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Evaluation of Prescribing Pattern of Antibiotics in Pregnant Women and Pediatrics at Various Hospitals of Narasaraopet

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I. INTRODUCTION

Drug usage is typical process. In any country a large number of socio cultural factors contribute to the ways drugs are used. In India, these include national drug policy, illiteracy, poverty, use of multiple health care systems, drug advertising and promotion, sale of prescription drugs without prescription, competition in the medical and pharmaceutical market place and limited availability of independent, unbiased drug information. The complexity of we means that optimal benefits of drug therapy in patient care may not be achieved because of under use, overuse or misuse ofdrugs.

Inappropriate drug use may also lead used cost of medical care, antimicrobial resistance, adverse effects and patient mortality. Hence in recent years studies on drug utilization have become a potential tool to be used in the evaluation of health systems. The interest in drug utilization studies began in the early 1960s and its importance has increased since then because of increase in marketing of new drugs, wide variation in the pattern of drug prescribing and consumption, growing concern about delayed adverse effects and the increasing concern regarding the cost ofdrugs.

In recent years pharmacists have been increasingly involved in many emerging areas of pharmacy in addition to drug therapy Pharmacists are expected to share their knowledge in improving policy decision in hospitals. At drug therapy level, pharmacists may utilize their expertise in making choice of drugs include or exclude in the formulary based onpharmaco-economics

The role of clinical pharmacists is to ensure rational, effective and safe treatment for the patient in their care. This involves interacting with patient to identify the medicines they have been taking before they were admitted to hospital.

Pharmacists, by virtue of their expertise and their mission of ensuring optimal patient outcomes, should work in the process of medicine use improvement through DUEDrug utilization review (DUR) is defined as an authorized, structured, ongoing view of prescribing, dispensing and use of medicationDURencompassesadrugreviewagainstpredeterminedcriteriathat

In changes to drug therapy when these criteria are not met it involves a comprehensive review of patient's prescription and medication data before, during and after dispensing to ensure appropriatemedication.

As a quality assurance measure, DUR programs provide corrective action, prescriber feedback and further evaluations. Include concept of appropriateness that must be assessed relative to the indication for the treatment, concomitant diseases (that might contraindicate or interfere with chose drug therapy) and the use of other drugs (interactions). Thus they document the extent of inappropriate prescribing of drugs and also the associated adverse, clinical, ecological and economicconsequences.

- Review drug use and /or prescribingpatterns
- Provide feedback of results toclinicians
- Develop criteria and standards which describe optimal druguse
- Promote appropriate drug us through education and other interventions. . Observe the patterns of drug use with current recommendationsor
- Guidelines for the treatment of a certaindisease.
- Relate the number of cases of adverse effects to the number of patients exposed. If it is

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possible to detect that the reaction in more common in a certain age group, in certain conditions or at a special dose level, then information on proper use of drug can be improved such as indications contraindications, appropriate dose etc. so that withdrawal of drug may beavoided.

- Evaluate drug use at a population level, according to age, sex, social classetc.The DUE plays a key role in helping the healthcaresystemsunderstand,interpretandimprovetheprescribing,administrationanduseofmedications.Theprincipal sins of t to facilitate rational use of drugs, which implies theprescription of will g in an optimal dose on the right indication,withcorrectinformation at an affordable price. It also provides insight into theefficacyofdrug is whether a certain drug therapy provides value for money. DUresearch can thus help to set at priorities for all rational allocation of heath care budget.

The World Health Organization (WHO) addressed drag utilization as the marketing distribution, prescription and use of drugs in a society, considering its use of drugs in society, considering its consequences , medical and economic Studies on the process of drug indication focus on the factors related to ping, dispensing, administering, and taking of medication, and its associates events, converting the medical and non medical determinants of drug utilization, the effects of drug use beneficial oradverse.
DUR is classified in three categories

- Prospective-evaluation of a patient's drug therapy before medication is dispensed.
- Concurrent- ongoing monitoring of drug therapy during the course of treatment.
- Retrospective - review of drug therapy after the patient has received the medication.

