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Pharmacoeconomic Evaluation Of Orthopaedic Disease Patients In A Rural Tertiary Care Teaching Hospital.

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ABSTRACT

The growing pressure on the healthcare budget, appropriate justification of progressive expenditures and future investments in public healthcare is becoming a priority in developing countries like India. Orthopedic diseases are the main cause of healthcare burden worldwide as it affects any class and category of the people. The pharmacoeconomic analysis in these diseases helps in justifying and minimizing this expenditure. Hence, the present study was carried out with the aim to learning/Understand the cost incurred in orthopedic disease patients in a tertiary care teaching hospital**.** It is a prospective observational and interventional study conducted in orthopedic inpatients department over a period of 9 months in AH & RC Hospital. Patients showed interests were enrolled after obtaining their consent. The data was collected in a fine-designed data collection form; the data were subjected for descriptive statistics**.** A total of 90 patients were enrolled in the study, among these male patients were predominant (72.2%) over female patients (27.8%) and the majority of patients were under the age group of 30-40 years (31.1%). Most of the participants were illiterate (77.7%). Farmers (38.9%), married (86.7%) and having an annual income in between Rs 50,000-1, 00,000 (66.7%). The mean length of hospital stay of the patients was 14.39±4.63 days, where mean overall direct medical cost (medicine, lab fee, hospital stay cost) was Rs 3624.66±957.52 and mean overall direct non-medical cost (travel expenses, food expenses, and others) was Rs1750.66±556.71 and the total cost of disease management was Rs 5375.33±1324.63. The mean cost of the different category of medication evaluation showed that total mean cost of 137.80±271.39, antibiotics (Rs305.64±778.38), anti-emetics/anti-ulcers drugs (Rs98.79±130.80), anti-diabetics and anti-hypertensive (Rs70±85.13), calcium preparations (Rs34.14±59.98), vitamins (Rs50.79±107.99) and other drugs used (Rs44.65±97.54). A total of 9 drug interactions and 7 (7.7%) ADRs were identified. Among them, 3 were drug food interactions and 6 were drug-drug interactions. This study showed that major orthopedic patients were farmers and they had low annual income and it was not sufficient for the treatment of disease in this rural areas. This study also suggests & showed that the presence clinical pharmacist in the clinical setting will help in cost minimization especially with the drug selection in the developing countries like the rural Indian populations.

Keywords: Pharmaco-economics, Orthopedic, Direct medical cost, Direct non-medical cost, Cost of illness (COI)

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INTRODUCTION

Economics is the social science focus on the factors of production, distribution and consumption of goods and services. The term economics came from the Ancient Greek oikos, ("house") and nomos, ("custom" or "law"), hence this economic “rules the house hold for good management". Earlier the economy word was described as 'Political economy’, but economists in the late 19th century suggested economics as a shorter term for "economic science" and shaped as a separate discipline out of the political science and other social sciences. [1][2]

The Economic analysis is pertaining to various areas like business, finance, health care, government. Crime, education, family, law, politics, religion, social institutions, war, science, and in the environment science. Hence economics concepts exhibit/edits importance even in the pharmaceutical area.

Pharmaco-economics is defined as branch of health economics which compares the value of one drug or a drug therapy and services.

In recent years, stimulationof economic crisis in health care systems createsan opportunity to introduction of Pharmacoeconomic studies and lot of employer’s opportunity, to assess the efficacy, effectiveness and availability of health care procedure and services. Hence Pharmacoeconomic evaluation helps in achieving maximum benefit with limited cost to the patients (payer perceptive) and to the clinicians for better outcomes by concentrating on individual patient treatment economic considerations.[3]

The various barriers in the health care budget, the Pharmacoeconomics in India is in the budding stage. Therefore, Pharmacoeconomic evaluation implementation helps in appropriate justification of expenditures and investments even in the public/ private healthcare sectors.

