

Epidemiology of Lowers Limb Fractures in Patient of Taleghani Hospital in Kermanshah in 2014

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Abstract: Fractures are one the most common accidents in occupational injuries and traffic accident. Generally the fracture of lower limbs account almost for one third of all fractures. So the objective of this study was to study the epidemiology of lowers limb fractures in patients of Taleghani hospital in Kermanshah in 2014. In this cross sectional study, in order to achieve the goal of study, the prepared checklist was completed through using the record information of patients with lower limb fracture in the emergency and orthopedic wards of Taleghani Hospital in Kermanshah. The number of 1117 subjects was surveyed through the random sampling. Finally, the obtained data was analyzed by SPSS 20 Software. The obtained data indicated that the study population consisted of 753 men (67.4%) and 364 woman (32.6%). The highest fracture was related to hip fracture. Also the most and least cause of fracture related to traffic accident (60.9%) and assault (0.5%). The result indicated that the highest frequency of lower limbs fractures were in the patient age ranged from 15-24 years. The highest frequency of lower limbs fracture were observed in the ankle, fibuls+tibia 5 and foot and the lowest frequency was related to femur region (40 cases). Generally it can be concluded that the prevention strategy should be considered aim to progress the safety of roads in country and implementation the strict regulation for offenders and enhance the quality and safety of car as well. The coordinated activity between the different units such as police, the fire and emergency wards can be improved the services to accident injuries. Moreover, it reduce the time of emergency reach to the accident site and done the faster vital activity to accident injuries.

Key words: Lowers limb fractures, Taleghani hospital, Kermanshah, acciedent, injuries

INTRODUCTION

Accidents constitute the leading of epidemiology in non-communicable disease in recent century (Pork and Park, 1991; Shaw and Lavelle, 1998). Accident injuries are the most important cause of disabilities and mortality rates in developed countries in the world (Adesunkanmi *et al.*, 1998; Rahmani *et al.*, 2013). These accidents affect the mental and physical aspect of personal injuries and additionally impose a notable financial burden to societies and families annually (Bull, 1979). Fractures are the

common accidents in occupational injuries and traffic accidents (6,25). The fracture of lower limbs account almost one 3rd of all fractures (Kaye and Jick, 2004).

Now a days, the incidence of accidents and the related awareness before it are considered as a major public health problem and the most common cause of mortality rate in the age <45 years (Bakhshi *et al.*, 2006; Garraway *et al.*, 1979; Baron *et al.*, 1996; Janmohamamdi *et al.*, 2014; Kamran and Ameri, 2005) Fractures impose a huge economical disadvantageous on the governments and people directly or indirectly.

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It is regarding that the delay of taking care regarding the groups of fractures with massive bleeding can be created the hemorrhagic shock and even leads to death of patients. Occasionally, the lack of adequate and also well-timed treatment can lead to disability. It is regarding that remarkable disability and mortality rate may be resulted from the fractures of lower limbs. Hence, understanding the fractures pattern, attention to hospital and pre-hospital emergency care, learning how to deal with these patients and provides the satisfactory health conditions aim to preserve the life, leads to reduce the risk of shock and the consequence disabilities (Fakouri *et al.*, 2007; Kaye and Jick, 2004).

Fakouri *et al.* (2007) assessed the frequency of bone fractures in adult referred patient Ahwaz Imam Khomeini hospital in a 4 years. The patients were consisted of men (77%) and women (23%). And the lower and upper fractures reported 64% and 36% respectively. The most common causes of fractures were related to car accident (55.9%), backfall (33.5%), indirect strike (45.6%) and assault (37.6%).

And the most common region of fractures were proximal metatarsal, foot phalanx fractures and metatarsal (Abedi *et al.*, 2012a, b).

Determine the frequency and pattern of fractures will be constructive in terms of compile the education programs in orthopedic wards. So the objective of this study was to determine the pattern and frequency of fractures and also finding the relationship between the intended variables in Kermanshah in 2014. In order to provide the adequate training for emergency and moreover reduce the risk factor for high risk groups. And additionally provide the sufficient facilities depends the anatomic location and their frequency in the emergency and orthopedic wards.

