

Epidemiology of hand and wrist injuries treated in a reference specialty center over a year

Epidemiología de las lesiones de mano y muñeca tratadas en un centro especializado de referencia durante un año

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ABSTRACT. Introduction: Hand injuries constitute 6.6% to 28.6% of all injuries in the musculoskeletal system. Little information has been reported on the non-laboring, non-insured population with no social security. We describe the epidemiology of hand and wrist injuries treated over a year in the emergency department of a reference hospital in Mexico City that treats patients with no social security. **Objective:** To describe the epidemiology of hand and wrist injuries treated in the ED of a high specialty reference medical facility over a year. **Material and methods:** Medical records for patients treated for hand and wrist injuries in the emergency department in 2015 were reviewed. A descriptive statistical analysis was performed. **Results:** Hand and wrist injuries constituted 8.9% of all emergencies treated in the emergency department of INR-LGII during 2015. Young, male patients, between 21 and 30 years of age were the most commonly affected age group. Students and housewives constituted almost half the population treated for hand and wrist injuries. The most common injuries were fractures, contusions and sprains.

RESUMEN. Introducción: Las lesiones en las manos constituyen entre 6.6 y 28.6% de las lesiones del sistema musculoesquelético. Existe poca información en el mundo sobre las lesiones de las manos en la población sin seguridad social y no trabajadora. Describimos la epidemiología de las lesiones de mano y muñeca tratadas durante un año en el Servicio de Urgencias de un Centro de Tercer Nivel de la Ciudad de México que trata a pacientes sin seguridad social. **Objetivo:** Describir la epidemiología de las lesiones de mano y muñeca tratadas durante un año en el servicio de urgencias de un Centro Hospitalario de Tercer Nivel. **Material y métodos:** Revisión de expedientes electrónicos de los pacientes tratados por lesiones de mano y muñeca en el servicio de urgencias durante 2015. Se llevó a cabo un análisis estadístico descriptivo. **Resultados:** Las lesiones de mano y muñeca constituyeron 8.9% de todas las emergencias tratadas en el Servicio de Urgencias del Instituto Nacional de Rehabilitación «Luis Guillermo Ibarra Ibarra» (INR-LGII) durante 2015. Los pacientes hombres, jóvenes entre 21 y 30 años de edad fueron el grupo más afectado. Los estudiantes

Level of evidence: IV

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Conclusion: Hand and wrist injuries are common. There is currently not enough epidemiological data on non-laboring hand injuries in Mexico or the world. Hand and wrist injuries need to receive specialized treatment to avoid complications and permanent disability.

Keywords: Hand, epidemiology, emergency, fracture, amputation, mangled hand.

y amas de casa fueron casi la mitad de la población tratada por lesiones de mano y muñeca. Las lesiones más comúnmente tratadas fueron fracturas, contusiones y esguinces.

Conclusión: Las lesiones de mano y muñeca son comunes y requieren tratamiento especializado oportuno para evitar complicaciones y discapacidad permanente.

Palabras clave: Mano, epidemiología, emergencia, fractura, amputación, mano traumática.

Introduction

Hand injuries are the most frequent lesions in the body and they constitute between 6.6 and 28.6% of all musculoskeletal injuries. Economically active, working class men, under 40 years of age are the most commonly affected group.^{1,2,3,4,5,6,7} Patients with hand injuries are generally treated as outpatients, except in severe cases, like mangling hand injuries, where there are multiple lesions to different kinds of tissues. These patients generally require a prolonged treatment period and they can result in a varying amount of incapacity and elevated direct and indirect costs if treated by unqualified personnel.^{1,2,3,4,5,6,7}

Mangled hand lesions are the majority of work-related injuries treated in emergency departments (ED) worldwide and there are little to no reports on these injuries in the general population.^{6,7,8,9,10} The most common injuries reported worldwide are lacerations.^{8,9,10,11,12} Other common lesions are fractures, dislocations, ligamentous injuries, contusions and amputations.^{7,9,10,11,12,13} Taras et al. found that left-handed workers were 4.9 times more likely to suffer a digit amputation than right-handed workers.¹⁴

