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Traffic Vehicle Accidents And Common Musculoskeletal Disorders In Jeddah City

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Abstract: *The diagnostic radiology has become a key pillar in the last four decades, especially with the progress of technology and medical physics that accelerated the development of radiology stunningly and generally added new features in medicine. This project aims to use the resulting reports in the radiology department at King Abdulaziz University Hospital (KAUH) to explore the musculoskeletal injuries and disorders caused by motor vehicle accidents for different age groups of youth (15 – 25 years old), adults (25 -40 years old) and old adults (>40 years old) as well as to study the relationship of those injuries and disorders with the bone mass index (BMI), where the musculoskeletal system is considered one of the most important support systems in the body. As a result of this study, the male participants (52%) were higher than in females (48%) for all different types of studied injuries. The youths were the dominant injured age group (42%) for all the participants followed by the old adults (32%) while the adult age group was the least (26%). It was found that there is a very high significant relationship ($p<<0.05$) for the degree of freedom ($df = 6$) between BMI and age groups. Youth males are considered as the dominant (30%) of all participants while the least was the older adults (8%) of the total participants. The injured knee in the older adults was the highest ratio (14%) while the lumbar spine injury was completely non-existent in the older adult age group. There was a highly significant relationship ($p << 0.05$, $df = 8$) between the injured regions and age groups. The lumbar spine had the dominant disorders and injuries (30%) compared to the other regions for various BMI categories and also for various age groups. As a conclusion, the authors recommend to establish an awareness campaign to sensitize the community to the disastrous effects that result from traffic accidents, such as all kinds of paralysis, fractures, and the common musculoskeletal injuries. Also, the introduction of awareness campaigns in schools, especially in middle and secondary schools to teach students etiquette and behaviors of traffic, whether pedestrian or drivers to instill in them the necessary concepts of traffic safety since childhood. The authors emphasize to use a seat belt as well as children and infant chairs when they get on the car, and the need to arrest the parents who put their children at risk and they do not implement these recommendations.*

Keywords: *Motor vehicle accident, musculoskeletal injuries, image findings, fractures, X-ray diagnosis.*

I. Introduction

All kinds of radiology are considered the main focus in medical diagnosis for patients' process that is called "Eye of Medicine". So, it allows the professionals to look into/inside the human body with high accuracy, and thus gives the ability to assess the general situation of the patient, and then make the proper diagnosis for him that guide the wizard physician for the appropriate method of treatment. It is certainly true that any error occurring in radiology steps may lead to treatment failure, and may have increased the health status of the patient embarrassment and worse.

Therefore, the diagnostic radiology has become a key pillar in the last four decades, especially with the progress of technology and medical physics that accelerated the development of radiology stunningly and generally added new features in medicine. Radiology department in any hospital is the backbone of any health institute seeking success and to provide high-level of medical services.

As a result, this project aims to use the resulting reports in the radiology department at King Abdulaziz University Hospital (KAUH) to explore the musculoskeletal injuries and disorders caused by motor vehicle accidents for different age groups of youth (15 – 25 years old), adults (25 -40 years old) and old adults (>40 years old) as well as to study the relationship of those injuries and disorders with the bone mass index (BMI), where the musculoskeletal system is considered one of the most important support systems in the body.

Generally, a musculoskeletal system forms approximately 50 - 60% of the body weight, so it may be influenced by many internal diseases, which in turn could increase the incidence of other organs of the body, including the circulatory system and the nervous system.

The musculoskeletal system consists of three general components that depend on each other in order to work correctly. If one of these components is injured, it may lead to defect and ultimately to deterioration of the other two components. Because of this, the musculoskeletal system depends on the circulatory and nervous

systems that support them. Musculoskeletal injuries are likely to lead to damage any of these two systems, and the occurrence of damage to the circulatory or nervous system lead to a malfunction or deterioration in the musculoskeletal system. [1]

Injuries are the highest causes of death and disability in human kind. In previous, the investigators reported that car accidents were the leading cause (39.3%) of musculoskeletal injuries in 150 patients. The major public health problem was pediatrics' injuries that are caused by road traffic accidents (RTAs) especially when they are not properly seated. [2]

In developed countries, the important cause of childhood morbidity and mortality is trauma while in modern societies trauma causes a higher loss of life rates. In the primary school, children and lower ages are at higher risks for musculoskeletal injuries because they are simply unable to avoid many hazards of injuries due to their lower judgment capability thus find themselves in large danger of accidents. The causes and ways of pediatric injuries vary based on many factors e.g. socioeconomic status, geographic area, and environment factors. [3]

This study aims to provide a better understanding of injury patterns in patients undergoing medical imaging that are caused by the motor vehicle accidents, and so the results that have been obtained by this work will be necessary for the development of prevention strategies in addition to best practice treatment protocols.