ANTIBIOTICS

Antibiotics are the Substance produced by a microorganism [or a similar product produced wholly (synthetic) or partially (semi synthetic) by chemical synthesis] that is capable, in low concentrations, of inhibiting the growth of or killing other microorganisms

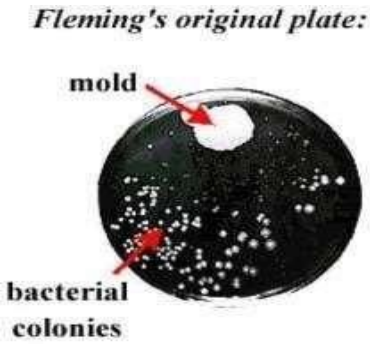
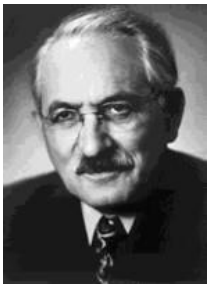


Figure.No.1.1 Flemings original plate

NOBELISTS INVOLVED IN ANTIBIOTIC RESEARCH

Gerhard Domagk Nobel Prize: 1939
Prontocil



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Selman Waksman NobelPrize:1952 Streptomycin
Alexander Fleming Nobel Prize: 1945
Penicillin

	EUKARYOTE	PROKARYOTE
Size	5 - 10 µm	1-3 µm
Cell Wall	Only in fungi/algae	Present
Cytoplasmic membrane	Present	Present
Nuclear membrane	Present	Absent
Genetic information	DNA (>1 chromosome)	DNA (1 chromosome)

Table.1.1 Comparison of Eukaryotes and Prokaryotes

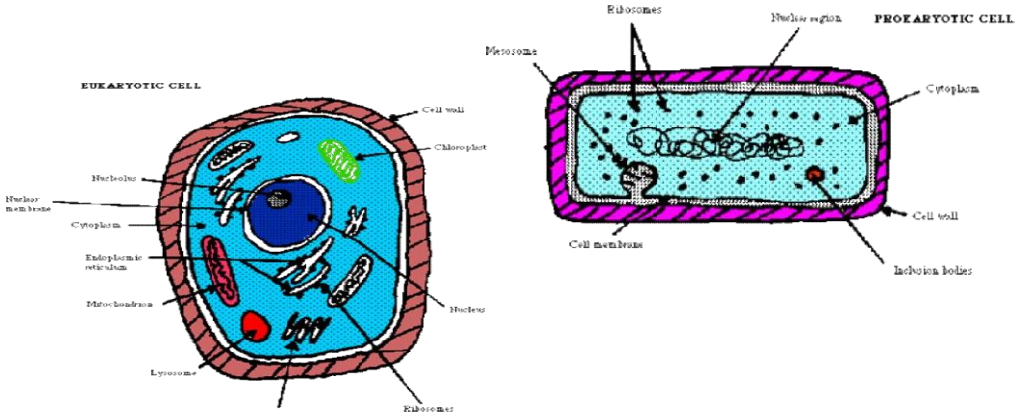

Figure.1.2Eukaryoticcell Figure.1.3. Prokaryotic cell

I. GRAM-POSITIVE and GRAM-NEGATIVEORGANISMS

Gram staining is based on the ability of bacteria cell wall to retain crystal violet dye during solvent treatment. The cell walls for Gram-positive microorganisms have a higher peptidoglycan and lower lipid content than Gram- negative bacteria.

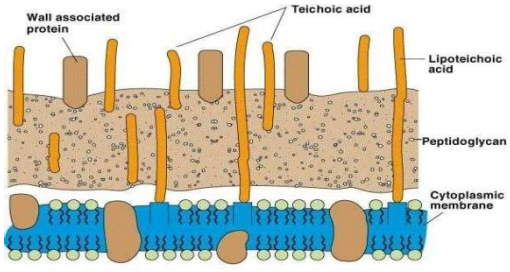

Figure.1.4 Grampositiveorganisms

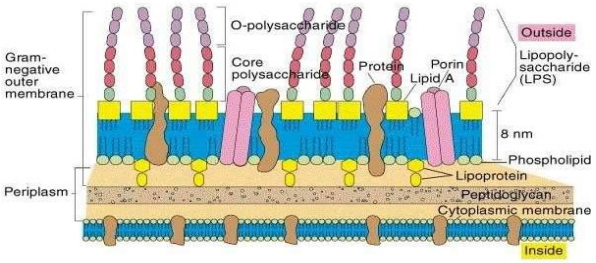

Figure.1.5 Gram negativeorganisms

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CommonGram-positiveorganisms: Common Gram-negativeorganisms:
Streptococcus
S. aureus Bacillus anthracis Clostridium botulinum
Klebsiella pneumonia Shigella Yersinia pestis Salmonella

