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A 15-year personal experience in managing orthopedic and hip fracture cases in Ninawa (Iraq)

Husham A. Salih, Bara H. Abdulkareem, Riyadh K. Lafta

ABSTRACT

Aims: Iraq is an example of the conflict-affected countries as it has been exposed to large-scale traumatic events since 1980 in addition to the economic sanction and continuous acts of violence which resulted in increasing numbers of injuries to summarize a 15-year experience and workload of an orthopedic surgeon during a period of conflict in the second largest governorate in Iraq. Methods: This is a case series hospital-based study that was conducted in department of orthopedics of three major hospitals in Mosul city, the center of Ninawa (the second largest Governorate in Iraq). The data included all the records of the patients that have had orthopedic surgical operations of different types through the period from 1999 to 2014. Results: The results showed that more than 80% of the cases age below ten years with an obvious difference between females and males (68% versus 32%). Developmental hip dysplasia forms the highest percentage of the cases (78.6%), fractures around hip (intracapsular, extracapsular, acetabulum and subtrochanteric) form 11.5%, while the lowest percentages registered in avascular necrosis and tumor were 0.8, and 0.7% respectively. Conclusion: The achievement of such a large number of surgical operations represents a real challenge considering the disastrous situation that Iraq has passed through during the last two decades in all aspects especially security threats and the rapid deterioration in health services.

Keywords: Acetabulum, Extracapsular, Hip fracture, Intracapsular, Orthopedic, Personal experience, Subtrochanteric

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INTRODUCTION

Orthopedicians of the 17th and 18th century had a large body of knowledge on crippling deformities. Improved surgical techniques and applied bioengineering have changed the practice of orthopedic in the last 50 years [1]. The most common daily orthopedic problems that we are facing in the city are developmental dysplasia of the hip (DDH), hip fractures and osteoarthritis.

Incidence of DDH in infants varies between 1.5 and 20

per 1000 births, more common among girls because of the female fetus hormone "relaxin" that may contribute to increased joint laxity [2].

The number of hip fractures worldwide is expected to increase from 1.7 million in 1990 to 6.3 million in 2050 [3]. Acetabular fractures are increasing in developing countries as a result of rise in incidence of road traffic accidents. Certain type of acetabular fractures can be treated conservatively with good outcome, but in the absence of facilities to get operated, some patients are treated with skeletal traction and prolonged bed rest leading to joint stiffness, DVT, and hypostatic pneumonia [4, 5]. Sub-trochanteric accounts for 3.9% of all the proximal femoral fractures and the average affected age is 74 years. It is common in older patients after low energy trauma along with osteoporosis or as pathological fractures (17%) due to metastatic deposits, and in younger patients with high energy trauma such as motor vehicle accident or fall from height, while 90% of these fractures in elderly people result from a simple fall. Women outnumber men by a ratio of 3:1 [6, 7].

The prevalence and burden of all osteopenic hip fractures, continue to be a concern. In patients age more than 60, there has been a 2.4-fold increase in the incidence of acetabular fractures over the past 25 years, with geriatric patients been the fastest growing subgroup [8].

Osteoarthritis (OA) is the most common joint disorder in the world. In USA, it is second only to ischemic heart disease as a cause of work disability. In women age 55 to 64, the reported prevalence of radiographic OA in the knee is 7.5%, while in women age more than 65, the prevalence increases dramatically to 20.3% [9]. Recent cohort and community-based studies have further documented the prevalence of osteoarthritis at different joints, based on radiographic findings and/or patient report [10, 11].

Septic arthritis of the hip is extremely important because of its potential consequences. The age range for its incidence includes neonates to elderly. Among children, the hip is the joint most affected; whereas in adults, the hip is second to the knee [12, 13].

Situation in Iraq

Iraq is an example of the conflict-affected countries as it has been exposed to large-scale traumatic events since 1980 in addition to the economic sanction and continuous acts of violence which resulted in increasing numbers of injuries [14], disabilities and deaths [15]. There have been many reports about violence in Iraq during the years of intense conflict. However, disabilities from these years have not been widely documented [16]. The poor staffing and equipping of health facilities after the 2003 invasion has worsened the situation [17].