The epidemiology of hand and wrist injuries is not well described in Mexico either in the working population or in the non-working population and there is no national registry of hand injuries and subsequent disability.^{5,12} The National Rehabilitation Institute «Luis Guillermo Ibarra Ibarra» (INR-LGII) is a third level, high specialty medical facility in Mexico City that treats orthopedic conditions. It has its own hand and microsurgery department and it is a reference center for hand and wrist injuries nationwide. It offers attention essentially to the non – working, non – insured population, and informal workers without social security. The aim of this study was to describe the epidemiology of hand and wrist injuries treated in the ED of a high specialty reference medical facility over a year.

Material and methods

This study was approved by the ethics and research board at the Instituto Nacional de Rehabilitación «Luis Guillermo Ibarra Ibarra» under research protocol number INRLGII/SEM/18/400. We performed a retrospective, observational, descriptive study by reviewing hospital records for every

patient who presented at the ED of our hospital with a hand or wrist injury from January 1st to December 31st, 2015. Incomplete patient records were excluded from this study. Registered variables were age, sex, occupation, injured hand side, injury mechanism, whether the patient was treated somewhere else before arriving to INR-LGII, diagnosis, treatment while in the ED and the patient's final destination after attention in the ED. Hand dominance was not found to be recorded on the charts, so it was not included in this study.

Statistical analysis. A descriptive statistical analysis was performed with SPSS. Quantitative variables were described as means and medians and qualitative variables are presented as frequencies and proportions. To determine association between qualitative and quantitative variables, χ^2 or U of Mantel and Haenszel, ANOVA test (polychotomous variables) or t-Student test (dichotomous variables) was performed. Confidentiality was established at 95% and statistically significant $p < 0.05$.

Results

From January 1st to December 31st of 2015, 24,468 patients were admitted to the ED of the INR-LGII. There were 2,289 records registered with a hand or wrist injury, 105 charts were excluded from the study for being incomplete or for having an incorrect diagnosis. There were 2184 patients treated for a hand or wrist injury during this period. This represents 8.9% of all patients treated in the ED during 2015. The right hand was injured in 1,252 cases (57.32%), while the left hand was injured in 908 cases (41.57%). In 24 cases (1.09%) patients suffered a bilateral injury. The busiest months in the ED were June, July, and October.

Average population age was 31.85 years (standard deviation 18.88) with a range between 1 and 95 years of age. The most commonly affected age group were patients from 21 to 30 years of age with 460 patients (21.06%), followed by the 31 to 40 years of age group with 329 patients (15.06%) and the group between 16 to 20 years of age with 280 patients (12.82%). These three groups constituted 48% of all patients treated. The rest of the age distribution can be found in *Table 1*. Women were usually over 50 years of age and men were more commonly between 15 and 40 years of age ($p < 0.001$).

Of all the patients treated, 33.47% were students, 14.6% were housewives, 12.82% were workers with an unspecified occupation, 11.63% were employees, 6.54% were unemployed, 6.31% were sellers or merchandisers, 2.7% were infants, 2.79% were drivers or transport operators. Women were more commonly registered as housewives, retired, working in vigilance, resident doctors, infants, religious person, stylist, instructors, and receptionists. Occupations were registered with the specific name code used at the INR-LGII for the national registry. The rest of the occupations can be found in [Table 2](#).

Of the 2,184 patients treated in the ED, 2028 (92.85%) presented with an acute hand or wrist injury, while 156 (7.42%) presented with chronic or non-traumatic conditions. The most common injuries were fractures in 750 cases (34.34%), followed by contusions in 606 cases (27.74%), sprains and ligamentous injuries were present in 315 cases (14.42%), wounds were present in 115 cases (5.26%), dislocations in 82 cases (3.75%), 47 mangling hand injuries (2.15%), 40 extensor tendon injuries (1.83%), 32 amputations (1.46%), 25 flexor tendon injuries (1.14%), 14 wrist ligamentous injuries (0.64%), one firearm injury and one dog bite (0.45% each one). Of the non-traumatic lesions, the most common were varied diagnosis in 54 cases (2.47%), 38 trigger fingers (0.96%), 18 infections (0.82%) and two cases of Dupuytren's disease (0.82%). [Table 3](#) shows diagnosis in more detail.