MATERIALS AND METHODS

In this cross sectional study, in order to achieve the goal of study, the prepared checklist was completed based on the record information of patients with lower limb fracture in the emergency and orthopedic wards of Taleghani Hospital in Kermanshah. The study population was considered all of the patients with lower limb fracture in Taleghani Hospital in Kermanshah. The data collection was conducted according to complete the checklist through the patient records in orthopedic ward. In the present study, the number of 1117 patient was surveyed that collected through random sampling. Finally, the obtained data was analyzed by SPSS 20 Software and it must be noted that the confidence level of 99% and the accuracy of 0.04 were considered.

RESULTS AND DISCUSSION

The data collection indicated that the study population consisted of 753 men (67.4%) and 364 woman (32.6%). It was found that the fracture in the urban area (83.6%) was more than rural area fracture (0.5%) in terms of residential area. The frequency distribution of lower limbs fractures are demonstrated in Table 1.

According to obtained result the most fractures were hip fractures. Also the most and least cause of fractures were related to accidents (60.9%) and assault (0.5%). The highest frequency of lower limbs fractures were in the patient age ranged from (15-24) years that is presented in Table 2.

The age distribution of patients were the average of (34.78 years) and standard deviation of (19.89 years). Furthermore, the maximum frequency of fractures in terms of time related to Summer (28.5%), Autumn (25.7%), Spring (23.3%) and Winter (22.6), respectively. The highest frequency of lower limbs fractures were in the groups ages ranged from 15-24 years (265 patient) and 25-34 years (252 patients) and the lowest frequency related to patient over than 65 years (102 patient). The highest frequency of lower limbs fracture was observed in the ankle, fibuls+tibia 5 and foot and the lowest fractures were occurred in the femur region (40 patients). As shown in Table 3, according to Chi-square test, a statistically significant relationship was observed between the type of fractures (fracture in different region of body) and age groups ($p = 0.001 < 0.05$). The most fracture of lower limbs observed in men.

But according to Chi-square test, there was not a significant relationship between gender and lower limbs fractures at confidence level of 95% (Table 4).

There was not a significant relationship between gender and type of fracture ($p = 0.633 > 0.05$). In present study, the 934 and 183 accidents have happened in urban and rural areas, respectively (Table 5).

According to Chi-square test a significant relationship showed between the frequency of fractures

Table 1: The frequency distribution of lower limbs fracture in terms of number (percent)

Fracture of lower limbs						
Hip	Tight	Foot	Leg	Ankle	Knee	More
8	40	319	188	188	120	178
(7/5)	(3/6)	(28/6)	(16/5)	(16/5)	(10/7)	(15/9)

Table 2: The frequency distribution of lower limbs fracture in terms of age groups (percent)

The age group					
<5	15-24	25-34	35-44	45-54	55-64
133 (11/9)	265 (23/7)	252 (22/6)	148 (13/2)	111 (9/9)	106 (9/5)

Table 3: The frequency distribution of lower limbs fractures corresponding to age groups (percent)

The region fracture	The age group							p-value
	<15	15-24	25-34	35-44	45-54	55-64	>65	
Basin	6 (4/5)	11 (4/2)	14 (5/6)	8 (5/4)	5 (4/5)	16 (15/1)	24 (23/5)	0.00
femur	7 (5/3)	8 (3)	2 (0/8)	4 (2/7)	1 (0/9)	4 (3/8)	14 (13/7)	
Foot	56 (42/1)	65 (24/5)	90 (35/7)	45 (30/4)	32 (28/8)	20 (18/9)	11 (10/8)	
Leg	22 (16/5)	44 (16/6)	36 (14/3)	21 (14/2)	25 (22/5)	20 (18/9)	20 (19/6)	
Ankle	25 (18/8)	54 (20/4)	39 (15/5)	25 (16/9)	20 (18)	13 (12/3)	12 (11/8)	
knee	4 (3)	32 (12/1)	30 (11/9)	15 (10/1)	14 (12/6)	15 (14/2)	10 (9/8)	
More	13 (9/8)	15 (19/2)	41 (16/3)	30 (20/3)	14 (12/6)	18 (17)	11 (10/8)	