The objective of this study was to summarize a fifteen-year experience and workload of an orthopedic surgeon during a period of conflict in the second largest governorate in Iraq.

MATERIALS AND METHODS

This is a case series hospital-based study that was conducted in the department of orthopedics of three hospitals: one major surgical hospital (Al-Jumhuri Teaching Hospital) and two private hospitals in Mosul city, the center of Ninawa (the second largest Governorate in Iraq). The surgical wards in these hospitals (with its emergency units) are working day round and receiving cold and emergency cases from different residential areas, sectors and districts of Mosul city and the whole (Ninawa) Governorate. The data included all the records of the patients that have had orthopedic surgical operations of different types through a period extended from 1999 to 2014. A verbal consent was taken from each patient to publish the information after assuring them that it will not be used but for research purposes.

Al-Jumhuri Teaching Hospital is the main Medical campus that comprises almost all surgical specialties in Mosul city with a capacity of 500 beds. It drains the patients from almost all the districts and sectors of Ninawa Province in addition to the attendees from adjacent governorates, So, we are relatively confident that the sample included in this study was representative for Ninawa governorates, it also represents -accordingly- different socio-economic strata (elite, public and urban).

All the patients' admission and operation details for the studied years were collected, revised, computed, organized and tabulated to list out the bulk and profile of the orthopedic cases and operations that have been done by the researcher during the period of fifteen years.

RESULTS

The results showed that out of the total (2379) surgical operations done; more than 80% of the cases age below 10 years with an obvious difference between females and males (68% versus 32%) (Table 1). Developmental hip dysplasia forms the highest percentage of the cases (78.6%), fractures around hip (Intra-capsular, extra-capsular, acetabulum and sub-trochanteric) form 11.5%, while the lowest percentages registered in avascular necrosis and tumor were 0.8, and 0.7% respectively as given in Table 2 which also indicates a highly significant association between the type of the orthopedic problem and gender ($p < 0.0001$). The DDH was seen much more among females than males (74.9% versus 25.15%), the same finding was true for other hip orthopedic abnormalities (68.2% in females), while the results revealed male preponderances with different percentages for tumor (81.3%), avascular necrosis (78.9%), irritable hip (76.9%), infection (62.5%), cerebral palsy (61.9%), and fracture around the hip (57.3%).

Table 3 demonstrates the age distribution of all surgical problems; the highest percentage for developmental hip dysplasia (94.4%) was among patients less than ten years of age, and the same was for cerebral palsy (100%),

Table 1: Distribution of cases according to age and gender

Age (years)	Gender			
	Male		Female	
	No	%	No	%
<10	520	27.2	1394	72.8
10---	55	40.1	82	59.9
20---	34	82.9	7	17.1
30---	33	75.0	11	25.0
40---	40	81.6	9	18.4
50---	16	34.8	30	65.2
60---	33	40.7	48	59.3
70---	17	44.7	21	55.3
=>80	14	48.3	15	51.7
Total	762	32.0	1617	68.0
p-value	0.0001* (Highly significant)			

Table 2: Distribution of all surgical problems by gender

Diagnosis	Gender					
	Male		Female		Total	
	No	%	No	%	No	%
Developmental hip dysplasia	469	25.1	1401	74.9	1870	78.6
Fracture hip (intracapsular, extracapsular, acetabulum, subtrochanteric)	157	57.3	117	42.7	274	11.5
Cerebral palsy	52	61.9	32	38.1	84	3.5
Others (Osteoarthritis, Pathological dislocation, Rotational abnormality, Coxa vara, Polio)	21	31.8	45	68.2	66	2.8
Irritable hip	20	76.9	6	23.1	26	1.1
Infection	15	62.5	9	37.5	24	1.0
Avascular necrosis	15	78.9	4	21.1	19	0.8
Tumor	13	81.3	3	18.8	16	0.7
Total	762	32.0	1617	68.0	2379	100
p-value	0.0001* (Highly significant)					

"different orthopedics problems" formed a percentage of 31.8%, Irritable hip (53.8%), Infection (62.5%) and tumors (43.8%) for the same age group. Fractures around the hip formed 27.4% for patients around 60 years, while avascular necrosis formed 31.6% for the age (30–40) years.