Men presented to the ED more commonly with amputations, wounds, tendinous injuries, dislocations and mangling hand injuries. Women presented more frequently with contusions, sprains or ligamentous injuries, distal radius fractures, and non-mangling injuries. Association between sex and diagnosis was statistically significant ($p < 0.001$). Right hands most frequently presented with finger amputations, hand contusions, sprains, open and closed metacarpal and long finger fractures, carpal bone fractures, lacerating wounds, fingertip injuries, flexor tendon injuries,

and finger dislocations. Hand and wrist amputations were more common for the left side and finger amputations were almost twice as common in the left hand than on the right hand. Extensor tendon injuries of the thumb, flexor tendon injuries in the wrist, and scapholunate injuries were more common in the left side. Mangling hand injuries were as common on the right as on the left side.

The most common injury mechanism was a fall (33.56%) followed by blunt trauma (22.57%). Association between diagnosis and injury mechanism was statistically significant ($p < 0.001$). Direct blunt trauma was most commonly the cause of finger, hand and wrist contusions, hand and wrist lacerations, extensor tendon injury, and finger dislocations. Hyperextension of a joint was the cause of 7.83% injuries, 6.96% were caused by punching an object with a fist. Falls were the main cause for fractures of all fingers, including the thumb, metacarpals, and distal radius fractures. Injuries with doors and injuries with sharp objects happened in 4.21% of cases each. There were 109 patients treated because of injuries related to doors. Doors caused contusion of the fingers, fractures of long fingers, fingertip injuries, and lacerations. Sharp objects caused wounds and flexor tendon injury in the hand or wrist.

Compression injuries were present in 3.21% of all cases and they mostly caused wounds, mangling hand injury, fingertip injuries, open and closed fractures of the long fingers and two cases of finger amputations. Motor vehicle injuries caused 2.29% of the cases. They were most commonly associated with contusions, first metacarpal and long finger fractures, open fractures of fingers and metacarpals, distal radius fractures, extensor tendon injury, carpal dislocation and one case of mangling hand injury. Industrial machinery caused 1.65% of injuries, while chainsaws and grinding machines constituted 1.10% of all cases. One or more finger amputations and mangling hand injuries were mostly caused by industrial machinery. Chainsaws and grinding machines caused finger amputations, open fractures of the fingers and metacarpals and extensor tendon injuries. Torsion injuries with dog leashes or ropes caused finger and metacarpal fractures, mangling hand injury, fingertip injury, and flexor tendon injury. Around 6.50% of all cases did not associate with a traumatic injury mechanism. Injury mechanisms can be seen in more detail in [Table 4](#).

Women usually presented with falls and non-traumatic hand injuries, while men presented with higher energy injury mechanisms, this association was statistically significant ($p < 0.001$). Association between hand and injury mechanism was also statistically significant ($p < 0.001$). Right hands were most commonly injured by falling, contusions, punching, hyperextension, non-traumatic injuries, lacerating wounds and compression injuries. Left hands were more injured by chainsaw, automotive vehicle, and chains. Bilateral hand injuries were most commonly associated with a non-traumatic injury, falls, contusions, compression, and explosions.

Table 1: Age distribution.

Age range	n (%)
0-5	85 (3.89)
6-10	129 (5.90)
11-15	252 (11.53)
16-20	280 (12.82)
21-30	460 (21.06)
31-40	329 (15.06)
41-50	226 (10.34)
51-60	213 (9.75)
61-70	143 (6.54)
71-80	47 (2.15)
81-90	17 (0.77)
91-100	3 (0.13)
Total	2,184 (100.00)

Number of cases (frequency) and % of the total population are presented for each age group.

Table 2: Occupation.