In countries like USA, UK Pharmacoeconomics is measured high priority. In order to achieve quality of economic pharmaceutical products (e.g.: biologics and vaccines) they adapted producers like a) Standardizing and communicating product support / requirement information b) projections of product impact on both the organization and enrolled patient population; c) information on the value of products; and d) Making evidence more clear, transparent and valuable by decision makers. [4][5]

Hence it is essential to study about Pharmacoeconomics, and estimates its overall cost in a particular disease in a defined population (i.e. direct and indirect costs). The commonly used methods are economic evaluation method &Humanistic evaluation**.** In economic evaluations sub types like**1.** Partial economic evaluations methods like 1.1 Cost consequence analysis (CCA) or Cost outcome analysis (COA) 1.2. Cost-of-illness (COI) evaluation and 2 Full economic evaluation methods like 2.1 Cost Minimization Analysis (CMA) 2.2. Cost Benefit Analysis (CBA) 2.3. Cost Effectiveness Analysis (CEA) 2.4. Cost Utility Analysis (CUA) .In Humanistic evaluation 3**.1**Health Regulated Quality of Life (HRQOL) 3.2 Patient preferences 3.3 Patient satisfaction

The research projections showed the total world Health care expenditure in DM is expected at least USD 490 billion by 2030. [6] Hence the PE evaluation in each step will helps in minimizing the cost of the therapy and also helps in optimizing the Quality of life of the patients. The orthopedic disease like, chronic pain, rheumatic diseases, musculoskeletal injuries and arthritis are more common. The research Projections showed that the Global expenditure incurred in the management of RA was $4,950 -$13,012. In India, very limited information is available on these diseases. Hence the present study was carried in our hospital first time to know the cost incurred in the orthopedic disease management. [7-9] The other objectives concentrated in our study are **1.** To study the type of disease, incidence and its outcomes. 2. To find out, document & report, of adverse drug reactions observed if any 3. To evaluate the analgesic and antibiotics uses, cost in orthopedic diseases. 4. To evaluate the overall cost incurred for the disease management

METHODOLOGY

This was a prospective observational and interventional study conducted for a period of 9 months in Adichunchanagiri Hospital & Research centre after obtained the ethical clearance (IEC No: IMS/IEC/1180/2016/17). The inclusion criteria were only orthopedic department patients and outpatient of

orthopedic department patients were not included in this study. The sources of data was from patient case notes, Medication/treatment chart, Laboratory data reports paid bills and other relevant sources

STUDY PROCEDURE: The study was conducted in an inpatient department of orthopedics department. The patient was informed about the study and those who shown interest was enrolled after obtaining their consent. The required details were collected in a well-designed data collection form which consists of direct medical as well as nonmedical cost along with other disease and demographic details. The required information of the patients was obtained by direct interview with patients/patient care takers. The detail includes demographic details, occupation, economic history, education status and past medical and medication history and presenting illness. Other details like cost of the drugs, travel expenses, special food information were collected. All the clinical data were obtained from the patient's case sheets and medical records. The other necessary details were also obtained from pharmacy & hospital accounts department. The Obtained data was tabulated and subjected for descriptive statistical method by using SPSS software.

RESULTS

Among 102 patients approached only 90 were accepted and shown interest in the study. The details of the enrolled patients were discussed in the below.

Among 90 enrolled patients; male patients were 72.2%, followed by female patients 27.8%.In which 1- 10 years & 80-90 years were only 1.1%, Majority of the orthopedic disease patients were at the age of 30-40years (31.1%) followed by41-50 years 21(23.3%),21-30 years17 (18.9%); 51-60 years8(8.9%); 71-80 years 6(6.7%);61 70years5(5.6%);11-20 years 3(3.3%) patients were observed.

The enrolled patients Occupations showed, farmers 35(38.9%) followed by Housewife 22 (24.4%); Carpenter 12 (13.3%); Shopkeeper10 (11.1%); student 4 (4.4%); Businessmen & students were only 2 (2.2%).The patients annual income is between 50,000-1,00,000Rs 60(66.7%) followed by<50,000Rs27(30.0%); and least >1,50,000Rs3(3.3%). The social habits of the patients showed that only 14.4 % were smokers and rest were nonsmoker and past smokers54.4%

The majority 96.7% of them were under normal BMI, only 2(2.2%) were under weight, and one patient is overweight 1.1%. The mean BMI of the patient was 21.2+ 1.9.