Musculoskeletal disorders are considered as one of the most common causes of disability for people in most parts of the world. The musculoskeletal pain, in adults, is a common reason for care seeking, especially in primary health care facilities, where they are usually assessed and managed. In children and adolescents, the understanding and awareness of these conditions is important for the development of effective prevention strategies and to provide a better understanding of the origin and evolution of chronic pain in adulthood. [4]

The number of musculoskeletal injuries sustained by adolescents has risen significantly. This may reflect the increasing use of motorized and high-speed-wheeled vehicles among this population. It is important to recognize the fundamental skeletal differences between children and adults, the signs and symptoms of common fractures, sprains, strains, and dislocations, initial treatment and the stability of these injuries in children. [5]

Radiographs are most useful in the evaluation of bone defects and abnormalities such as fractures, dislocations, and osteoarthritis. Radiography is the least expensive imaging methods [6,7].

Fractures and sprains/strains made up almost 90% of all musculoskeletal injuries in patients aged 5–24 years. The most common sprain/strain was an ankle strain, followed by muscle strain and back strain. Radial and metacarpal fractures were the most common fractures. A further 5% of injuries represented an acute internal damage to the knee, and the remaining 5% was made up of dislocation/subluxation, shoulder syndrome. Gender-specific rates showed that males aged 5 – 24 years were managed for a musculoskeletal injury more than twice as often as females from the same age group. An age breakdown found that those aged 5–9 years experienced the lowest management rate of musculoskeletal injuries in the group, while those aged 10–14 were managed almost three times more often. [8]

Paracetamol, followed by ibuprofen, diclofenac and paracetamol/codeine were the most common medication. Clinical treatment (mainly advice/education and counseling) or a procedural treatment was provided for half of all musculoskeletal injury problems. Almost half of the procedural treatments were for repair/fixation-suture/cast, and a further 28% for dressings/compression. Almost half of all referrals were to a physiotherapist, followed by those to an orthopedic surgeon. An X-ray was ordered for a third of all problems, most commonly of the ankle and wrist.

Musculoskeletal injury has significant effects on the local soft tissues around the injury as well as an effect on the entire physiology of the patient. The greater the energy force, the greater the damage and hence the more components involved, and the more the injury to this axial limb segment, the more likely the compromise to the patient's overall condition and care. [9]

Musculoskeletal pain diseases involve an injury or disorder of the muscles, tendons, ligaments, joints, cartilage and spinal discs and constitute the most prevalent, costly, disabling, and commonly researched conditions in the workplace. [10]

In another study which provides useful information about patients whom had moderate or severe persisting disability and chronic pain five years after severe injuries, multiple extremity injuries or combinations of pelvic and lower extremity or shoulder girdle and upper extremity injuries were much more likely to have continuing disability compared with those sustaining single bone injuries of that limb. [11]

An overview is given of the occurrence and risk factors of the most common musculoskeletal disorders, back and neck disorders, osteoarthritis, upper limb disorders, and osteoporosis. The point prevalence of clinically verified low back pain syndrome was 17.5% in men and 16.3% in women. Recent studies have revealed that the prevalence of low back and neck disorders already starts to increase in the adolescence. There also seems to be an association between the development of disc degeneration and low back pain among the young. [12]

The most prevalent disorders are low back pain, osteoarthritis, and a so-called soft tissue rheumatism. Even though they afflict millions of persons around the world, several of the common musculoskeletal disorders fall into the category of moderately prevalent, including gout, a form of episodic arthritis; fibromyalgia, a disorder of diffuse muscular pain and a subtype of soft tissue rheumatism; and rheumatoid arthritis, an inflammatory systemic disorder that causes widespread joint pain.