Occupation*	n (%)
Student	731 (33.5)
Housewife	321 (14.7)
Trade	280 (12.8)
Employee	254 (11.6)
Unemployed	143 (6.5)
Trader/salesperson	138 (6.3)
Driver/bus driver	61 (2.8)
Infant	59 (2.7)
Mechanics, artisans, officials	40 (1.8)
Professionist	25 (1.1)
Non-qualified worker	23 (1.1)
Farmer	22 (1.0)
Retired	22 (1.0)
Workman	21 (1.0)
Stylist	6 (0.3)
Nun	5 (0.2)
Resident physician	5 (0.2)
Instructor	5 (0.2)
Automotor mechanic	4 (0.2)
Professor/teacher	3 (0.1)
Messenger	2 (0.1)
Athlete	2 (0.1)
Technician and medium level professionist	1 (0.04)
Trash recollection	1 (0.04)
Policeman	1 (0.04)
Receptionist	1 (0.04)
Scientific or intelectual professionists	1 (0.04)
Editor	1 (0.04)
Accountant	1 (0.04)
Commerce	1 (0.04)
Capturist	1 (0.04)
Vigilance	1 (0.04)
Concierge	1 (0.04)
Unknown	1 (0.04)
Total	2,184 (100.0)

Number of cases (frequency) and % of the total population are presented for occupation groups.
 * Occupations are registered with the specific terms corresponding to codes used at the INR-LGII for the national registry.

Students were injured more frequently by compression and crushing, dog bites, contusions, hyperflexion and hyperextension of a joint, falls, explosions, punching with a fist, doors, automotive vehicle accidents, and accidents with a bicycle or motorcycle chain. Workers were more commonly injured by cutting instruments, chainsaw and grinding machines, rope or chain torsion, and industrial machinery. Housewives, on the other hand, presented more commonly with non-traumatic injuries, falls, and contusions. These associations between injury mechanism and occupation were statistically significant ($p < 0.001$).

Regarding treatment in the ED, 950 cases (43.50%) were treated only with pain management. Eight hundred and eight cases (37%) were immobilized (splinted or casted), 150 (6.87%) of the cases underwent a surgical lavage and debridement plus suture or fixation with pins or hypodermic needles in the emergency department procedures room under

local anesthesia. In 103 cases (4.72%) closed reduction and immobilization was performed and in 78 cases (3.57%) treatment was not specified. In 41 cases (1.88%) only a surgical lavage was performed, in 22 cases (1.01%) suture took place in the procedures room. In 19 cases (0.87%) amputated fingers were remodeled (either because of economic reasons, time from initial injury, or anatomic incapability for replantation). In 10 cases (0.46%) only a reduction took place with no specified immobilization and in three cases there was no specified treatment recorded.

Of all the patients who attended the ED, 317 patients (14.51%) had had a previous evaluation in another health establishment. Patients who were initially evaluated in another health establishment included: patients with amputations of the hand and fingers, open fractures of the long fingers and metacarpals, flexor tendon lesions in the wrist and mangling hand injuries. The rest, 1,867 patients (85.48%), presented initially to the INR-LGII's ED. These patients presented mostly with: contusions, finger and wrist sprains, fractures of the hand and wrist bones, open wounds, and finger dislocations. After being treated in the ED, 1749 patients (80.08%) were discharged for ambulatory follow up, 195 (8.93%) were referred to a secondary attention center or primary care for follow up, and only 126 (5.77%) patients were admitted for surgical treatment. Patients who were admitted for surgical treatment were patients with amputations, fractures that needed osteosynthesis and mangling hand injuries.

Patients referred to other health establishments presented with contusions, sprains, metacarpal and phalanx fractures (including the thumb), distal radius fractures, open wounds and infections, finger dislocation and mangling hand injuries. The association between destination after treatment in the ED and diagnosis was statistically significant ($p < 0.001$). Usually, when patients with fractures were referred, it was due to lack of physical space to admit them for surgical treatment. Patients who asked for voluntary discharge usually had a hand or wrist fracture and refused the proposed treatment. There were also patients with wounds and tendinous injuries who refused treatment. See [Table 5](#).