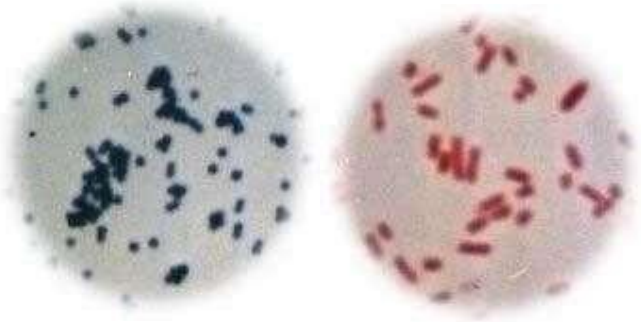
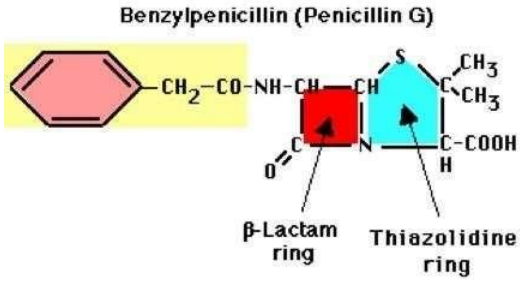


Figure.1.6.Grampositive Figure.1.7. Gramnegative

II. PENCILLIN:



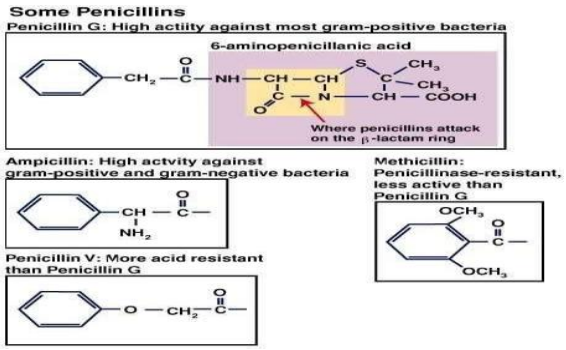


Figure.1.8.Benzyl Penicillin Figure.1.9.Some Pencillins

An expanded role for the penicillins came from the discovery that natural penicillins can be modified chemically by removing the acyl group to leave 6- aminopenicillanic acid and then adding acyl groups that confer new properties. These modern semi-synthetic penicillins such as Ampicillin, Carbenicillin, and Oxacillin have various specific properties such as: resistance to stomach acids so that they can be taken orally, a degree of resistance to penicillinase (a penicillin-destroying enzyme produced by some bacteria) extended range of activity against some Gram-negative bacteria. Although the penicillins are still used clinically, their value has been diminished by the widespread development of resistance among target microorganisms and also by some people's allergic reaction to penicillin.

III. OTHER COMMONANTIBIOTICS

Cephalosporins

Beta-lactams with a similar mode of action to penicillin but with less allergenicity.

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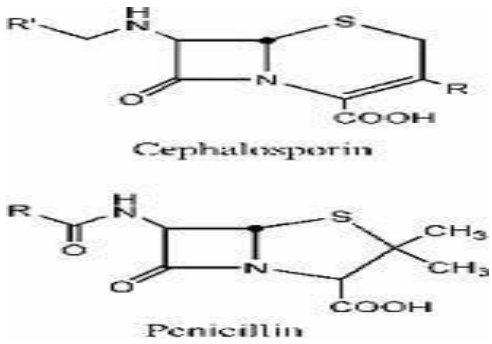

Figure.1.10.Cephalosporins Streptomyces-derived Antibiotics

Actinomycetes, especially the Streptomyces species, have yielded most of the antibiotics used today in clinical medicine. Examples: amphotericin B, erythromycin, streptomycin, tetracycline, neomycin, and vancomycin.

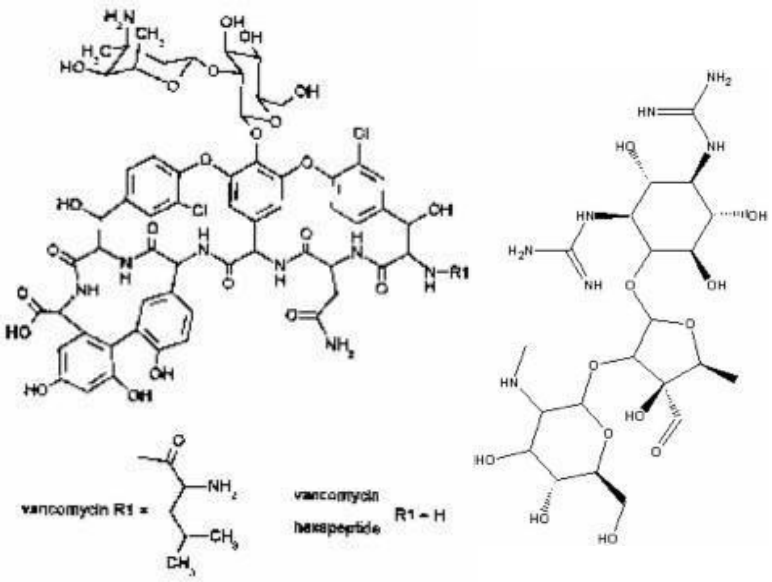

Figure.1.11. Streptomyces-derived Antibiotics
Figure.1.12. Streptomyces-derived Antibiotics