Table 4 illustrates the orthopedic problems around the hip by gender; intracapsular fracture around the hip formed 54.6% mainly for females, while males registered higher percentages for: extracapsular fracture (64.5%), subtrochanteric (66.7%) and acetabulum fracture (88.9%). On the other hand, the highest percentages shown in females were for rotational abnormality (55.6%), pathological hip dislocation (64.5%), osteoarthritis of the hip (69.7%), coxa vara (75%), and poliomyelitis 100%.

Table 5 demonstrates the percentages of the "around the hip" problems according to age; intracapsular fracture showed the highest percentage (38.5%) among the age group (60–69), extracapsular fracture (22.6%) for the same age group, subtrochanteric (36.4%) among the age group (10–19), while fracture acetabulum (33.3%) for the age group 30–39 years. In respect to coxa vara; the highest percentage (62.5%) was seen in the age group (10–19), osteoarthritis of the hip (33.3%) in the age group (50–59), pathological dislocation (85.7%) and rotational abnormality (88.9%) in the (below ten years) age group.

DISCUSSION

The security instability in Iraq for the last decades increased the incidence of traumatic events due to violence (car bombing, military operations, landmines, conflict, unexploded ordinance, and other remnants of decades of war) causing a negative impact on the availability and quality of the health services [16, 17]. One of the most fields affected was orthopedics and traumatology.

Developmental Dysplasia of the Hip

The results has revealed that developmental dysplasia of hip (DDH) is prevalent in our locality as it forms 78.6% of all treated surgical cases. We have collected 1870 cases during the study period, but this is an underestimation and does not represent the real prevalence as many files were lost during the (June 2014) attack of ISIS to Mosul city. Also at issue here is that this was the workload of one surgeon only.

We noticed an obvious familial tendency in the occurrence of DDH, this might be attributed to some local cultural habits in nursing the neonates by wrapping clothes and swaddling bed with wrapping legs in extension.

Incidence of DDH in the neighboring countries showed less rate, for example in Turkey (1.7/1000), Dubai (3.17/1000), and Saudi Arabia (3.8/1000). In

Table 3: Distribution of all surgical problems by age

	Age (years)																	
	<10		10---		20---		30---		40---		50---		60---		70---		=>80	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Developmental hip dysplasia	1766	94.4	88	4.7	10	0.5	3	0.2	1	0.1	1	0.1	1	0.1	-	-	-	-
Hip Fracturea	7	2.6	18	6.6	24	8.8	25	9.1	29	10.6	29	10.6	75	27.4	38	13.9	29	10.6
Cerebral palsy	84	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Othersb	21	31.8	14	21.2	3	4.5	5	7.6	10	15.2	11	16.7	2	3.0	-	-	-	-
Irritable hip	14	53.8	12	46.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infection	15	62.5	3	12.5	-	-	3	12.5	1	4.2	-	-	2	8.3	-	-	-	-
Avascular necrosis	-	-	1	5.3	2	10.5	6	31.6	6	31.6	4	21.1	-	-	-	-	-	-
Tumor	7	43.8	1	6.3	2	12.5	2	12.5	2	12.5	1	6.3	1	6.3	-	-	-	-

[a]Intracapsular, extracapsular, acetabulum, subtrochanteric
[b]Osteoarthritis, pathological dislocation, rotational abnormality, coxa vara, polio