Table 4: The frequency distribution of lower limbs corresponding to gender

Gender	The region of fractures						
	Basin (%)	Femur (%)	Foot (%)	Leg (%)	Ankle (%)	Knee (%)	More (%)
Men	55 (7/3)	24 (3/2)	213 (28/3)	129 (17/1)	120 (15/9)	85 (11/3)	127 (16/9)
Women	29 (8)	16 (4/4)	106 (29/1)	59 (16/2)	68 (18/7)	35 (9/6)	51 (14)

Table 5: The frequency of distribution corresponding to the site of living

The region of fracture	The region of accident							p-value
	Knee (%)	Ankle (%)	Leg (%)	Foot (%)	Femur (%)	Basin (%)	More (%)	
Urban area	149 (16)	101 (10/8)	167 (17/9)	134 (14/3)	279 (29/9)	34 (3/6)	70 (7/5)	0/001
Rural area	29 (15/8)	19 (10/4)	21 (11/5)	54 (29/5)	40 (21/9)	6 (3/3)	14 (7/7)	

Table 6: The frequency distribution of fractures corresponding to time (month-year)

The region of fracture	The season				p-value
	Springer	Summer	Autumn	Winter	
Hip	19 (7/3)	25 (7/9)	17 (5/9)	23 (9/1)	0.011
Thigh	0	16(5)	13 (4/5)	11(4/4)	
Foot	46 (29/2)	97 (30/5)	75 (26/1)	71 (28/2)	
Leg	59 (22/7)	35 (11)	50 (17/4)	44 (17/5)	
Ankle	49 (18/8)	53 (16/7)	51 (17/8)	35 (13/9)	
Knee	27 (10/4)	32 (10/1)	34 (11/8)	27 (10/7)	
more	30 (11/5)	60 (18/9)	47 (16/4)	41 (16/3)	

Table 7: The frequency distribution of accident type corresponding to age groups

Type of accident	The age group							p value
	<15	15-24	25-34	35-44	45-54	55-64	>65	
Driving accident	82 (61/7)	146 (55/1)	156 (61/9)	100 (67/6)	78 (70/3)	63 (59/4)	55 (53/9)	0.001
Dispute	0	2 (0/8)	4 (1/6)	0	0	0	0	
Stumble and falls	11 (8/3)	6 (2/3)	4 (1/6)	2 (1/4)	3 (2/7)	2 (1/9)	13 (12/7)	
More	40 (30/1)	111 (41/9)	88 (34/9)	46 (31/1)	30 (27)	41 (38/7)	34 (33/3)	

and living in the urban areas at confidence level of 95% which it means that the frequency of fractures was more in the urban areas ($p = 0.001 < 0.05$). According to chi-square test, a significant relationship was observed between the frequency of fractures and time at confidence level of 95% (Table 6). That it means the difference of fracture frequency at different season ($p = 0.011 < 0.05$).

According to chi-square test, a significant relationship was observed between the type of accident and age groups at confidence level of 95% ($p = 0.001 < 0.05$). As it can be seen in Table 7, the accidents have more happened in the age groups under 45 years in compare to other causes.

CONCLUSION

The numerous publications indicated that almost half of injuries with severe trauma had the limbs fracture and

men more exposed to injuries. It was found that the fracture associated with the age. So that by increment of age, the frequency of fractures increased particularly in femur bone. The large percentage of visitors in emergency were the accident injuries, so identify the incidence of limbs fracture and its mechanism will be helpful aim to provide the required facilities for management the accident injuries. The finding of study indicated that the most common type of fracture in trauma patient were foot fracture (Hoffmann and Glaeske, 2006; Shayesteh *et al.*, 2001).

The result showed that there was a statistically significant relationship between age and type of fractures ($p < 0.05$) that have occurred due to traffic accident.

