INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN:2320-2831

IJPAR |Vol.7 | Issue 4 | Oct - Dec - 2018
Journal Home page: www.ijpar.com

Research article *Open Access*

Retrospective study on antibiotic use in different clinical departments of hospital in Nalut, Libya

Prakash Katakam*, Mabroukah Amr Ishrayhah, Nada Alaazbi, Abdurraouf MM Khalf

Faculty of Pharmacy, Zawiya University, Zawiya, Libya

Corresponding Author: Prakash Katakam
Email: pkatakam9@gmail.com

ABSTRACT

A retrospective Study on Antibiotic Use in Different Clinical Departments of Hospital in Nalut, Libya during a period of five months (1/1/2013to 30/5/2013). Data were collected retrospectively from inpatients medical files (600 patient's medical file), prescriptions for outpatients (400 prescriptions studied) and the total number of prescription was 1000. The data then was evaluated by Microsoft Excel software for analysis and descriptive statistics. The World Health Organization (WHO) indicators (utilization in defined daily doses (DDD); DDD/1000 inh/day) were used and the ATC/ DDD method was implemented. The three most frequently used antibiotics for inpatients were cefotaxime, ceftriaxone and metronidazole with 25.57%, 16.54% and 15.34% of the total prescribed antibiotics respectively, and for outpatients they were amoxiclav (26.23%), amoxicillin and azithromycin (12.41%) and ciprofloxacin (11.48%). After calculating the consumption of antibiotics in DDD, the highest consumed antibiotic in DDDs (g) was clarithromycin 10.67 g and 0.119 g in terms of DDD/1000inh/day, while consumption of amoxiclav was the lowest consumption 0.011 g and 0.00012 DDD/1000 in h/day. About 98% of patients given antibiotics without culture sensitivity tests (c/s). Only 2% of the patients undergone the test during the treatment. In conclusion, this study we identified that the DDD for antibiotic consumption data for five months and the clarithromycin was the most consumption over those months and we find out the most prescribed antibiotics and the most of the wards use it. In addition to the demographic data, this also helps physicians to have a more precise idea about prescriptive patterns prevalent in the Libyan community.

Keywords: Drug utilization research, Inpatient, Defined daily dose, Anatomical therapeutic chemical (ATC), Libya

INTRODUCTION

The dawn of antibiotics, which are one of the most booming drug groups used in medicine, dramatically improved the prognoses of patients with microbial infections. Unfortunately, following quite a few years of hopefulness, the over the top and unpredictable utilization of these antiinfection agents in both human and veterinary practices has prompted the development and spread of resistant organisms that imperil their viability, joined by undesirable symptoms and unwanted adverse effects [1].

In spite of the effectiveness of antimicrobials in the treatment of various bacterial diseases, usually they are utilized improperly worldwide [2]. This

abuse of antibiotics is presently one of the real major medical problems around the world. Antibiotics are the most as often as possible prescribed medications among hospitalized patients, particularly in intesive care and critical departments of the hospitals.

Programs intended to encourage proper antimicrobial prescriptions in well being institutions are an important component in quality ofcare, infection control, and cost regulation [3]. Medication usage reseach aims about means to survey whether drug treatment is rational or not. To achieve this objective, techniques for examining drug treatment towards rationality are essential [4].

Surveillance studies provide important information that identifies trends in pathogen incidence and antimicrobial resistance, including identification of emerging pathogens at both the national and global levels. Routine surveillances are critical and essential for creating and refining approaches to control antimicrobial resistance, and for guiding clinical decisions regarding appropriate treatment. The traditional approach has been to monitor pathogen antimicrobial susceptibility [5].

There are little studies about drug utilization patterns of antibiotic use in Libyan hospitals. We have done two studies earlier [3, 6]. Therefore the aim of our study was to assess drug consumption of antibiotics in outpatient and inpatient units of the government hospital in Nalut, Libya. Therefore the objectives of our study were: (a) to examine the current usage of the anti-microbial agents in medicine department of a governmental hospital in Nalut, Libya. (b) to study and assess the suitability of antibiotics utilizaiton and its prescribing pattern in different wards of the hospital. (c) to find out out the defined daily dose (DDD) of each prescribed antibiotic and (d) to offer the prescribers with information about the make use of of antibiotics in the Libyan community for further interventions to minimize antibiotic misuse.

