate a significant correlation between the Physical score and Professional reintegration ($p < 0.001$, χ^2 test) and a large effect size (Cramér's V=0.85).

The study found a significant correlation between the Environment score and patients' environment ($p < 0.001$, χ^2 test) and a large effect size indicated by Cramér's V of 0.89.

We found a significant correlation between the Psychological score and Cause ($p=0.009$, χ^2 test).

The strength of the association was moderate, with a Cramér's V coefficient of 0.43.

The present study utilized Spearman's rank correlation coefficient to assess the association between scores on Psychological and Social Relationships constructs, given their proximity in value.

The data indicates a strong correlation between the two variables, as evidenced by a Pearson correlation coefficient of r=0.78 and a statistically significant p-value of less than 0.001.

The results of the study indicate that there were no significant correlations observed between Gender, Age and the four aspects evaluated at WHOQOL-BREF ($p>0.05$, $\chi 2$ test).

Discussion

Various instruments are currently utilized in the assessment of hand trauma outcomes.

Over the past few decades, there has been a growing emphasis on the impact of trauma and its short-and long-term consequences.

This is particularly relevant as trauma can lead to increased special needs for patients, higher economic expenses, and a reduced quality of life [4,5].

The present study reports a mean age of 46 years in the group under investigation.

This finding contrasts with the mean age of 35 years reported by Kovasc et al. [6] and the mean age of 38.2 years reported by Chan et al., who conducted similar investigations on patients with acute hand trauma in their respective clinics [7].

The present study posits that the observed higher mean age can be attributed to the continued engagement of older individuals in the workforce and active participation within the living area under investigation, as no alternative explanation has been identified.

The elderly population is on the rise in society due to increased longevity and reduced mortality rates among this demographic [8].

According to a United Nations report, the age group of individuals over 60 years old is projected to experience the greatest population growth in the coming decades.

This trend is expected to occur worldwide, regardless of the level of development in a given region.

According to findings, there appears to be a correlation between increased physical activity in retirement and a rise in the incidence of injuries [9].

The consideration of gender distribution is a crucial aspect in the analysis of patients who have experienced hand and forearm trauma.

It has been observed that males are more prone to experiencing hand and forearm injuries as compared to females.

Research indicates that males are more likely to engage in behaviors that increase their risk of injury, experience a higher incidence of injuries, and have a higher mortality rate due to injuries.

In the United States, the mortality rates of unintentional injuries, homicides, and suicides vary significantly between males and females.

10.12865/CHSJ.49.02.18

Specifically, males are 2.5 times more likely than females to die of any unintentional injury, and approximately five times more likely to die of homicide or suicide [10].

The observed discrepancy in injury rates between genders could potentially be explained by a number of factors, including but not limited to differential engagement in activities that carry a higher risk of injury and variations in occupational exposure.

The observed variation was ascribed to the greater proportion of males in physically demanding job roles in the manufacturing sector.

The results emphasize the significance of taking occupational variables into account while investigating gender discrepancies in hand injuries.

The utilization of dermal substitutes for hand coverage and reconstruction in patients with intricate hand defects was examined in a study conducted by Elbadawy et al. (2021).

The research findings indicate that a significant proportion of the patient population (80%) was male, with a comparatively smaller proportion (20%) being female.

The findings suggest the possibility of a gender-based discrepancy in the prevalence of intricate hand injuries [11].

A hospital-based study conducted in Ethiopia [12] revealed a male-to-female ratio of 4:1.

This ratio was observed to be higher than a similar study conducted in Nigeria [13], but lower than another study conducted in India [14].

These findings suggest that cultural and health-seeking behavior differences may contribute to the observed variations.

Our study revealed a notable preponderance of males, comprising 87.21% of the sample.

This proportion was observed to be greater than reported in previous studies.

We found a significant correlation between the patients' Environment and Cause ($p=0.041$, χ^2 test).

The strength of the association was moderate, with a Cramér's V coefficient of 0.45.

The influence of the environment, particularly the differentiation between rural and urban settings, on individuals with hand and forearm injuries is a subject of interest.

It has been found that rural areas pose a higher level of risk and danger compared to urban areas [15].

Rural settings are characterized by a higher prevalence of farming equipment and heavy machinery, which may contribute to an elevated risk of crush injuries.