Table 4: Distributions' of orthopedic problem around the hip by sex

Diagnosis	Gender			
	Male		Female	
	No	%	No	%
Fracture hip				
Intracapsular	59	45.4	71	54.6
Extracapsular	60	64.5	33	35.5
Subtrochanteric	22	66.7	11	33.3
Acetabulum	16	88.9	2	11.1
Others				
Coxa vara	2	25.0	6	75.0
Osteoarthritis	10	30.3	23	69.7
Pathological dislocation	5	35.7	9	64.3
Polio	-	-	2	100.0
Rotational abnormality	4	44.4	5	55.6

the European countries, the incidence showed a wide spectrum; in Scandinavia (0.9–28/1000), UK (0.91–1.7) with the highest incidence of 30.3 in Aberdeen, Scotland. In the Mediterranean Islands, it is 10.6 in Crete and 25.5 in Sicily. The incidence is higher in Eastern Europe ranges from 5.2 in Croatia to 113 in Czech Republic [18].

Screening for DDH may be based upon clinical and/or ultrasound methodology. With clinical screening only, the late dislocation rate is reported as between 0.5 and 0.8 per 1000 live births. Some studies suggest that clinical examination for DDH should be delayed until after the neonatal period due to the high rate of spontaneous stabilization in the first four weeks of life [19, 20]. Ultrasonography is not always available in our locality, either due to lack of experience in detecting DDH or because of its cost. That is why, we depend on clinical examinations by Ortolani and Barlow test, and hart sign (limited hip) abduction test. Radiological examination is usually done for those above four months of age to confirm the clinical examination.

The treatment of children with DDH evolved markedly during the last century. Lorenz first proposed his method of forceful closed reduction and plastering in fixed maximal abduction. At the turn of the last century, most infants were not diagnosed to have dysplasia/dislocation until they start walking [20, 21]. Surgical intervention may be necessary when DDH is severe, diagnosed late, or after an unsuccessful trial of nonsurgical methods [22].

Table 5: Distributions' of orthopedic problem around the hip by age

	Age (years)																	
	<10		10---		20---		30---		40---		50---		60---		70---		=>80	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Hip Fracture																		
Intracapsular	4	3.1	5	3.8	3	2.3	8	6.2	13	10.0	14	10.8	50	38.5	18	13.8	15	11.5
Extracapsular	-	-	1	1.1	14	15.1	3	3.2	10	10.8	12	12.9	21	22.6	20	21.5	12	12.9
Subtrochanteric	3	9.1	12	36.4	3	9.1	8	24.2	2	6.1	1	3.0	3	9.1	-	-	1	3.0
Acetabulum	-	-	-	-	4	22.2	6	33.3	4	22.2	2	11.1	1	5.6	-	-	1	5.6
Others																		
Coxa vara	-	-	5	62.5	1	12.5	2	25.0	-	-	-	-	-	-	-	-	-	-
Osteoarthritis	1	3.0	4	12.1	2	6.1	3	9.1	10	30.3	11	33.3	2	6.1	-	-	-	-
Pathological dislocation	12	85.7	2	14.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polio	-	-	2	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rotational abnormality	8	88.9	1	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Treatment in our locality is decided according to the child's age and time of presentation, for those below one-year, conservative management is done with regular casting followed by splint till reduction is ensured, while if the dislocation is reducible and stable, particularly in the first four months of age, application of abduction splint (similar to von Rosen splint), locally made during the sanction, is done. For those more than four months; we do tight abduction manipulation under anesthesia followed by plaster of Paris (POP Spica) for one month followed by abduction splint with or without tenotomy of the adductor muscle. In cases above one-year of age, surgery (open reduction with or without pelvic or femoral osteotomy) is considered depending on the staging.

Femoral neck fractures are more frequent after the age of 60 (77.5%). The left hip has been affected in 62.5% and the left in 37.5%. Women (62.5%) are more affected by such fractures than men (37.5%) [23]. Incidence rates of hip fracture vary geographically within the United States, with the highest rates reported in the south and the lowest in the north, more often in women than in men, and higher among white women than among black women [24–26].

Hip fractures rank in the top ten of all impairments worldwide in terms of loss in disability adjusted years for people age 50 years and more. The short term goal of surgical treatment is to stabilize the hip fracture enough to withstand early mobilization and weight bearing, which prevents complications due to prolonged bed rest and aids in fracture healing [27].