86.7 % of the enrolled were married; the remaining 13.3 % were unmarried. The past medical history of the patients showed Only two patients have comorbidities of DM (2.2%)

The education details of the patients showed that majority of the enrolled patients were illiterate (77.7%) rest were literates. The literates Qualifications Majority were 10th std, followed by 12 std and higher education and Majority of the patients were in the semi govt sector people

The table 1 showed among 90 cases low back pain 32(35.6%) were common followed by Osteoarthritis 18(20.0%). Fractures/minor displacement/dislocate9 (10.0%) foot pain and problem were8(8.9%)Sclerosis & soft tissue injury issue cases were 7(7.8%)Interestingly arthritis, medial epicondylitis knee and neck problems were observed only in 1.1% of the patients.(fig11&tab1). The DMC (direct medical cost of these disease management is 3624.66 +957.52, the direct non-medical cost of these disease management (Hospital stay, Special food, other costs) was 1750.66+556.71. The total cost of this disease management was 5375.33+1324.63

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Table 1: Category of the orthopedic disease and its costs

S.no	Type of disease category	Frequency	Percent	DMC(Mean± SD)	DNMC(Mean± SD)	TC(Mean± SD)	Overall DMC(Mean± SD)	Overall DNMC(Mean± SD)	Overall TC(Mean± SD)
1.	Arthritis	1	1.1	3479± 00	2430± 00	5909± 00	**3624.66 ± 957.52**	1750.66± 556.71	5375.33± 1324.63
2.	Osteoarthritis	18	20.0	3594.45 ± 1173	1741.38 ± 687.31	5335.84 ± 1814.66			
3.	Medial epicondylitis	1	1.1	3492.4 ± 00	1810 ± 00	5752.40 ± 00			
4.	foot pain and problem	8	8.9	3717.18 ± 1699.13	1253.75 ± 442.96	4970.93 ± 1934.02			
5.	Fractures/minor displacement/dislocate	9	10.0	3592.00 ± 442.9±	1882.22 ± 454.87	5474.22 ± 851.95			
6.	hip fractures/Minor hip displacement	1	1.1	3317.36 ± 00	1825± 00	5142± 00			
7.	low back pain	32	35.6	3467.20 ±630.20	1809.68 ± 537.47	5276.89 ± 1059.81			
8.	hand pain and problem	2	2.2	3473.28 ± 135.65	1852.5± 130.81	5325.78 ± 4.83			
9.	knee pain and problem	1	1.1	3505.78 ± 00	2065± 00	5570.78 ± 00			
10	Neck pain and problem	1	1.1	3498.2± 00	2185.0± 00	6133.20 ± 00			
11	sclerosis	7	7.8	4509.21 ± 1439.28	1927.85 ± 356.02	6437.10 ± 1.28			
12	Shoulderpain /problem	2	2.2	3566.± 209.21	2175± 14.14	5741.86 ± 195.07			
13	soft tissue injury	7	7.8	3523.7± 894.55	1352.85 ± 588.83	4876.55 ± 1331.48			
14	Total	90	100.0	46735.76 + 6623.09	24310.23+3212.41	71946.55+7193.1			

Table 2: Distribution of diagnostic sub costs of the orthopedic disease patients

Category of the disease		Totalhepatology cost	Total hematology cost	Total biochemical cost	Total urine analysis cost	Total blood sugar cost	Total laboratory cost	Total radiological cost
Arthritis	Mean±SD	120.0000	25.0000	85.0000	.0000	104.0000	334.0000	1300±0.00
Osteoarthritis	Mean±SD	108.33±60.99	73.61±26.05	113.33±42.53	17.77±20.23	98.77±22.15	417.05±95.70	1344.44± 129.35
Medical epicondylitis	Mean ±SD	120.00	90.00	120.00	25.00	104.00	459.00	1300±0.00
foot pain and problem	Mean± SD	120.00± 64.14	61.87± 35.14	108.75± 31.81	18.75± 17.67	104.00± 0.00	403.50± 126.09	1300±0.00