MATERIALS AND METHODS

A retrospective drug consumption study was conducted in inpatient and outpatient wards of Nalut Hospital, Libya. The study was accepted by hospital clinical administration. The study time was five months (1/1/2013to 30/5/2013). Data were collected retrospectively from inpatients medical files (600 patient's medical file), and prescriptions for outpatients (400 prescriptions studied), the total number of prescription is 1000. The data then was calculated by Microsoft Excel software for analysis and descriptive statistics.

Data obtained from prescription statistics were:

- Age
- Gender
- Most ward using antibiotics
- The most antibiotic used in all departments
- % of admissions as related to diagnosis and antibiotic use
- % of antibiotic used without bacterial culture/sensitivity test
- Drugantibiotic interaction
- % of prescribing broad spectrum antibiotics to narrow spectrum antibiotics
- % of a combination antibiotic used to a single antibiotic used
- % Antibiotic consumption for each antibiotic using DDD

Drug utilization data were noted as defined daily doses (DDD) per 1000 inhabitants per day. The WHO indicators (Utilization in DDD; daily defined dose/inhabitants/day) were used to calculate the defined daily dose using the following formula:

$$total\ DDDs = \frac{dosage\ form\ strength * quantity\ of\ antibiotic\ dispensed}{WHO\ assigned\ DDD}$$

$$DDD/1000\ inh/day = \frac{Covered\ inhabitants\ x\ Days\ in\ the\ period\ of\ data\ collection}{total\ consumption\ in\ DDDs}\ x1000$$

Anatomical Therapeutic Chemical (ATC) classification system was prescribed by WHO and the ATC codes for each antibiotic were obtained from WHO Guidelines for ATC. Aggregate data were calculated according to the ATC/ DDD method [7].

RESULTS

A total of 600 inpatients, 400 outpatients were included during a five month study. Results showed that the percentage of inpatients was 35.8%, and 64.2% for males and females respectively. For outpatients, it was 44.5% and 54.5% for males and female respectively (Figure 1). Percentage of age groups among inpatients and outpatients is summarized in Figure 2. The inpatients' ages ranged from (5.83% for neonates) to (46.83% for young adults), and (0.25% for neonates) to (31.5% for young adults) for outpatients as clarified.

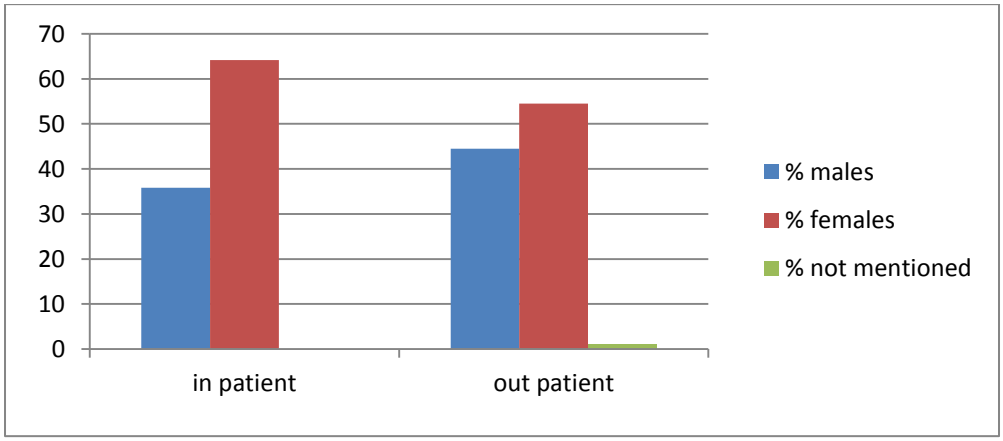

Figure 1. Number of patients admitted in the hospital showing males(35.8%) and females(64.2%), and the patients from the OPD showing males(44.5%) and females (54.5%).