In the present study; fractures around the hip represented about 11.5% of all surgical cases. The peak incidence is among the age group (60–70 years), usually with history of sudden fall on the ground especially in those who have porotic bones, the other peak was around 20 years, in those exposed to severe trauma. Acetabular fractures were more common among the age group 20–40 who were exposed to road traffic accident, this agrees with other studies [28]. Surgical treatment is done either through dynamic hip screw, curved dynamic plate or external fixation for patients with extra-capsular fractures, while for those with intra-capsular fracture, the surgical intervention depends on the garden classification grading; in grade I (and patients below 60 years) we do compression cancellous screw, in grade II, III and IV, Austen moor partial hip arthroplasty is done. Since 2010, hip arthroplasty (bipolar, or total hip arthroplasty) was introduced in our ward.

For younger patients with history of severe trauma; immediate surgery was done either through compression screw for intracapsular, or DHS for extracapsular fractures. The results revealed that acetabular fractures are more common in young (20–40 years) exposed to road traffic accident (22.2–33.3%). We do not have pelvic clamp in our causality unit, so fixation is done by pelvic plate and compression screw.

Osteoarthritis

The incidence of knee osteoarthritis is twice that of hand or hip osteoarthritis, and the female to male ratio for hand, hip and knee osteoarthritis is approximately 2:1. After 50 years of age, the prevalence and incidence

is significantly greater in women than men, while hip osteoarthritis appears to progress more rapidly in women [29].

Osteoarthritis has proven to be a challenging disease. It poses a great socio-economic impact as its prevalence is 7–20 times greater than rheumatoid arthritis. It is impact on health-related quality of life is major as it is a leading cause of physical and psychological disability and expense, including time lost from work and medical care. According to the National Health and Nutrition Examination Survey, 25% of patients cannot perform major activities of daily living and about 12% require help with personal care and routine needs [30–32].

In the present study; Osteoarthritis of the hip was mostly seen among the age group (40–50 years) secondary to an underlying pathology like neglected DDH, avascular necrosis (idiopathic or secondary to fractures) and steroid intake, with a female to male ratio of 2.3:1, this probably goes with the ideas of structural changes in bone difference between sexes [33].

Proper surgical treatment was started after 2010 when THA system was introduced. Dramatic pain relieve for chronic hip pain makes the patients ready to start full weight bearing immediately after the operation. The problem was in patients with corticosteroid therapy (porotic bone, bleeding tendency) during surgery, adrenaline with ringer solution was considered.

The current study revealed that irritable hip (including septic arthritis) is seen in both sexes with male dominance which might reflect their activity and exposure to trauma. Most of the patients had Perthes disease, septic arthritis, and slipped capital femoral epiphysis.

As tuberculosis is prevalent in our locality; some patients were presented with chronic history of general ill health and limping, surgical debridement was done with Spica hip immobilization and anti-tuberculosis medical treatment. In patients with Perthes disease; osteotomy on the femoral side or pelvic side was considered depending on the stage of hip displacement.

Cerebral palsy is a common problem, 75–80% of the cases are due to prenatal injury with less than 10% being due to birth trauma or asphyxia. The most important risk factor seems to be prematurity and low birth weight [34]. The average prevalence is 3.6/1000, higher among children whose families live in low and middle socio economic communities [35].

Cerebral palsy is the most common condition responsible for child disability. In some countries, people believe that this is a curse for the family, now-a-days, this thinking has been changed enough in most of the countries, but some developing countries like Bangladesh are still not well aware [36].

Cerebral palsy is not uncommon in the city, more prevalent in males than females, with most of the patients are less than ten years of age, mostly with diplegic cerebral palsy. Different surgical procedures were done (pelvic or femoral osteotomy, tenotomy, tendon lengthening, tendon transfer to minimize the bad effect of the spastic disorder that the child encountered followed by regular splinting and physiotherapy till the age of 14 years.