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Fractures/minor displacement/dislocate	Mean± SD	120.00±0.00	71.66±16.39	97.77±36.58	22.22±15.02	104.00±0.00	415.66±39.68	1300±0.00
hip fractures/Minor hip displacement	Mean±SD	120.00	70.00	120.00	0.00	104.00	414.00	1300±0.00
low back pain	Mean±SD	114.06±24.21	70.62±35.55	100.93±38.23	15.93±16.03	104.50±2.82	403.25±80.77	1300±0.00
hand pain and problem	Mean ±SD	120.00±0.00	80.00±14.14	120.00±0.00	12.50±17.67	104.00±0.00	436.50±31.81	1300±0.00
knee pain and problem	Mean± SD	120.00	95.00	120.00	0.00	104.00	439.00	1300±0.00
Neck pain and problem	Mean± SD	120.00	40.00	120.00	25.00	104.00	409.00	1300±0.00
Sclerosis	Mean± SD	120.00±0.00	69.28±27.60	114.28±49.28	17.85±12.19	104.00±0.00	425.42±61.01	1300±0.00
Shoulderpain /problem	Mean± SD	120.00±0.00	92.50±3.53	120.00±0.00	12.50±17.67	104.00±0.00	449.00±14.14	1300±0.00
soft tissue injury	Mean± SD	102.85±45.35	60.00±39.89	110.00±51.96	7.14±12.19	89.14±39.30	369.14±169.39	1300±0.00

This table2 shows the various cost incurred in the disease management; the total laboratory mean cost was highest in the shoulder pain followed by knee pain, sclerosis, osteoarthritis. The radiological mean cost was more in osteoarthritis when compare to all other diseases

Majority of the patients were stayed for 15 days followed by 20 days and least days stay was minimum of 4 days. The mean stay of the patients was 14.39 ± 4.63.

Table 3: Distribution of Other analgesics and antipyretic used in patients

S.no	Drugs	N	%
1.	NO	50	55.6
2.	Aceclofenac+thiocolchicoside	25	27.8
3.	Diclofenac+thiocolchicoside	3	3.3
4.	Flupirtinematate	1	1.1
5.	Powergesic gel[diclofenac+linseedoil+methyl salicylate]	6	6.7
6.	tab.Lyser[serratiopeptidase]	1	1.1
7.	Tramadol+paracetamol	4	4.4
8.	**Total**	**90**	**100.0**
9.	Aceclofenac+Paracetamol+cholrozaxazone	7	8.8
10.	Aceclofenac and paracetamol	1	1.1
11.	Diclofenac +Paracetamol	0	0
12.	Aceclofenac alone	24	26.7
13.	Diclofenac alone	52	57
14.	Acetaminophen+tramadol	1	1.1
15.	Paracetamol	1	1.1
16.	Piraxicam	4	4.4
17.	Tramadol	24	26.7

18.	Analgesics cost Mean+SD	137.80±271.39	

This table 3 showed that in Majority of the patients diclofenac alone sodium52 (57%). followed by aceclofenac combinations and Aceclofenac alone was used majorly the total mean cost of analgesic 137.80±271.39.

Table 4: Distribution of antibiotics used in patients

S.No	Antibiotic	N	%
1.	NO	62	68.9
2.	Piperacillin combination(Piperacilin+Tazobactum)	2	2.2
3.	Cephalosporin 3 gen(cefexime)	3	3.3
4.	Cephalosporin 3 gen combination Cefexime+clavalunicacid Cefoperazone+sulbactum Ceftriaxone	 1 11 4	 1.1 12.2 4.4
5.	Quinolones(ciprofloxacin)	3	3.3
6.	Oxazolidines(linezolid)	4	4.4
7.	antibiotic cost Mean+SD	305.64±778.38	

This table 4 highlights the Cephalosporin 3 gen combination antibiotic were used more, rest were in single form. The mean antibiotic cost of antibiotics was 305.64+778.38. The mean cost of calcium preparations was 34.14±59.98. The mean cost of Vitamin preparations was 50.79±107.99

Among the antiemetic's ondoncitran and among anti-ulcers only pentaprazole was used. The mean cost of antiulcer was 98.79±130.80