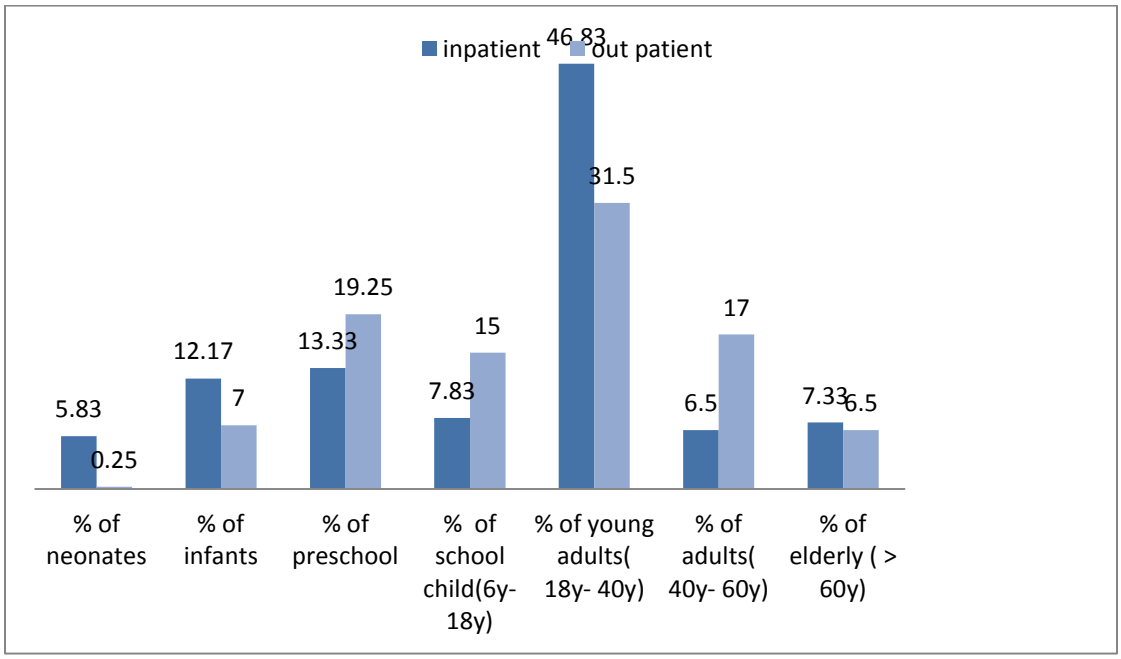

Figure 2. Percentage of age groups among inpatients and outpatients

Table 1 summarizes the prescribing frequency of antibiotics distributed for males and females in different hospital wards. Those wards in which antibiotic use was the highest were obstetrics and gynecology 32.5% and pediatrics 30.17% for inpatients and pediatric (22.5%) following by ENT (19.75%) for outpatients.

Table 1: Antibiotics consumption (g) in different wards of hospital during the period of study of inpatient

Department	1st month	2nd month	3rd month	4th month	5th month	total	%
PEDIA	36	47	32	38	28	181	30.17
NICU	7	0	2	0	3	12	2
INCUBATOR	0	5	3	5	0	13	2.17
OB.GYNE	3	44	54	42	52	195	32.5
MMW	13	5	6	5	10	39	6.5
FMW	7	6	3	12	10	38	6.3
MSW	9	7	12	9	8	45	7.5
FSW	36	4	5	4	4	53	8.83
ICU	9	2	3	5	5	24	4
Total	120	120	120	120	120	600	

More detailed information on admissions related to diagnosis and antibiotic use in the hospital was shown in Figure 3. The manner of usage of antibiotic for therapy or prophylaxis was so closed (53% for therapy and 47% for prophylaxis), lower respiratory tract infection was the most frequent diagnosis 22% while 0% otitis media, septicemia, bone and skin infection 1%, upper respiratory tract infection 3%, gastrointestinal tract 20%, 12 % for urinary tract infections, while 33% of the use not documented.