The study indicates that the prevalence of injury severity is higher in rural areas, which could be attributed to the increased risk associated with hazardous environments.

Specifically, our findings show that 61.73% of the cases analyzed in the study occurred in rural areas.

The extended duration between the incidence of an injury and the availability of healthcare services, coupled with the increased distance to medical facilities, may potentially exacerbate the gravity of injuries upon admission.

Comprehending the etiology and trends of trauma that occur in the context of work is of paramount importance in order to establish and execute preemptive measures within the occupational setting.

The present study identified the leading causes for the hand and forearm trauma were sharp cuts (67.44%) and crush (31.40%).

As well as a study conducted in Ethiopia [12], the predominant cause of hand injuries was found to be sharp cuts, accounting for 56.7% of cases.

Crush injuries were the second most common cause, accounting for 37% of cases.

This finding is consistent with a study conducted in Poland, which also identified sharp and crush injuries as the most common mechanisms of hand injury [16].

Regarding professional reintegration, the study revealed that 48.84% of the patients experienced a successful return to work, whereas 51.16% expressed either a lack of success or no intention to reintegrate into the workforce.

The analysis revealed a significant association between Age and Professional reintegration ($p=0.028$, χ^2 test) and a large effect size indicated by Cramér's V of 0.8.

The influence of age on the process of professional reintegration for patients with hand and forearm trauma is a significant factor to consider.

Research findings suggest that younger patients exhibit superior functional recovery and are more likely to reintegrate into the workforce following traumatic incidents.

The results of the study indicate that there is a correlation between age and return to work rate as well as duration of absence.

Specifically, younger patients demonstrated a higher rate of return to work and a shorter period of absence compared to their older counterparts.

The observed phenomenon can be partially explained by the superior recovery ability, heightened adaptability, and increased physical endurance of the subjects in question [17].

The process of professional reintegration is of paramount importance in facilitating the recuperation and reinstatement of productivity among individuals who have suffered from hand and forearm injuries.

Research has identified that experiencing psychological stress early on can serve as a predictor for long-term functional outcome and the ability to return to productivity.

The ramifications of hand and forearm trauma on the successful reintegration of individuals into their professional roles are not limited to physical factors alone.

The successful resumption of productivity is influenced by various factors, including but not limited to psychological well-being, cognitive function, and academic skills [18].

Regarding the WHOQOL-BREF assessment tool, the physical and environmental domains exhibited the lowest scores of quality of life, while the social domain demonstrated the highest scores of quality of life.

The results indicate that patients expressed satisfaction with the social support they received, while expressing dissatisfaction with their physical status, as hypothesized.

The findings presented here are consistent with those reported by van Delft-Schreurs et al. [19], who similarly observed that quality of life is primarily influenced by sociodemographic factors, rather than by the duration of rehabilitation following the accident or the extent of injury to the affected body area [20].

Generally, moderate to high correlations were found between the WHOQOL-BREF and different parameters.

A statistical correlation was observed between the scores of the Psychological and Cause domains.

The severity of the trauma's triggering factor was found to be positively associated with the severity of the affected segment, as indicated by lower scores.

A statistical correlation was observed between the Environment score and the patients' environment.

Patients coming from rural areas exhibited lower scores, while those from urban areas displayed higher scores.

Similar findings were also noted in the domain of Psychological and Social Relationships.

A significant statistical correlation was observed between the two scores, indicating a potential influence of social relationships on the psychological well-being of patients.

Conclusion

The acquisition of epidemiological data is instrumental in expanding our understanding of acute occupational hand injuries.

This information may prove valuable in the development of strategies aimed at preventing and treating such injuries, ultimately resulting in a reduction of lost work time and economic burden in the Oltenia region.

The potential utility of the WHOQOL-BREF as an instrument for enhancing trauma care may be attributed to its incorporation of inquiries pertaining to patients' contentment with their level of functioning.

The utilization of a questionnaire facilitates the identification of post-traumatic issues that patients may encounter.

Conflict of interests

None to declare.

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Corresponding Author: Victor Gheorman, Department of Psychiatry, University of Medicine and Pharmacy of Craiova, Romania, e-mail: gheormanv@gmail.com