In study of Sadat and Ameri *et al.*, the average of age were 28.1 and 28.8 years, respectively. It may be attributed to risky behavior in this age ranged of the society which was consistent with result of present study

(Sanchez-Tocino *et al.*, 2007; Ameri, 1996). Also in this study, like other research, men constituted the most trauma injuries. The fracture in men have been reported approximately twice in compare to women fracture. The most injuries in lower limbs reported particularly foot in both gender and likewise the leading cause related to car accidents. In this regard, Søreide *et al* showed that most injuries were in the men (74%) and the same result has been reported by Cothren study (70%) (Lopez , 2005). The result of Sadat and Ameri *et al* revealed that the bone fracture in men were 71% (Sadat *et al.*, 2000) and 70% (Ameri, 1996), respectively which was consistent with present study. It may be related to the presence of men outside the home, working in high places and more use of vehicles (Ameri *et al.*, 2006; Sadat *et al.*, 2000; Søreide *et al.*, 2007; Cothren *et al.*, 2007). The fracture of lower limbs is the most common fractures in accident. Likewise in the present study, the most frequency of lower limbs fractures in both gender were due to car accident as the major cause which was consistent with other publication.

The result of Sanchez *et al* in Spain showed that almost 42% and 14% of severe trauma referred patient to health center suffered from leg bone and hip fractures, respectively. Also the study of Ameri *et al* in Shfayahyaeian Hospital showed that the 925 of cases with hip fracture (41%) (Sanchez-Tocino *et al.*, 2007; Ameri, 1996). In the present study, the most trauma (6.38%) was seen in the urban area that was consistent with the other research. The obtained result indicated that there was not a significant relationship between age and the type of accident ($p>0.05$). The epidemiologic study of fractures based on gender and age pattern have been the subject of many publication over half a century (Shayesteh *et al.*, 2001). However, the epidemiology of any type of fracture is different depends the geographical and social differences and its pattern changes by over the time (Buhr and Cooke, 1959). In this study, the most common trauma mechanism related to the car accident. The result of Mac Nicol *et al* in Northern Ireland indicated that the 71% of the trauma mechanism related car accident and fall from the height.

Cothren *et al* study assessed the epidemiology of urban trauma and the result have shown that the two most common of trauma mechanism were vehicles accident (34%) and fall the height (20%) (Lopez , 2005). The study of Sadat *et al* reported that the fracture caused by fall in the same level (40%), the accident of passer with vehicle (22%) and motorcycle accident (4%) (Shayesteh *et al.*, 2001)

The study of Khatami *et al* showed that the car accident and fall the height (44%) determined as the

leading cause of trauma mechanism. As it can be seen, the car accident regarded as the major cause of bone fracture.

And it should be noted that the adverse effect of traffic accident is not limited only to this issue, because the traffic injuries are the second leading cause of mortality rate in Iran. And this numbers more twice than the global average. The vast majority of people died due to traffic accident were below the 34 years, therefore the burden of traffics accidents are ranked in the maximum level (Green *et al.*, 2010.). Based on obtained data, it is recommended that the prevention strategy should be considered aim to progress the safety of roads in country and implementation the strict regulation for offenders and enhance the quality and safety of car as well. The coordinated activity between the different units such as police, the fire and emergency can be improved the services to accident injuries. This coordination reduces the time of emergency reach to the accident site and performs the vital action.

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REFERENCES

- Abedi, G., I. Ebadattalab and F. Rostami, 2012b. Analyzing quality gap of nursing services in the selective academic hospitals. *Intl. J. Collaborative Res. Internal Med. Public Health*, 7: 1809-1815.
- Abedi, G.A., L. Rostami and F.S. Mohammadi, 2012a. Applying a Model of Patient's Right in the State Hospital, Sari, Iran. *Intl. J. Collaborative Res. Internal Med. Public Health*, 4: 103-110.
- Adesunkanmi, A.R., L.M. Oginni, A.O. Oyelami and O.S. Badru, 1998. Epidemiology of childhood injury. *J. Trauma*, 44: 506-512.
- Ameri, A., 1996. Evaluation of patients referred to the orthopedics department of Shfayahyaeian Hospital in one year. *J. Iran. Univ. Med. Sci.*, 4: 33-38.
- Bakhshi, H., P.M. Asad, M. Kazemi and R.M. Etmnan, 2006. Survey the frequency distribution of injuries in emergency ward of Rafsanjan Medical research & Training Hospital. *J. Payesh*, 5: 113-121.
- Baron, J.A., M. Karagas, J. Barrett, W. Kniffin, D. Malenka, M. Mayor and R.B. Keller, 1996. Basic epidemiology of fractures of the upper and lower limb among Americans over 65 years of age. *Epidemiology*, 7: 612-618.