Among antidiabetic Insulin was widely used in Antihypertensives amlodipine and atenolol combinations was used. The mean antidiabetic cost was70±85.13

The mean cost of other drugs used was 44.65±97.54. in which some cough preparations were used to manage the issues Rest were like vitamin preparation like neurobian and calcium preparation

Table 5: Distribution of Drug- drug interactions and ADRs observed

S.no	**Category of Drug-Drug Interactions & ADR**	**N**	**%**
1.	Food drug interactions	3	3.3
2.	Mild	1	1.1
3.	Moderate	4	4.4
4.	Severe	1	1.1
5.	ADR	7	7.7

The table no 5 showed that the drug- drug interactions were observed only in 6(6.6%) and food drug interactions were observed in 3.3 % of the patients. The minor interaction was observed with diclofenac and ceftriaxone- Impairment of activity of the antibiotic, hence the space intervals are required or alternate category of NSAID is recommended. The moderate drug interactions were amlodipine, ciprofloxacin+ Diclofenac, Methocarbamol+doxylamine, ondancitrate +tramadol were noticed. Severe interaction was

Tramadol+ methocarbamol – sedation was noticed. The food drug interactions were with ciprofloxacin, doxylamine; Tramadol+ food interactions were commonly noticed. The possible food was told them to avoid it.

Interestingly one 7.7 % of ADR s were noticed. The ADRs were with aceclofenac, cephoperazone and sulbactum, methicarbamol, ondan citrate, pentaprazole, Piroxicam and Tramadol were commonly observed in our study durations

DISCUSSION

Out of 102 patients (orthopedic disease) enrolled, only 90 patients were accepted and shown interest in the study and remaining 12 patients did not shown their interest towards the study. Out of 90 patients, male patients were 65 (72.2%), followed by female patients 25 (27.8%). A similar by Pooja A et al study, reported 61.15% participations were male and female were 38.5%[10]. Another study by Icagasioglu A et al reported 69.6% female and 30.4% male [11]. Generally our study showed male patients were more because this study was conducted rural area and most of the participants were farmers and male were exposed various stressful moments, more work load, working area compared to female.

Age group between 30-40 years, were found to be major group, 28 (31.1%) followed by 41-50 years age group 21 (23.3%), this was similar to the study conducted by Icagasioglu A et al, where they reported patients mean age was 46 years in their study[11]. This study suggested that after the 40 years health checkups and their awareness should be practiced to avoid the future complications.

As the study was conducted in rural part of Karnataka, major number of participants were farmer 35 (38.9%) followed by housewife 22 (24.4%). This may be because of rural condition and their education, which showed their low literacy rate and lack of awareness

Out of 90 patients enrolled, majority of the patients 60 (66.7%) were having annual income Rs 50,000-1,00,000 followed by <Rs 50,000, 27 (30.0%). This may be due of lack of job opportunity in rural area where the study was conducted. The present study was supported by Filipe Prazerestal et al where they reported 44.6% participants had not enough money to fulfill their daily needs.[12] Our study suggested that low economic status of the patients affects them in curing the disease, buying the medication and regular health checkups.

The majority of participants were past smokers 49 (54.4%) followed by 28 (31.11%) smokers. In our study only 14.4% participants were smokers. Our study was supported by Ramanath et al where they reported 88% participants were past smokers and 12% were smokers. [13] . Majority of the patients were under normal BMI 87(96.7%) and mean BMI of the patient was 21.2±1.9. Only 2 (2.2%) were under weight, this may be due to their high labour work in field and related area and underweight was due to of poor diet.

Majority 78 (86.7%) of the patients were married and only 12 (13.3%) were unmarried. These results were correlated with the age of the participants were 69 (76.66%) participants were age above 30 years and chance to get marriage.

Majority of patients were illiterate 77.7% and only 22.3% were literates. Out of literate, majority of patients had up to 10th standard education 7(35%) followed by 12th standard 4 (20%). Illiteracy rate was high in this present study this might be due to the fact that majority of patients were belongs to rural area, farmers and they don't have proper schooling facility. Among the 85 (94.44%) were semi-government employee and only 5 (5.56%) were government employee. Less number of government employees in this study might be less number of government offices in the rural area.