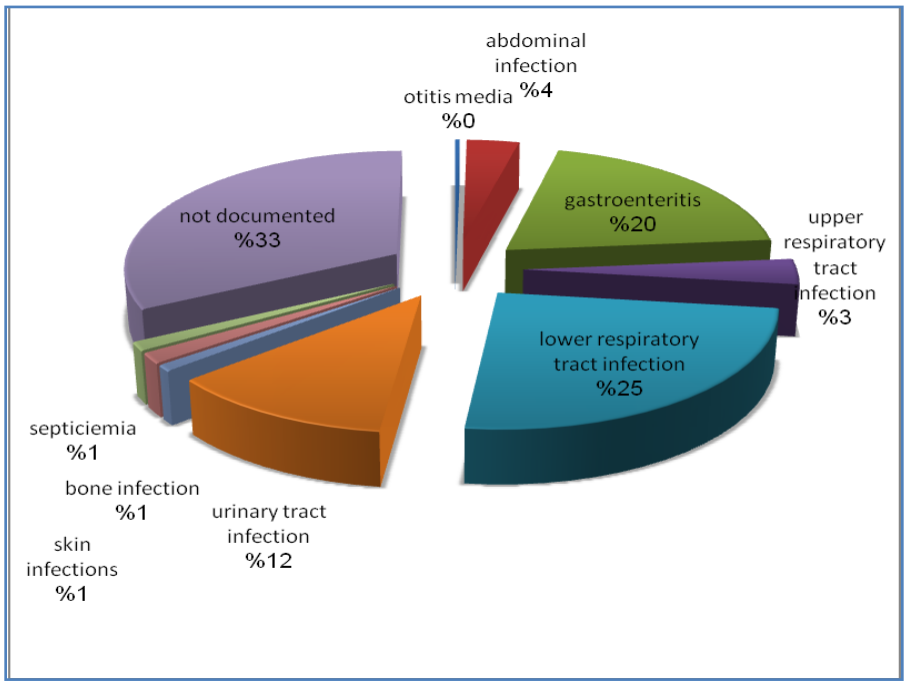

Figure 3: Admissions related to diagnosis and antibiotic use in the hospital

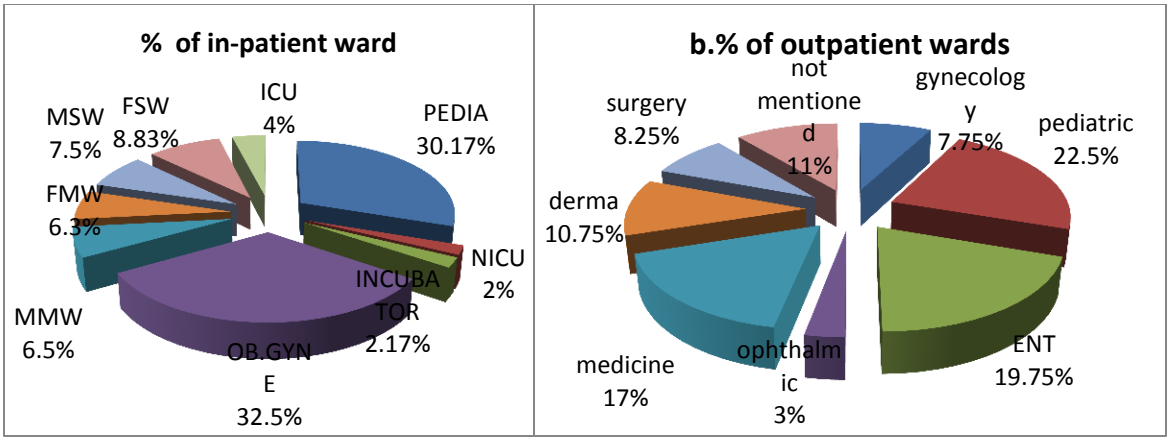

Figure 4: Antibiotic use in (a) inpatient ward and (b) outpatient ward

Antibiotic use in inpatient and outpatient wards is summarized in Figure 4. Percentage of antibiotic prescribed for in and outpatients is shown in Figure 5. The three most frequently used antibiotics for inpatients were cefotaxime, ceftriaxone and metronidazole 25.57%, 16.54% and 15.34% of the total prescribed antibiotics respectively, and for outpatients were amoxiclav (26.23%), amoxicillin and azithromycin (12.41%) and ciprofloxacin (11.48%).