- Buhr, A. and A. Cooke, 1959. Fracture patterns. *Lancet*, 273: 531-536.
- Bull, J.P., 1979. Accidents and their Prevention. In: *Theory and Practice of Public Health*, Hobson, W., Ed., 5th Edn., Oxford University Press, London.
- Cothren, C.C., E.E. Moore, H.B. Hedegaard and K. Meng, 2007. Epidemiology of urban trauma deaths: A comprehensive reassessment 10 years later. *World J. Surg.*, 31: 1507-1511.
- Fakour, M., S.A. Marashinezhad and S. Vaziri, 2007. A five-year assessment of frequency of extremity fractures in adult patients referring to Ahwaz Imam Khomeini Hospital. *Jundishapur Scient. Med. J.*, 5: 731-734.
- Garraway, W.M., Stauffer R.N., L.T. Kurland and W.M. O'Fallon, 1979. Limb fractures in a defined population. I. Frequency and distribution. *Mayo Clin. Proc.*, 4: 701-707.
- Green, D.P., C.A. Rockwood, R.W. Bucholz, J.D. Heckman and P. Tornetta, 2010. *Rockwood and Green's Fractures in Adults*. Lippincott Williams & Wilkins, Philadelphia.
- Hoffmann, F. and G. Glaeske, 2006. Incidence of hip fracture in Germany--person-related analysis of health insurance population. *Gesundheitswesen*, 68: 161-164.
- Janmohammadi, N., M. Montazeri and E. Akbarnezhad, 2014. The epidemiology of extremity fractures in trauma patients of Shahid Beheshti Hospital, Babol, 2001-2006. *J. Emergency Medicine Iran*, 1: 34-39.
- Kamran, A. and E. Ameri, 2015. Epidemiology of orthopedic trauma in children and adolescent in a referral center in Tehran: A prospective study. *Tehran Univ. Med. J.*, 73: 40-48.
- Kaye, J.A. and H. Jick, 2004. Epidemiology of lower limb fractures in general practice in the United Kingdom. *Inj. Prev.*, 10: 368-374.
- Lopez, A.D., 2005. The evolution of the global burden of disease framework for disease, injury and risk factor quantification: Developing the evidence base for national, regional and global public health action. *Global Health*, Vol. 1. 10.1186/1744-8603-1-5
- Park, J.E. and K. Park, 1991. *Text Book of Preventive and Social Medicine 13th Edn.*, Banarsidas Das Bhanot, Jabalpur, pp: 158-161.
- Rahmani, A., M. Khadem, E. Madreseh, H.A. Aghaei and M. Raei et al., 2013. Descriptive study of occupational accidents and their causes among electricity distribution company workers at an eight-year period in Iran. *Saf. Health Work*, 4: 160-165.
- Sadat, M., M. Zehtab and M. Karami, 2000. Incidence of orthopedic. *United World Rev. Serv.*, 1: 43-51.
- Sanchez-Tocino, J.M., F. Turegano-Fuentes, D. Perez-Diaz, M. Sanz-Sanchez, J. Lago-Oliver, J. Zorrilla-Ortuzar and D. Martinez-Baena, 2007. Severe pelvic fractures, associated injuries and hemodynamic instability: Incidence, management and outcome in our center. *Cirugiaespanola*, 81: 316-323.
- Shaw, K.N. and J.M. Lavelle, 1998. VESAS: A solution to seasonal fluctuations in emergency department census. *Ann. Emerg. Med.*, 32: 698-702.
- Shayesteh, A.M., M.H. Kariminasab, A. Shorofi and A. Khalilian, 2001. Epidemiological study of 1000 musculo-skeletal trauma cases in Sari township in 1998-1999. *J. Mazandaran Univ. Med. Sci.*, 11: 16-23.
- Soreide, K., A.J. Kruger, A.L. Vardal, C.L. Ellingsen, E. Soreide and H.M. Lossius, 2007. Epidemiology and contemporary patterns of trauma deaths: changing place, similar pace, older face. *World J. Surg.*, 31: 2092-2103.