Low back pain, being one of the most frequent of musculoskeletal disorders, affects up to 80 percent of people sometime in their lives. Generally, the pain is in the lower back on one or both sides. In most persons the cause of back pain is unknown. It may arise from any number of pain sensitive structures in the lumbar spinal column, including joints, ligaments, muscles, and soft tissues. Persons at high risk of low back pain include those between age twenty and forty, and those whose jobs involve physical labor—especially lifting, pushing, or pulling heavy objects, or twisting during lifting. Another risk factor for low back pain is cigarette smoking, and poor physical fitness may also contribute to its occurrence. Osteoarthritis is the most common form of arthritis and, depending on how it is defined, affects 10 to 20 percent of all adults and a much larger percentage of the elderly. [13]

Andersson et. al (1984) found a lifetime incidence of spinal disorders ranging from 51.4% to 70%. The prevalence of musculoskeletal disorders was predicted to increase to 18.4% in 2002. Furthermore, Bergman and colleagues (2001) examined the prevalence of chronic musculoskeletal pain (CMP) among the population of a subsection of southwest Sweden, and found a 34.5% rate of musculoskeletal pain. They note, however, that other studies have found a lower prevalence and the musculoskeletal pain prevalence was associated with age, gender, socioeconomic status and ethnicity. The lifetime incidence of musculoskeletal pain has been found to range from 15% to 80%, and it is expected to increase (Anderson et al., 1984; Cats-Baril and Frymoyer, 1991; National Research Council, 2001.) Prolonged loading on the muscles may result in permanent changes in the structure of the muscle that may lead, over time, to injury. [14]

Injuries to the lower extremities are most common, with the majority of injuries resulting from nobody contact. Ankle injuries account for 16% to 29% of these injuries and are more frequent in male players. Knee injuries occur in 7% to 36% of injured players and are seen more frequently in females. The lower leg (5%–6%), upper leg (9%–22%) and groin/torso (5%) are less commonly affected. Contusions and sprains/strains of the lower extremities are the most common injury types more sprains and strains are seen in the emergency department setting than either contusions/abrasions or fractures. The musculoskeletal system is the structural movement-generating component of the body. [15]

Based on the previous works and investigations, this study was conducted in order to detect the most common musculoskeletal disorders in various musculoskeletal system injuries by observing the clinical indications via images and to help the local community in reducing the common musculoskeletal indications caused by motor vehicle accidents and determining the site of injuries with further investigations on how to prevent it. Further education to a local community in preventing and limiting personal injury especially in younger age groups is recommended. Also, the authors intend to explore the highest significant common injury and indication of the different musculoskeletal systems.

II. Materials and Methods

A permission to start this survey by the authors at the department of radiology at King Abdulaziz University Hospital (KAUH) and then collecting the required data to finalize this study was given by KAUH ethics commission and the ethical approval had been obtained.

A study plan was settled and followed by building an appropriate questionnaire to be inquired by patients and cover mainly prospective studies of randomly selected patients who came to an emergency unit and the outpatient from other departments at KAUH in Jeddah.

The study subjects consist of both genders; males and females that investigated randomly by collecting data from PACS unit that exists in the radiology department in KAUH. The total participants (>15 years old) had a mean age of 32.80 ± 0.64 years, a mean height of 162.50 ± 0.31 cm, a mean mass of 71.50 ± 0.87 kg, and a mean BMI of 27.10 ± 0.33 kg/m^2.

The height of patient was measured in centimeters divided by body mass in kilograms (using a suitable meter-machine and balance that was available in the department) to determine the BMI. After that, the measurements were categorized into underweight (under or equal to 18.5 kg/m^2), normal weight (18.5 to 24.9 kg/m^2), overweight (25 to 29.9 kg/m^2) and obese (over 30 kg/m^2). [16]

We developed a questionnaire to collect data and it had two parts, the first part was patient demographic data, and the second part was for determining the incidences and regions (knee "K", upper limb regions "UP", other lower limb regions "LO", spine "SP" and pelvis "PL") of different type of injuries and disorders. After finishing from collecting data, SPSS 15.0 program for Windows was used for statistical analyses purposes. Data are presented using descriptive statistics, and were analyzed using the chi-squared test.