Discussion

Hand injuries constitute a high percentage of injuries treated in emergency departments worldwide. They are usually work related and they can be underestimated.² There is some information on the epidemiology and economic impact of these injuries in workers. However, there is little information on hand injuries in the non-working population.^{6,7,8,11,15}

A revision made in the United States in 2009 showed that 92,601 upper extremity injuries were treated that year. The most commonly affected anatomical region of the upper extremity were the fingers (38.4%) followed by wrists (15.2%). The most common specific lesions were finger lacerations (221/100,000 persons/year), wrist fractures

(72/100,000 persons/year), and finger fractures (68/100,000 persons/year).⁶ They were also the most frequently work-related lesions treated in the EDs. Global incidence for hand injuries has been reported as 4 to 11 per 100 workers per year.⁸ Lombardi et al. identified 1,166 workers with hand injuries, predominantly males between the age of 25 and 34 years of age, followed by the 35 to 44 years of age group.¹⁶ Grivna described a similar sex and age pattern in the Arab Emirates.⁷

There is little information on the epidemiology of hand injuries in Mexico. A study made at the López-Mateos

Medical Center a hospital from the State of Mexico Health Institute (ISEM) found that males between 20 to 29 years of age were the most affected by hand injuries. Right dominant hands had a higher injury frequency (54% of all cases).¹⁵ Between 1990 and 1993 there were 3,672 patients treated for hand or wrist injuries in Mexican Petroleum (PEMEX). Of those, 925 had some degree of resulting disability.¹¹ In 1993, 10,191 patients were treated in four major public hospitals in Mexico City. Hand fractures were present in 11.1% of these patients and the incidence for male and female patients was similar.¹³ A report by the Mexican Social Security Institute (IMSS) in 1999 revealed a 26.51% rate of hand injury in workers (77.9% of total hand injuries treated) and males being affected more than women (80 vs 20%). Patients between 20 and 39 years of age constituted 62.48% of all hand injuries.¹⁰

Between 2010 and 2015, 4,751 patients were treated by the plastic surgery service at the «Dr. Manuel Gea González» General Hospital with hand injuries. Most of them were male and the most affected age group was between 16 and 30 years of age. The most affected side was the right side. They reported 87% of patients being treated surgically and the rest as outpatients.¹² The most common lesions reported in Mexican records are lacerations and wounds followed by different incidence of fractures, dislocations, ligamentous injuries, tendinous injuries, and amputations. These reports are very similar to the international epidemiology of hand injuries in workers.^{9,10,11,12,13}

In 2015, the IMSS registered 425,063 work related injuries. Injuries to the hand and wrist constituted 27% of all cases. Of these 114,919 patients, 84,402 (73.44%) were men and 30,517 (26.55%) were women. The main affected group were males between 20 to 24 years of age, followed by males between 25 and 29 years of age.¹⁷ The most common diagnosis were superficial trauma (24,102 patients), dislocations, tears, and sprains (12,837 patients), wounds (52,778 patients), fractures (16,067 patients), contusions (2,545 patients), burns and chemical corrosion (3,277 cases), and amputations (3,314 patients). Overall, there were 57,452 wounds to the hand and wrist nationwide, 5,355 of these were treated in Mexico City. A total of 17,932 hand and wrist fractures were reported nationwide, of which, 1,586 happened in Mexico City.¹⁷ The three occupations with more hand wounds were: warehouse and storage control personnel (4,556 cases), workers in the elaboration of meat and fish products (2,743 cases), and cooks (3,455 cases). The three occupations with more fractures of the hand and wrist were: sales and commercial employees (1,636 cases), non-classified fixed industrial machinery operators (868 cases), and construction workers (masons) (677 cases). Most accidents were reported as having happened because of an inadequate use of the limbs, inadequate use of personal protective equipment, or omission in using personal protective equipment.¹⁷ For that same year, the Institute of Social Security and Services for State Workers (ISSSTE) registered 729,817 emergency consults nationwide. Of these, 548,333 were treated in Mexico City. During 2015,

Table 3: Diagnosis.