CONCLUSION

This work shows that the achievement of such a large number of surgical operations represents a real challenge considering the disastrous situation that Iraq has passed through during the last two decades in all aspects especially security threats and the rapid deterioration in health services.

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Author Contributions

Husham A. Salih – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Bara H. Abdulkareem – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Riyadh K. Lafta – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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REFERENCES

1. Ignacio V. Ponseti. History of Orthopaedic Surgery. Iowa Orthop J 1991;11:59–64.
2. Al-Kattan HA Al-Youzbaki DB. Social Backgrounds for Mothers Having Infants and Children with Developmental Dysplasia of Hip. Iraqi J Comm Med 2009;(1):18–23.
3. Filipov O. Epidemiology and Social Burden of the Femoral Neck Fractures. Journal of IMAB - Annual Proceeding (Scientific Papers) 2014;20(4):516–18.
4. Sayana MK, Lakshmanan P, Peehal JP, Wynn-Jones C, Maffulli N. Total hip replacement for acute femoral neck fracture: a survey of National Joint Registries. Acta Orthop Belg 2008;74(1):54–8.

5. Shrestha D, Dhoju D, Shrestha R, Sharma V. Acetabular Fracture: Retrospective Analysis of Thirty Three Consecutive Cases with Operative Management. Kathmandu Univ Med J (KUMJ) 2014 Oct-Dec;12(48):279–87.
6. Chakraborty MK, Thapa P. Fixation of Subtrochanteric Fracture of the Femur: Our Experience. Journal of Clinical and Diagnostic Research 2012;(9):76–80.
7. Patel CD, Gamit MN, Jaiswal S, Suthar PP, Dave DJ. Epidemiological study of proximal femoral fractures in tertiary-level institute. Int J Med Sci Public Health 2015;4(12):1666–9.
8. Butterwick D, Papp S, Gofton W, Liew A, Beaulé PE. Acetabular fractures in the elderly: evaluation and management. J Bone Joint Surg Am 2015 May 6;97(9):758–68.
9. Dhafer B. Al-Youzbaki, Hisham A. Al-Kattan, Muzahim K. Al-Khyatt. Sociological Risk Factors in the Development of Knee Osteoarthritis Among Women 50 years. Iraqi J Comm Med 2008;21(4):287–95.
10. Allen KD, Golightly YM. Epidemiology of osteoarthritis: State of the evidence. Curr Opin Rheumatol 2015 May;27(3):276–83.
11. Srikanth VK, Fryer JL, Zhai G, Winzenberg TM, Hosmer D, Jones G. David Hosmer and Graeme Jones. A meta-analysis of sex differences prevalence, incidence and severity of osteoarthritis. Osteoarthritis Cartilage 2005 Sep;13(9):769–81.
12. Souza Miyahara Hd, Helito CP, Oliva GB, Aita PC, Croci AT, Vicente JR. Clinical and epidemiological characteristics of septic arthritis of the hip, 2006 to 2012, a seven-year review. Clinics (Sao Paulo) 2014 Jul;69(7):464–8.
13. Deshpande SS, Taral N, Modi N, Singrakhia M. Changing epidemiology of neonatal septic arthritis. J J Orthop Surg (Hong Kong) 2004 Jun;12(1):10–3.
14. Lafta R, Al-Shatari S, Cherewick M, et al. Injuries, Death, and Disability Associated with 11 Years of Conflict in Baghdad, Iraq: A Randomized Household Cluster Survey. PLoS One 2015 Aug 7;10(8):e0131834.
15. Burnham G, Lafta R, Doocy S, Roberts L. Mortality after the 2003 invasion of Iraq: a cross-sectional cluster sample survey. Lancet 2006 Oct 21;368(9545):1421–8.
16. ICRC Iraq. Giving disabled people a chance to resume a normal life. 2011. [Available at: www.icrc.org/eng/resources/documents/update/2011/iraq-update-2011-10-20.htm]