Normal radiographic images for different parts and organs were retrieved from PACS followed by printing the medical report and rely on both of them to fill our data sheets and questionnaire with required information as it is illustrated in Figure 1. The Figure shows some of the normal X-ray image findings for different regions in the human body such as; (a) other lower limb regions for youth's normal image, (b) Anterior-Posterior (AP) position of the right shoulder and (c) knee for adults' normal image; used as a reference for other injured regions for comparison and completing our study.

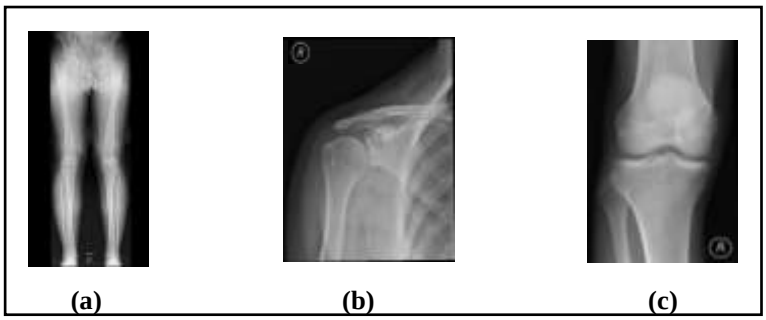


Figure 1. Normal X-ray image findings for different regions.

After that, a health education programs will be designed and ready for implementation in the future to indicate the significant factors and best practice to prevent those injuries to be happened, especially in focused groups of elderly people.

III. Results

The nature of the Saudi society and community is characterized as the probability of external duties of males are higher than the females, and the enjoyable luxury life of most Saudi women with the existence of home-servants, which in turn reduces the proportion of injuries in the females in Saudi society. Nevertheless, it is cleared through the study's findings that the male ratio (52%) is higher than in females (48%) for all different types of studied injuries.

The age groups were classified into three main categories, i.e., youths (15 – 25 years old), adults (25 – 40 years old) and older adults (>40 years old). The musculoskeletal injuries caused by the motor vehicle accident were studied based on those age groups as seen in Table 1. Generally, the youths were the dominant injured age group (42.0%) for all the participants in this study followed by the old adults (32.0%) while the adults' age group was the least (26.0%).

Table 1. Distribution the musculoskeletal injuries for all age groups.

Age group	Frequency (N)	% N
Youth	210	42%
Adult	130	26%
Older adult	160	32%
Total	500	100%

For all musculoskeletal injuries' cases, the BMI was studied for all age group ages where it was found there is a very high significant relationship ($p = 4.70 \times 10\text{-}27$, i.e., $p << 0.05$) for degree of freedom is ($df = 6$) between BMI and age groups as seen in Table 2. Most of the injured cases were had the normal weight (38%) where the youth consists of the majority of all other age groups (24%) in the normal weight category. Comparing males with females, it was noted that in males the relationship is much significant ($p = 1.85 \times 10\text{-}6$, i.e., $p << 0.05$) than female ($p = 0.043$) for the same degree of freedom ($df = 6$).

Youth males are considered as the dominant that were 30% of all participants as it was expected while the least was the older adults with 8% of the total participants as illustrated in Table 3. It is seen also that the injured knee in the older adults was the highest ratio (14%) while the lumbar spine injury was completely non-existent in the older adult age group. Table 3 shows the distribution of the injured regions caused by motor vehicle accident for various age groups where it was found that the upper limb region injuries formed 14% of the total participants similarly to the lumbar spine. Then, it results that there was a highly significant relationship ($p = 6.5 \times 10\text{-}20$, $p << 0.05$, $df = 8$) between the injured regions and age groups.

Table 2. The BMI for various age groups and all genders (N = 500).

	BMI (kg/m^2)*				
Gender	**Under weight**	**Normal weight**	**Over weight**	**Obese**	**Total**
Youth	4%	24%	12%	2%	42%
Adult	4%	8%	2%	12%	26%
Older adult	4%	6%	14%	8%	32%
Total	12%	38%	28%	22%	100%

***$p = 4.70 \times 10^{-27}$, $p << 0.05$, df = 6**

Table 3. Injured regions caused by motor vehicle accident for different age groups.