Diagnosis*	n (%)
Metacarpal fracture (2nd to 5th)	315 (14.42)
Long finger fracture (2nd to 5th)	267 (12.23)
Hand contusion	248 (11.36)
Finger contusion	226 (10.35)
Wrist sprain	193 (8.84)
Wrist contusion	132 (6.04)
Finger sprain	122 (5.59)
Dislocation of the fingers of the hand	78 (3.57)
Other diagnosis	54 (2.47)
Fingertip injury	48 (2.20)
Mangling hand injury	47 (2.15)
Distal radius fracture	45 (2.06)
First metacarpal fracture	42 (1.92)
Tenosinovitis	38 (1.74)
Lacerating wounds of the fingers	36 (1.65)
Extensor tendon injury in the hand	34 (1.55)
Lacerating wounds of the hand and wrist	27 (1.24)
Open fracture of long fingers (2nd to 5th)	27 (1.24)
Carpal tunnel syndrome	24 (1.05)
Flexor tendon injury in the hand	21 (0.96)
Trigger finger	21 (0.96)
Amputation of a long finger 2,3,4,5	19 (0.87)
Soft tissue infections	16 (0.73)
Open metacarpal fracture (2nd to 5th)	14 (0.64)
Thumb fractures	13 (0.60)
Scapholunate ligament injury	12 (0.55)
Scaphoid fracture	11 (0.50)
Other carpal bone fracture	10 (0.46)
Amputation of more than one finger	8 (0.37)
Open fracture of the thumb	6 (0.27)
Extensor tendon injury of the thumb	5 (0.23)
Carpal dislocation	4 (0.18)
Amputation of the hand and wrist	3 (0.14)
Flexor tendon injury in the wrist	3 (0.14)
Thumb amputation	2 (0.09)
Septic Arthritis	2 (0.09)
Dupuytren's disease	2 (0.09)
Fingertip injury with fingernail injury	2 (0.09)
Multiple hand and wrist lacerating wounds	2 (0.09)
Triangular fibrocartilage complex injury	2 (0.09)
Extensor tendon injury in the wrist	1 (0.05)
Flexor tendon injury in the thumb	1 (0.05)
Bite injury	1 (0.05)
Firearm injury	1 (0.05)
Total	2,184 (100.00)

Number of cases (frequency) and % of the total population are presented according to the diagnosis.
* Long finger diagnosis include any phalanx or interphalangeal joint injury for the index, middle, ring, and small fingers.

Table 4: Injury mechanisms.

Injury mechanisms*	n (%)
Fall	733 (33.56)
Direct blunt trauma	493 (22.57)
Hyperextension of a joint	171 (7.83)
Punching an object with a fist	152 (6.96)
Another non- traumatic mechanism	142 (6.50)
Door injury	109 (4.99)
Cutting instruments (knife, machete, scissors, glass)	92 (4.21)
Compression	70 (3.21)
Motor vehicle or motorcycle accident	50 (2.29)
Industrial machinery	36 (1.65)
Chain saw and grinding machine	35 (1.60)
Torsion (dog leash, rope)	24 (1.10)
Hyperflexion of a joint	24 (1.10)
Motorcycle or bicycle chain	15 (0.69)
Bite injury	11 (0.50)
Not specified	8 (0.37)
Crushing injury	7 (0.32)
Firearm injury	6 (0.27)
Explosion	6 (0.27)
Total	2,184 (100.00)

Number of cases (frequency) and % of the total population are presented according to the injury mechanisms.
* Injury mechanisms were grouped according to the most common mechanisms registered.

364,727 patients were discharged from hospitals, and 1,420 patients were hospitalized because of hand or wrist lesions.¹⁸ There is no more specific information on hand and wrist injuries for ISSSTE.

The INR-LGII is a third level high specialty hospital that treats the uninsured, non-working or informal working population with no social security. Most emergency consults are for orthopedic injuries. There are hand surgeons and hand surgery fellows available at all times to perform emergency surgeries including replantation and microsurgical procedures. There are orthopedics residents and an on-call orthopedist in the ED to evaluate all emergency consults. In 2015, 2,184 patients were treated for a hand or wrist injury.