Among 90 participants, majority of 32 (35.55%) participants have complication of back pain, followed by 18 (20%) were having osteoarthritis, 10% fracture/minor displacement /dislocation, 8% foot pain and problem, 7.77% sclerosis and soft tissue injury each. Majority of participants experienced back pain because in our study majority of participants were farmers, carpenters, housewife and teachers who work throughout day and chances of back pain. Some patients experience fracture/minor displacement which might be the fact that the hospital lies beside the national high way and number of accident cases are also high.

There are very few studies were observed on illness cost studies in orthopaedic disease patients. Hence, this study was conducted in a rural and service oriented hospital. The prevalence of orthopaedic disease was high in rural area as majority of participants were hard working labours like farmers, teachers, carpenters, students and shopkeepers and the economic status of patients was poor. Cost-of-illness in orthopaedic patients was done on sum of direct medical and direct non-medical cost.

In the present study, we found total 13 numbers of orthopaedic diseases and analysed total treatment cost of each disease. The overall direct medical cost (DMC) (lab cost, medicine cost, hospital charge) was found to be Rs 3624.66±957.52 and the direct non-medical cost (DNMC) of these orthopaedic disease management was 1750.66±556.71 (hospital stay, special food, other food cost, travel cost) and overall treatment cost of these disease was 5375.33±1324.63. Patients with sclerosis had maximum total medical cost i.e. 6437.10±897.65, this might be due to the fact that the drug used for the treatment of sclerosis is high in cost. Our results also suggested that overall treatment cost of 5375.33±1324.63 might be burden for the participants because most of the participants have low income i.e. 66.7% of participants have less than one lac annual income.

The costs for sub-diagnostic test are also included in direct medical cost, where total laboratory mean cost was highest in the shoulder pain (Rs 2,198), followed by knee pain (Rs 2178), sclerosis (Rs 2,150) and osteoarthritis (RS 2,144). There was not that much variation in sub-diagnostic costs for all the category of the disease. Among all sub-diagnostic test, cost for radiological test was high i.e. Rs 1,300, may be due to the use of available sophisticated instrument.

In the present study range of patients stayed in hospital was 4-26 days. Majority of the patients stayed for hospital was 15 days 22 (24.44%) followed by 20 days, 13 (14.44%). The mean stay of the patients in the hospital was 14.39±4.63. As the patients stayed in hospital for longer duration the overall treatment cost was also increased significantly.

Among the total number of patients 82 (91.11%) showed improvement in their health condition and only 8 (8.88%) patients were fully cured/recovered. Patients who showed improvement in treatment were discharged from the hospital and they were advice to continue the treatment and come for regular follow up.

This study showed only 40 (44.44%) patients had received analgesics and antipyretic drugs whereas 50 (55.56%) patients did not received any analgesics and antipyretic drugs. In the present study majority of patients received only diclofenac sodium 52 (57%), followed by aceclofenac plus thiocolchicoside 25 (27.8%), aceclofenac alone 24 (26.7%) and Tramadol 24 (26.7%). The total mean cost of analgesic and antipyretic in this study was137.80±271.39. Among 90 patients, 62 (68.88%) patients did not use any antibiotics. A total of 28 (31.11%) patients used antibiotics, among them majority of the patients used the cephalosporin 3 generation combination i.e. cephoperazone+ sulbactum 11 (12.2%) followed by ceftriaxone 4 (4.4%) and oxazolidines (linezolid) 4 (4.4%). The total mean cost of antibiotics was 305.64±777.38, which was comparatively higher than analgesics and antipyretics. Anti-emetics were given only in 5 (5.6%) patients because some patients experience nausea and vomiting. Seventy nine (87.78%) patients received pentaprazole a PPI and total mean cost of antiulcer drug was 98.79±130.80. Among antidiabetic Insulin was used more because of higher blood sugar level at the admitting time. The mean cost of antidiabetic drug was 70±85.13. Among the anti-hypertensives, amlodipine and atenolol combinations was used by 2 (2.2%) of patients because of low cost and effective in treatment. Calcium preparation were used by 25 (27.77%) patients, among calcium preparations, cap. caldikind was used by 11 (12.2%) followed by tab. Shanecal K27 7 (7.8%) patients. The mean cost of calcium preparations was 34.14±59.98. Vitamins were used by 31 (34.44%) patients and the mean cost of calcium preparations was 50.79±107.99. Among all vitamins, tab. servijen p (benfotiamine + folic acid+ mecobalain+ pregabalin) was used by majority of the patients 5 (5.6%). Trypsin+ chymotrypsin was other class of drug which was used by majority of patients 5 (5.6%) and mean cost of these drugs was 44.65±97.45. These drugs also include enzymes, cough preparations and used to manage the disease.