	Gender		Injured regions*					
Age Groups	**Male**	**Female**	**UP**	**LO**	**PL**	**K**	**SP**	**Total**
Youth	30%	12%	6%	6%	6%	12%	12%	42%
Adult	14%	12%	6%	8%	6%	4%	2%	26%
Older Adult	8%	24%	2%	8%	8%	14%	0%	32%
Total	52%	48%	14%	22%	20%	30%	14%	100%

***$p = 6.5 \times 10^{-20}$, $p << 0.05$, df = 8**

The injured regions were compared to the BMI as shown in Table 4. It was found also there is a highly significant relationship (p = 8.40 × 10-20, p << 0.05, df = 12) between both of them. It was noted that the most injured cases (50%) fall in the overweight and obese BMI categories while 38% was in normal weight category alone. It is clearly that there were no injured cases in the upper limb and pelvis regions for underweight as same as for the overweight in the upper limb region.

Table 4. Injured regions caused by motor vehicle accident injury for different BMI categories.

	Injured regions*					
BMI (kg/m^2)	**UP**	**LO**	**PL**	**K**	**SP**	**Total**
Underweight	0%	4%	0%	6%	2%	12%
Normal weight	12%	6%	6%	8%	6%	38%
Overweight	0%	6%	8%	10%	4%	28%
Obese	2%	6%	6%	6%	2%	22%
Total	14%	22%	20%	30%	14%	100%

***$p = 8.40 \times 10^{-20}$, $p << 0.05$, df = 12**

During this study, many types of disorders and injuries for the various injured regions were counted and observed. Table 5 and Table 7 list and show the type of disorders and then compared them with the BMI and age groups respectively. The normal cases in each table were 46% comparing with the total other types of disorders that formed 54% where the fracture cases were formed 20% out of 54% of the total type of disorders. Through those data in Table 5 and Table 7 it is cleared that there is a significant relationship ($p << 0.05$, df = 36 and df = 24) between the BMI and age groups respectively and all the type of disorders and injuries.

The lumbar spine had the dominant disorders and injuries (30%) compared to the other regions for various BMI categories and also for various age groups as illustrated in Table 6 and Table 8.

Table 5. Total type of disorders and injuries for various BMI categories in all injured regions.

	BMI (kg/m^2)*				
Type of disorder	**Under weight**	**Normal weight**	**Over weight**	**Obese**	**Total**
Degenerative changes	2%	0%	4%	4%	10%
Normal	2%	18%	16%	10%	46%
Fracture	4%	10%	2%	4%	20%
Spondylolisthesis	2%	0%	0%	0%	2%
Spur	0%	0%	2%	2%	4%
Palatine tonsils	0%	2%	0%	0%	2%
Mild narrowing	2%	0%	0%	0%	2%
Intact atlantoaxial interval	0%	2%	0%	0%	2%
Multiple Phlebolith	0%	0%	2%	0%	2%
Sclerotic region	2%	0%	0%	0%	2%
Decreased bone density	0%	0%	2%	2%	4%
Osteoporosis	0%	0%	2%	0%	2%
Foreign body	0%	0%	2%	0%	2%
Total	14%	32%	32%	22%	100%

***$p = 4.60 \times 10^{-63}$, $p << 0.05$, df = 36**

Table 6. Disorders and injuries for different BMI categories in each injured region individually.

		BMI (kg/m^2)*				
Injured region	**Type of disorder**	**Under weight**	**Normal weight**	**Over weight**	**Obese**	**Total**
UP	**Degenerative changes**	2%	0%	0%	0%	2%
	Normal	0%	4%	4%	2%	10%
	Fracture	0%	2%	0%	0%	2%
	Total	2%	6%	4%	2%	14%
LO	**Spondylolisthesis**	2%	0%	0%	0%	2%
	Spur	0%	0%	2%	2%	4%
	Normal	2%	2%	2%	4%	10%
	Fracture	0%	4%	2%	0%	6%
	Total	4%	6%	6%	6%	22%
K	**Fracture**	0%	4%	0%	4%	8%
	Normal	0%	2%	6%	2%	10%
	Degenerative changes	0%	0%	2%	0%	2%
	Total	0%	6%	8%	6%	20%
SP	**Normal**	0%	4%	2%	0%	6%
	Palatine tonsils	0%	2%	0%	0%	2%
	Mild narrowing	2%	0%	0%	0%	2%
	Intact atlantoaxial interval	0%	2%	0%	0%	2%
	Multiple Phlebolith	0%	0%	2%	0%	2%
	Sclerotic region	2%	0%	0%	0%	2%
	Degenerative changes	0%	0%	2%	4%	6%
	Decreased bone density	0%	0%	2%	2%	4%
	Osteoporosis	0%	0%	2%	0%	2%
	Fracture	2%	0%	0%	0%	2%
	Total	6%	8%	10%	6%	30%
PL	**Fracture**	2%	0%	0%	0%	2%
	Normal	0%	6%	2%	2%	10%
	Foreign body	0%	0%	2%	0%	2%
	Total	2%	6%	4%	2%	14%