Our population corresponds in age and gender distribution with international and Mexican reports. Males between 21 and 40 years of age more commonly presented to the INR-LGII's ED with hand and wrist injuries. This represents 36.12% of all cases. However, only 902 (12.82%) were workers. Unlike international and national reports, we found a high number of housewives and students treated for hand and wrist injuries in the ED. These two groups alone represented 48% of all hand and wrist emergency consults.

Mexican institutions that treat laborers with social security, like IMSS and ISSSTE reported that the most common hand and wrist injuries in 2015 were lacerations, dislocations, ligamentous injuries, and superficial trauma.

At our institution we treated more fractures, contusions, sprains and lacerating wounds. The right hand was the most commonly injured hand, although we are lacking information on hand dominance.

There is no more detailed information on anatomical region or specific diagnosis available from these institutions to compare more thoroughly. The only hospital with reported data on hand and wrist injuries is the «Dr. Manuel Gea González» General Hospital. It is located in the southern part of Mexico City, near the INR-LGII and also treats hand injuries in a non-working and non-insured population. However, hand injuries there are treated by the plastic surgery department, so they don't treat osseous lesions. They reported treating patients from 16 to 30 years of age and mostly soft tissue injuries like tendon and fingertip injuries over 10 years.

Another fact that draws our attention is that, mostly, the injuries that need urgent care by a hand surgeon and maybe require microsurgical procedures, were the ones that were evaluated in another health care establishment before. This takes precious time away and diminishes the possibility of performing replantation procedures. The economic cost of attention probably plays a factor in patient's decisions on treatment, since patients need to pay for their attention (although the cost is adjusted to their socio-economic status). This was not explored in this analysis because we did not have enough data, but patients who declined attention did it mostly because of economic reasons.

Multiple studies have attempted to establish direct and indirect costs of hand and wrist lesions worldwide.^{5,19,20} Robinson et al. did a systematic review and extrapolated costs to 2015 American dollars. They found that indirect costs represented an elevated proportion, reaching between 60 to 70% of the total cost for the management of these lesions. The average cost per case of all lesions was US\$6,951 (interquartile range \$3,357-\$22,274) and \$8,297 (interquartile range \$3,858- \$33,939) for health economy evaluations.¹⁹ This is another reason to support adequate initial hand and wrist injuries and provide opportune rehabilitation.

We found that injuries like contusions, that could be treated in a second level general hospital were the most

Table 5: Patient destination after treatment in the emergency departments.

Destination	n (%)
ED discharge	1,749 (80.08)
Referral to first or second level center	195 (8.93)
Admittance to hospitalization	126 (5.77)
Voluntary discharge	114 (5.22)
Total	2,184 (100.00)

Number of cases (frequency) and % of the total population are presented according to the patient's destination after attention in the emergency departments.

frequent consults in the ED at our institution. Most injuries were treated in the ED and sent to hand and wrist consult for follow-up. Many injuries that were referred to secondary or primary level would need follow-up by a hand surgeon and early rehabilitation, especially finger dislocations. Reference between health system levels of attention in Mexico needs to be optimized to provide better guidelines that allow adequate attention of hand and wrist injuries by a hand surgeon.

There is not enough epidemiological data on non-working hand injuries in Mexico or any other country. It has been documented that hand injuries tend to be minimized, and an incorrect treatment can cause permanent disability.² If there is an early, adequate treatment by a hand surgeon, the indirect costs associated to the injury and the number of procedures decrease.² National registries could be of importance, especially to identify opportunity areas for prevention in order to decrease disability due to these injuries.

Conclusion

Hand and wrist injuries are common. There is currently not enough epidemiological data on non-laboring hand injuries in Mexico or the world. Hand and wrist injuries need to receive specialized treatment to avoid complications and permanent disability and the creation of national registries could help better design reference guidelines for hand and wrist injuries in Mexico.

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