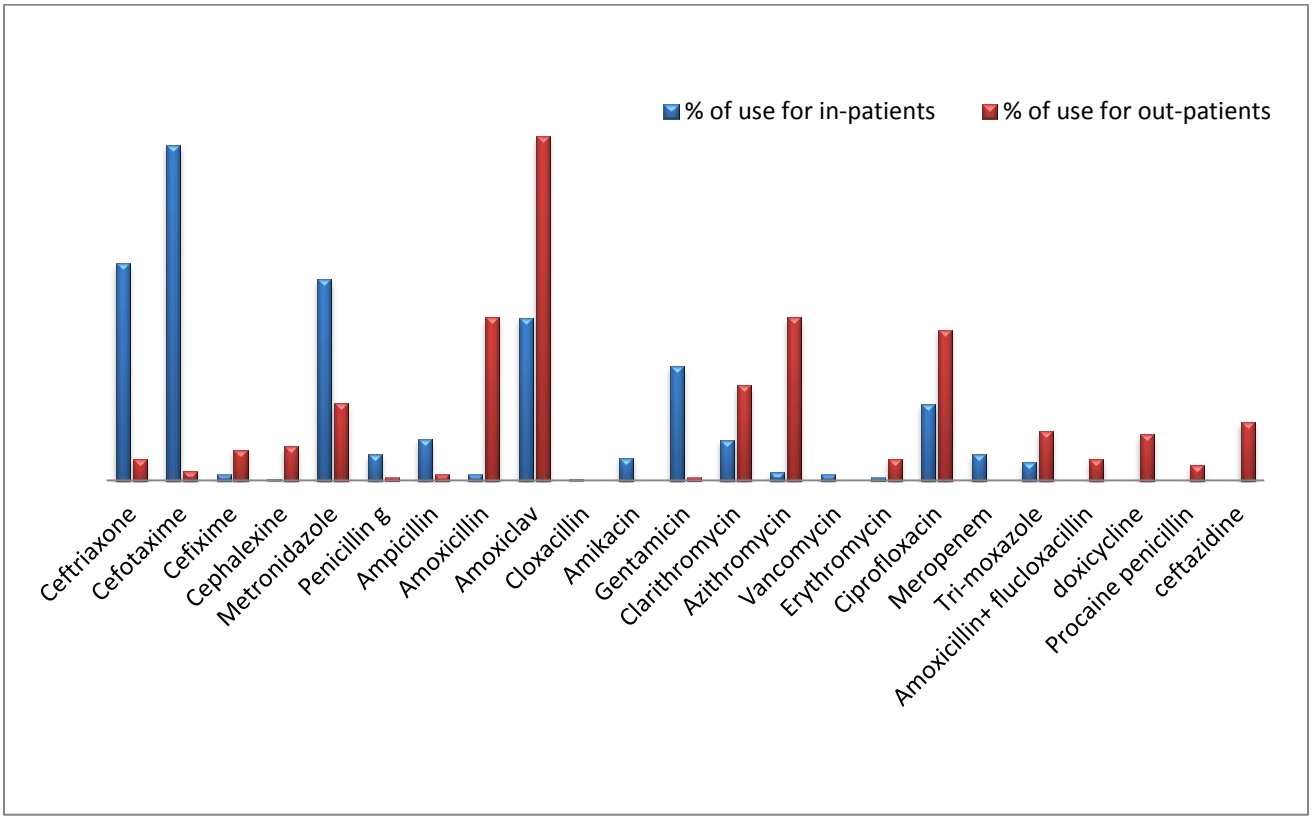

Figure 5: Percentage of antibiotic prescribed for in and outpatients

Table 2: Antibiotic consumption in terms of total consumed DDD for inpatients

S.No.	Antibiotic	ATC code	WHO's DDD (G)	DDD(g)	DDD/1000 inh/day
1	Vancomycin	J01XA01	2	3.65	0.041
2	Trimethoprime+sulfamethoxazole	J01EE01	0.4 – 2	0.676	0.0075
3	Benzyl penicillin	J01CE01	3.6	1.35	0.015
4	Metronidazole	J01XD01	1.5	1.8	0.02
5	Meropenem	J01DH02	2	3.4	0.037
6	Gentamycin	J01GB03	0.24	1.84	0.02
7	Erythromycin	J01FA01	1	0.45	0.005
8	Cloxacillin	J01CF02	2	3	0.033
9	Clarithromycin	J01FA09	0.5	10.67	0.119
10	Ciprofloxacin	J01MA02	1	2.7	0.03
11	Ceftriaxone	J01DD04	2	4.047	0.045
12	Cefotaxime	J01DD01	4	1.1	0.012
13	Cefalexin	J01DB01	2	0.225	0.0025
14	Cefixime	J01DD08	0.4	0.72	0.008
15	Azithromycin	J01FA10	0.3	2.5	0.028
16	Ampicillin	J01CA01	2	0.8	0.009
17	Amoxicillin+clavulonic acid	J01CR02	1	0.011	0.00012
18	Amoxicillin	J01CA04	1	0.988	0.011
19	Amikacin	J01GB06	1	0.44	0.005