Table 7. Total type of disorders and injuries for different age groups in all injured regions.

	Age groups			
Type of disorder	**Youth**	**Adult**	**Older adult**	**Total**
Degenerative changes	0%	0%	10%	10%
Normal	24%	16%	6%	46%
Fracture	10%	6%	4%	20%
Spondylolisthesis	0%	0%	2%	2%
Spur	0%	2%	2%	4%
Palatine tonsils	2%	0%	0%	2%
Mild narrowing	2%	0%	0%	2%
Intact atlantoaxial interval	2%	0%	0%	2%
Multiple Phlebolith	0%	2%	0%	2%
Sclerotic region	0%	0%	2%	2%
Decreased bone density	0%	0%	4%	4%
Osteoporosis	0%	0%	2%	2%
Foreign body	2%	0%	0%	2%
Total	42%	26%	32%	100%

***$p = 7.5 \times 10^{-61}$, $p << 0.05$, df = 24**

Table 8. Disorders and injuries for different age groups in each injured region individually.

		Age groups			
Injured region	**Type of disorder**	**Youth**	**Adult**	**Older adult**	**Total**
UP	**Degenerative changes**	0%	0%	2%	2%
	Normal	4%	6%	0%	10%
	Fracture	2%	0%	0%	2%
	Total	6%	6%	2%	14%
LO	**Spondylolisthesis**	0%	0%	2%	2%
	Spur	0%	2%	2%	4%
	Normal	2%	6%	2%	10%
	Fracture	4%	0%	2%	6%
	Total	6%	8%	8%	22%
K	**Fracture**	2%	4%	2%	8%
	Normal	4%	2%	4%	10%

	Degenerative changes	0%	0%	2%	2%
	Total	6%	6%	8%	20%
SP	**Normal**	6%	0%	0%	6%
	Palatine tonsils	2%	0%	0%	2%
	Mild narrowing	2%	0%	0%	2%
	Intact atlantoaxial interval	2%	0%	0%	2%
	Multiple Phlebolith	0%	2%	0%	2%
	Sclerotic region	0%	0%	2%	2%
	Degenerative changes	0%	0%	6%	6%
	Decreased bone density	0%	0%	4%	4%
	Osteoporosis	0%	0%	2%	2%
	Fracture	0%	2%	0%	2%
	Total	12%	4%	14%	30%
PL	**Fracture**	2%	0%	0%	2%
	Normal	8%	2%	0%	10%
	Foreign body	2%	0%	0%	2%
	Total	12%	2%	0%	14%

IV. Discussion

Some people left out on the results of traffic accidents, such as the physical disabilities that are suffered by road users, whether they are drivers or pedestrians. It is wrong if anyone believes that disability is only a result of the genetic or congenital causes, and he is forgetting the most important gained reasons that lead to permanent disability such as amputation and paraplegic injury as a result of traffic accidents.

So, there are a few questions that should be answered. Are the traffic accidents causing permanent disability for individuals? What percentages of disability resulting from traffic accidents? What efforts by the country to curb traffic accidents? What is the role of the traffic awareness to show and define the dangers of the traffic accidents and to increase the awareness of individuals?

Traffic accidents are the most important and the most serious problems facing communities around the world, where it drains a great deal of human resources, cause significant economic losses, and significant social effects. The world Health organization (WHO) confirms that all road accidents are the second major cause of death among the world's population, especially in the age group of 5 years to 29 years. It is also the third leading cause of death among the world's population in the age group of 30 years to 44 years. Road accidents kill about 1.3 million people annually and lead 50 million people worldwide for injury and disability according to the Emirates Association for Traffic Safety. The cost of injuries caused by road accidents in developing countries is about $ 65 billion annually.