The drug interaction was found in 9 patients, generally which will increase the cost of illness treatment. Out of 9 interactions, the drug-drug interaction were observed only in 6 (6.66%) and food-drug interaction were observed in 3 (3.33%) patients. Among six DDI, only one minor interaction was observed with diclofenac and ceftriaxone, here diclofenac impaired the activity of ceftriaxone, hence the space intervals are required or alternate category of NSAID is recommended. The moderate DDI was observed in amlodipine,

ciprofloxacin+ diclofenacMethocarbamol+ doxylamine, ondancitrate+ Tramadol were noted. Only one severe interaction was noted throughout the study, where Tramadol interacts with doxylamine and patient experience sedation. Out of three drug-food interactions, ciprofloxacin, doxylamine and Tramadol were commonly noted in interact with food. The possible food was told them to avoid it.

In this present study only 7 (7.77%) ADR were noted. The ADR were with aceclofenac, cephoperazone and sulbactum, methicarbamol, ondan citrate, pentaprazole, Piroxicam and Tramadol were commonly observed in our study.

Hence this study showed that above said drugs were used very commonly. So this type of study will helps in understanding the disease management in orthopaedic diseases**.**

CONCLUSION

The study was conducted in a rural and charitable research hospital. The prevalence of orthopaedic disease was common in all the localities and this issue was also high in this rural area.

This study concluded that the majority of male and age group 30-40 years were affected more commonly. The economic status of the patients was low and it was not sufficient for the treatment and healthy nutrient food.

The various researches showed that direct medical cost was more, but our study patients direct medical cost was less as compared to other hospital. Since, it was a rural tertiary care teaching hospital running by a charity service oriented organization, the hospitalization charge, nursing, bed and consultant charges would have paid very nominally in the admission charges itself. So, Pharmacoeconomic impact was less on these disease patients. In this study the medicine cost and the laboratory cost was the major costs and hospital costs were less. The travel expense was less as compared to other charges.

This study also suggests that the presence of clinical pharmacist in the clinical practice will help in selection of generic or brand drug with same efficacy and safety and conversion of parental to oral form (eg. Inj. Diclofenac to tab. Diclofenac, inj. Paracetamol to tab. Paracetamol, inj. linezolid to tab. Linezolid, inj. Pantaprazole to tab. Pentaprazole) with less cost to reduce the direct medicine cost.

Hence this study concludes that clinical pharmacist can play an immense role in multi-disciplinary healthcare team in managing the complications and clinical outcomes with cost effective.

LIMITATIONS

The study was done for a short period of time (only nine months). Even this study can be extended for longer period.

- Since the study was conducted in a research/service oriented hospital, the hospital charge like bed, nursing, consultation charges was very nominal/ few cases had free.
- Only in-patients were included in the study.
- Only total cost of treatment was analysed in the study, but cost minimization and cost effectiveness analysis studies were not conducted.
- Follow up was not conducted due to short duration of study period

FUTURE DIRECTIONS

- Duration of the study should be long in order to achieve good pharmacoeconomic results.
- Similar study can be conducted in other specific disease.
- Similar type of study can be conducted in special departments like ICU/ ICCU, pediatric, and OBG department diseases.
- Cost minimization and cost effectiveness analysis studies can be done in future.
- Medication adherence behavior and follow up association studies can be conducted

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