After calculating the consumption of antibiotics in DDD, the highest consumed antibiotic in DDDs (g) was clarithromycin 10.67 g and 0.119 in terms of DDD/1000inh/day, while consumption of amoxiclav was the lowest consumption 0.011 g and 0.00012 DDD/1000inh/day. In outpatients, doxicycline was highly consumed with DDD of 26.1 g and 2.175 DDD/1000 inh/day as compared to that of phenoxybenzyl penicillin whose consumption was 0.19 g and 0.016 in terms of DDD/1000 inh/day.

Table 3: Antibiotic consumption in terms of total consumed DDD for outpatients

S.No.	Antibiotic name	ATC class1ification	WHO DDD	DDD	DDD/1000inh/day
1	Sulfamethoxazole+trimethoprim	J01EE01	2 – 0.4	3.16	0.26
2	Procaine penicillin	J01CE09	0.6	5.18	0.43
3	Phenoxymethyl penicillin	J01CE02	2	0.19	0.016
4	Metronidazole	J01XD01	1.5	5.1	0.425
5	Gentamicin	J01GB03	0.24	3.33	0.278
6	Erythromycin	J01FA01	1	2.99	0.249
7	Doxicycline	J01AA02	0.1	26.1	2.175
8	Clarithromycin	J01FA09	0.5	9.5	0.791
9	Ciprofloxacin	J01MA02	1	5.55	0.463
10	Cefalexin	J01DB01	2	5.13	0.428
11	Ceftriaxone	J01DD04	2	3.4	0.283
12	Ceftazidine	J01DD02	4	1.65	0.138
13	Cefotaxime	J01DD01	4	1.3	0.108
14	Cefixime	J01DD08	0.4	1.749	0.146
15	Azithromycin	J01FA10	0.3	4.84	0.403
16	Ampicillin	J01CA01	2	3.125	0.26
17	Amoxicillin+flucloxacillin	J01CR50	1 – 2	3 – 1.5	0.25-0.125
18	Amoxicillin+clavulonic acid	J01CR02	1	8.25	0.688
19	Amoxicillin	J01CA04	1	4.9	0.408

The manner of usage of antibiotic for therapy or prophylaxis was so closed (53% for therapy and 47% for prophylaxis) lower respiratory tract infection was the most frequent diagnosis 22% while 0% otitis media, septicemia, bone and skin infection 1%, upper respiratory tract infection 3%, gastrointestinal tract 20%, 12 % for urinary tract infections, while 33% of the use not documented. About 98% of patients given antibiotics without culture sensitivity tests (c/s), only 2% of the patients undergone the test during the treatment.

DISCUSSION

The principal aim of drug utilization research is to facilitate the rational use of drugs in populations. For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose, together with the correct information, at an affordable price. Drug utilization research can increase our understanding of how drugs are being used [3]. The manner in which antibiotic usage is expressed does matter. Proper expression of antibiotic use is needed for the interpretation of prescribing habits, the evaluation of compliance with clinical guidelines and the linkage with antibiotic resistance data. The DDD system gives a suitable tool for the quantification of antibiotic use and allows comparisons between different settings, regions, or even nations [8].

The present investigation was conducted for 5 months to collect data from 600 inpatients medical files and a month to collect 400 prescriptions of outpatients, the goal was to determine antibiotic utilization at Nalut hospital – Libya, the percentage of inpatients was 35.8%, and 64.2% for males and females respectively. For outpatients, it was 44.5% and 54.5% for males and female respectively. The longer duration of administration was 15 days and the shorter was 1 day, this is considered irrational. The inpatient's ages are from (5.83% for neonates) to (46.83% for young adults), and (0.25% for neonates) to (31.5% for young adults) for outpatients. Most ward consumed antibiotics was ob.gyne ward 32.5% from the total consumed antibiotics the most prescribed for prophylaxis, followed by pediatric ward which consume 30.17 %, this is high value for pediatric ward the most are used without clear diagnosis (fever, vomiting) and without clear investigation tests, in the incubator they also use antibiotics with 2.17 percentage.