Traffic accidents are considered as the streets of terrorism, not less dangerous for criminal organized terrorism, where Saudi Arabia occupies an advanced level globally in the number of road accidents. Depending on the Traffic Department statistics, the number of victims of road accidents in 2011 amounted to more than 7153 people, a figure that exceeds the number of victims of violence in Iraq, in the same year, which amounted to about 4,200 people, and it is higher than the number of Gulf War victims who reached 5,200 people only. It has been asserted that the number is steadily increasing and is expected to reach in 2019 to 9600 people a year.

Most of the accidents occur due to the human mistakes, especially the high speed, in addition to crossing the traffic light, driving the vehicles by the non-qualified drivers, and using the vehicles for the purpose that is not prepared for it to be used. The high accident injuries deplete the health efforts and occupies one-third of the capacity of governmental hospitals, and cause a beds crisis in hospitals, where the proportion of occupied beds incidents of 30 out of 100 beds.

A statistical report issued by the Ministry of Municipal and Rural Affairs in January 2016 shocked the Saudi society, when it detected the high mortality rate among males 62% of all deaths in Saudi Arabia, while female deaths registered with the ministry 38% of all deaths, which means an imminent danger of losing the first energy that the future of the country depends on.

According to the report, Riyadh's region experienced the highest number of total deaths for both genders, followed by Makkah and then Jeddah came in third, while Al-Ahsa and Hafr Al-Batin were less cities in the number of deaths recorded in the municipalities during 2015. The report emphasized increasing the proportion of male mortality in all Saudi Arabian areas. The highest rate of death for males was 68.3% in Hail's region, followed by Riyadh's region, which the male mortality formed 65% of deaths, compared to 35% for females.

Al-Ahsa came in the third, where the mortality rate for males in which more than 64% compared to 36% for females, and each of Hafr Al-Batin and Jeddah had the least percentage of male mortality, as only in Hafr Al-Batin 57.2%, versus 42.8% for females, while in Jeddah it is recorded as 57.7% for males and 42.3% for females. If we concentrate on Jeddah region, its results were approximately approached to our results in this study where the musculoskeletal injuries were 52% for males while 48% for females.

The direct cause of the high mortality rate among males than females is primarily traffic accidents, where the daily incidents caused the death of 1225 people in Saudi Arabia during 2015, according to the traffic department statistics. This is because of a man's lifestyle in Saudi society, which is very different from a woman's lifestyle; where the man is the most friction and contact with what goes on around him partly.

The majority of males go to work, universities and schools daily, while many Saudi women commit their homes to practice other roles, especially when we talk about the Saudi women's lives in areas where the scenes of modernity are less compared to those characterized by large cities. Those reasons make males the most likely for death.

Most of the deaths occur among the youth, and it continues to increase, thus possibly Saudi Arabia occupies the first place in the world in terms of the mortality rate due to motor vehicle accidents. Those results are compared to our results where around 42% of the total participants were youths of both genders which confirm the results that came out from the report.

In our study, most of the musculoskeletal injuries were due to motor vehicle accidents that occurred during the daytime, as the likelihood of accidents occurring within cities is more than abroad. Most of the traffic accidents are the result of car crash and collisions due to excessive speed.

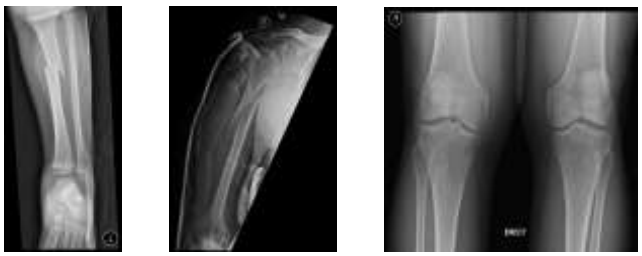
Traffic accidents are the first cause and the most important in the incidence of spinal cord injuries, which are the fraction of the overall injuries, and when it is incorporated into the multiple fractures in other parts of the body such as brain injuries, chest, abdomen and other injuries and deaths resulting from traffic accidents, we see that there are a clear real danger and great suffering of the people in this country either as a result of the erroneous methods they adopt when driving or as a result of wrong methods that are adopted by other drivers on the roads.