17. Al Hilfi TK, Lafta R, Burnham G. Health services in Iraq. Lancet 2013;381(9870):939–48.
18. Loder RT, Skopelja EN. The epidemiology and demographics of hip dysplasia. ISRN Orthop 2011:238607.
19. Gulati V, Eseonu K, Sayani J. Developmental dysplasia of the hip in the newborn: A systematic review. World J Orthop 2013;4(2):32–41.
20. Shipman S, Helfand M, Nygren P, Bougatsos C. Screening for Developmental Dysplasia of the Hip. U.S. Department of Health and Human Services Agency for Healthcare Research and Quality. Evidence Synthesis, Number 42. 2006.
21. American Academy of Orthopaedic Surgeons Board of Directors Detection and Non-operative Management of Pediatric Developmental Dysplasia of the Hip in Infants up to six Months of Age Evidence – based Clinical Practice Guideline September 5, 2014.
22. Shipman SA, Helfand M, Moyer VA, Yawn BP. Moyer, Barbara P. Yawn. Screening for developmental dysplasia of the hip: a systematic literature review for the US Preventive Services Task Force. Pediatrics 2006;117(3):557–76.
23. Costache C, Costache D. Femoral Neck Fractures. Medical Sciences 2014;7(56):103–10.
24. Karagas MR, Lu-Yao GL, Barrett JA, Beach ML, Baron JA. Heterogeneity of hip fracture: age, race, sex, and geographic patterns of femoral neck and trochanteric fractures among the US elderly. Am J Epidemiol 1996 Apr 1;143(7):677–82.
25. David J. Hak, Haotian Wu, Chenhao Dou, Cyril Mauffrey, Philip F. Stahel. Challenges in Subtrochanteric Femur Fracture Management. Orthopedics 2015;38(8):498–502.
26. Kaplan K, Miyamoto R, Levine BR, Egol KA, Zuckerman JD . Surgical management of hip fractures: an evidence-based review of the literature. II: intertrochanteric fractures. J Am Acad Orthop Surg 2008 Nov;16(11):665–73.
27. Magnusson KA, Gunnarsson B, Sigurdsson GH, Mogensen B, Olafsson Y, Karason S. Treatment and outcome of patients with hip fracture. [Article in Icelandic]. Laeknabladid 2016 Mars;102(3):119–25.
28. Miyamoto RG, Kaplan KM, Levine BR, Egol KA, Zuckerman JD. Surgical management of hip fractures: an evidence-based review of the literature. I: femoral neck fractures. Journal of the American Academy of Orthopaedic Surgeons 2008;16(10):596–607.
29. Grubor P, Krupic F, Biscevic M, Grubor M. Controversies in treatment of acetabular fracture. Med Arch 2015;69(1):16–20.
30. Cooper CM, Javaid K, Arden N. Epidemiology of osteoarthritis, Chapter 2. In: Cooper CM, Javaid K, Arden N eds. Atlas of Osteoarthritis. London: Springer Healthcare; 2014.
31. Massicotte F. Epidemiology of osteoarthritis. Chapter 1. Understanding Osteoarthritis from Bench to Bedside. Kerala, India: Research Signpost; 2011. p. 1-26.
32. Felson DT, Nevitt MC. Epidemiologic studies for osteoarthritis: new versus conventional study design approaches. Rheum Dis Clin North Am 2004;30(4):783–97.
33. Racine J, Aaron RK. Pathogenesis and epidemiology of osteoarthritis. R I Med J 2013;96(3):19–22.
34. Sankar C, Mundkur N. Cerebral palsy-definition, classification, etiology and early diagnosis. Indian J Pediatr 2005;72(10):865–8.
35. Yeargin-Allsopp M, Van Naarden Braun K, Doernberg NS, Benedict RE, Kirby RS, Durkin MS. Prevalence of cerebral palsy in 8-year-old children in three areas of the United States in 2002: a multisite collaboration. Pediatrics 2008;121(3):547–54.
36. Mahmuda J. Demographic Profile of Cerebral Palsy: A Retrospective Study Bangladesh, for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT). February, 2013.