3rd generation Cephalosporin is the most prescribed antibiotics among inpatients (42.67%), excessive use of a particular antibiotic or class of antibiotics provides selective factor favoring the arising of resistant bacteria [10]. followed by aminoglycosides (19.16%) and penicillins(18.08%), but for outpatients the penicillins are the most prescribed antibiotics (41.97%) especially amoxicillin+clavulanic acid (26.23%), and macrolides (21.31%), then cephalosporins (11.47%|) ciprofloxacillin (11.42%).

From the data obtained, only 12 patients (2%) were found to have employed microbial culture investigations that showed the demand for the instigation of treatment could have subjugated over the time-consuming tests for identification of microorganism. Prescribers might have started treatment based on experience about the indication [3], but with the spread of antibiotic resistance, which necessitates doing C/S for all bacterial infections, and in addition, all antimicrobial therapy should conform to well-defined protocol. 41.5% from inpatient prescriptions are combination of antibiotics, and 58.5% are single antibiotics, for outpatients; 93.25% are single and 6.75% are combination. The physicians prescribe combination of antibiotics for different reasons; either for synergistic effect, and to cover all of the likely pathogens, these are irrational actions to be taken, as there might be possibility of resistance to the chosen antibiotic. Or they would prescribe combination of antibiotics depending on the type and severity of infection; this is considered to be an acceptable practice for patients having serious microbial infections, or prescribed for mixed infections or if the patient's condition is not improved on a single antibiotic [9].

The most antibiotic consumption for inpatients was clarithromycin 10.67 DDD g whereas the amoxiclav was the lowest consumption 0.011 DDD g in comparisons with a research for Katakam P *et al* in Alzawia hospital that the highest consumed antibiotic in DDDs (g) was amoxicillin+clavulanic acid 36.38 DDD g for outpatients doxicycline was the most prescribed antibiotic 26.1 DDD g and the phenoxymethyl penicillin was the lowest prescribed antibiotic 0.19 DDD g [3].

In conclusion, the present study provides practical advice on the use of administrative medical files and pharmacy data to address this need. Focus is made on the use of the Anatomical Therapeutic Chemical classification and Daily Defined Dose system [10]. There is a vital need for microbiological investigation before treatment of infections. This study should help physicians to have better insight about prescription patterns prevalent in the Libyan community.

REFERENCES

[1]. Wise R, Hart T, Cars O, Streulens M, Helmuth R, Huovinen P, Sprenger M. Antimicrobial resistance. Is a major threat to public health. BMJ. 5, 1998, 317 (7159), 609-10.

[2]. Masterton R. The importance and future of antimicrobial surveillance studies. Eur J ClinPharmacol.64, 2008, 1005-11.

[3]. Katakam P, Elfituri AA, Ramadan ZH, Abadi OG. A retrospective study on antibiotic use in different clinical departments of a teaching hospital in Zawiya, Libya. Ibnosina Journal of Medicine and Biomedical Sciences. 4(1), 2012, 13-19.

[4]. Introduction to drug utilization research/WHO International Working Group for Drug Statistics Methodology, WHO Collaborating Centre for Drug Statistics Methodology, WHO Collaboration Centre for Drug Utilization Research and Clinical Pharmacological Services. Geneva: World Health Organization;2003, 8-12.

[5]. Masterton R. The importance and future of antimicrobial surveillance studies. Eur J ClinPharmacol.64, 2008, 1005-1011.

[6]. Katakam P, Chandu BR, Elfituri AA. Retrospective study on antibiotic prescription patterns in Libyan community pharmacies of Zawia. Libyan J Med Res. 8(1), 2014, 81-89.

[7]. Guidelines for ATC classification and DDD assignment, WHO collaborating centre for drug statistics methodology 16, 2013.

[8]. Fillius PMG, liem TBY et al. An additional measure for quantifying antibiotic use in hospitals. J AntimicrobChemother. 55, 2005, 805-808.

[9]. MufidaA.Yamane, AbdulrazagElghelali et al. Physicians involved in the misuse of antibiotics in Tripoli. Libyan J med Res, 2014, 8:2.

[10]. Hutchinson JM, Patrick DM et al. Mmeasurement of antibiotic consumption: a practical guide to the use of the Anatomical Therapeutic Chemical classification and Defined Daily Dose system methodology in Canada . Can J infect Dis, 15(1), 2004.