Unfortunately, the spine fractures in both the cervical spine and thoracic spine or lumbar region due to traffic accidents is a very common thing in Saudi Arabia as a result of the vast amount of traffic accidents. Often accompanying these fractures are different intensity in the spinal cord and peripheral nerve injuries. It is clear from the results in this study that 12% of the youth injured in the spine as same as the knee.

Through the current study, there is a close relationship between BMI and the injured regions as well as with the type of disorders. It was found that 50% of the participants had an overweight and obese for all injured regions. Obviously, a 20% of all the type of disorders and regions belong to fractures while the other type of disorders formed 34% and the normal cases were 46%.

Therefore, if a traffic accident has occurred, the probability of the severity of the injury will increase by the size of the person and thus affect the injured region in the body. In addition, the nature of the traffic accident, the location of the person; whether he is sitting in the front or in the back of the vehicle, or pedestrian, all of these will inevitably affect the region, type and severity of the injury.

The most common musculoskeletal disorder is related to fracture and is more likely to happen in youth age group, followed by adult and older adult as shown in Figures 2a, 2b, and 2c respectively. Figure 2a shows the comminuted left mid-shaft tibia fracture with associated a lateral displacement and soft tissue swelling while Figure 2b illustrates the evidence of displaced comminuted fracture noted at the surgical neck and the proximal diaphyseal part of the right humerus with the adjacent soft tissue swelling. On the other hand, Figure 2c shows a minimal degenerative change in the form of osteophyte formations and subchondral sclerosis mainly seen at the medial compartments.



(a) **(b)** **(c)**

Figure 2. The most common musculoskeletal disorder is related to fracture and degenerative changes.

From the current statistics and data in our study and previous statistics, it is clear to us how dangerous the result of traffic accidents, caused loss of life and affect a large proportion of individuals a permanently disabled, and the consequent social and economic effects are reflected on the individual and society. Road accidents have contributed in addition to some other factors in the increase in some social groups as disability cases, orphanhood, widowhood, divorce and other cases, where most of the injured are males, and individuals of youth and adult people are in the age of productivity and earning capacity, so families will suffer financially in case they die or become disabled.

The most productive groups in the work are those ranging in age between 20 and 44 years old. What is regrettable, it is also the hardest hit as a result of traffic accidents on the roads, whether deaths or injuries or deficit, and then the negative effects over the loss of the contributions and efforts of factors in this age category, harmless and having an impact on the development of the economies of the country.

The real productivity losses are represented in the value of the lost gains for the injured persons that are linking with the medical treatment costs. These costs may be huge and reached to a high level, especially if the treatment process for the unknown period for severe cases of injury or permanent disability, where those cases are required long-term for medical care and rehabilitation directly and indirectly.

V. Conclusion

The traffic awareness may be defined as the driver to know the rules and instructions of traffic and etiquette or the knowledge of pedestrians and road users to the rules and etiquette of traffic and the crossing places of pedestrians.

The traffic awareness in economic terms means the knowledge of traffic rules to prevent the occurrence of potential danger as a result of the use of the individual to his vehicle, or to reduce the value of damage caused by the non-conscious use of traffic that limits the human and material losses as a result of the incident.

In fact, there are a lot of steps that the whole community must take to care about it and to reduce the phenomenon of traffic accidents and their consequences and to reduce the phenomenon of spinal cord injuries that resulted from these incidents. Some of the suggested steps are: knowledge of traffic rules and regulations, awareness of the dangers of the use of vehicles, awareness of others mistakes and work on how to avoid them and lastly avoiding the potential dangers.

The authors recommend establishing an awareness campaign to sensitize the community to the disastrous effects that result from traffic accidents, such as all kinds of paralysis, fractures, and the common musculoskeletal injuries. Also, the introduction of awareness campaigns in schools, especially in middle and secondary schools to teach students etiquette and behaviors of traffic, whether pedestrian or drivers to instill in them the necessary concepts of traffic safety since childhood. The authors emphasize to use a seat belt and children and infant's chairs when they get on the car, and the need to arrest the parents who put their children at risk and they do not implement these recommendations.

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