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Mechanism of action	Antibiotic	Bacterial Target
Inhibition of cell wall synthesis	β Lactams: Penicillin Cephalosporin Bacitracin Vancomycin	Transpeptidase Peptidoglycan Transporter Ala-ala dipeptide
Inhibition of protein synthesis	Aminoglycosides Streptomycin Gentamycin Neomycin Tetracyclines Erythromycin	30S ribosome 50S ribosome Free ribosomes
Inhibition of nucleic acidsynthesis	Quinolones, Rifampacin	DNA gyrase DNA- dependent RNA polymerase
Inhibition of cytoplasmic membrane function	Polymyxin	Membrane lipids
Anti metabolites	Sulfonamides	Folate synthesis

Table.1.2 Mechanism of Action of Common Antibiotics

Pencilling action

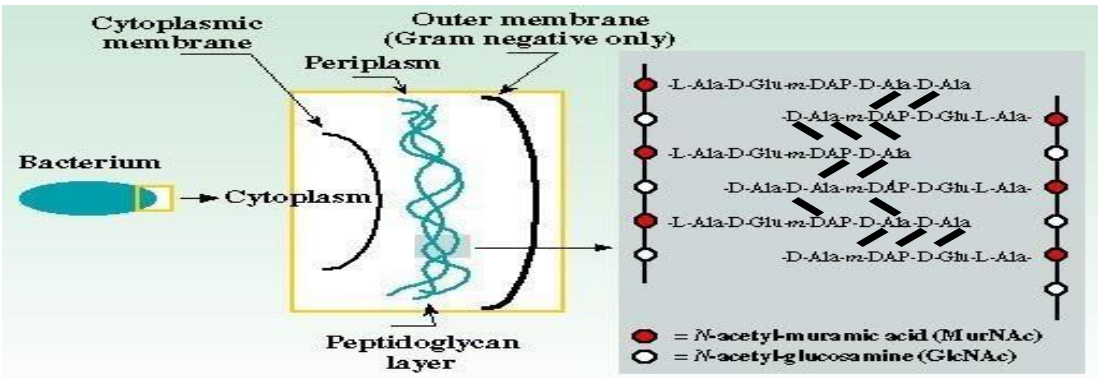

Figure.1.13.Pencillian action

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MECHANISMS OF ANTIBIOTIC RESISTANCE:

Current penicillin prescriptions such as augmentin contain beta-lactamase inhibitors to block cleavage of the penicillin.

Antibiotic resistant genes

Pumping mechanisms to remove antibiotic from bacterial cell

Enzymes that modify antibiotics

Bacteria acquire genes conferring resistance in any of three ways.

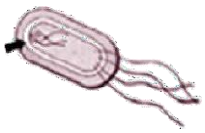

Figure.1.14. Spontaneous DNA mutation

In **spontaneous DNA mutation**, bacterial DNA (genetic material) may mutate (change) spontaneously arises this way. (indicated by starburst). Drug-resistant tuberculosis

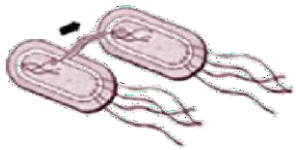

Figure.1.15. Transformation

In a form of microbial sex called **transformation**, one bacterium may take up DNA from another bacterium. Pencillin-resistant gonorrhoea results from transformation.

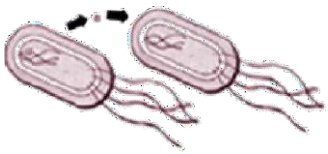

Figure.1.16. Plasmid

Most frightening, however, is resistance acquired from a small circle of DNA called a **plasmid** that can flit from one type of bacterium to another. A single plasmid can provide a slew of different resistances. In 1968, 12,500 people in Guatemala died in an epidemic of Shigella diarrhoea. The microbe harboured a plasmid carrying resistances to four antibiotics.

1.2.1 For all Quinolones/Fuoroquinolones

The indications in the table below should be restricted for all quinolones/ fluoroquinolones containing products in order to be used only when it is considered inappropriate to use other antibacterial agents that are commonly recommended for the treatment of these infections.

Therefore the following text should be added in Section 4.1 as relevant:

"In [indication] [name of product] should be used only when it is considered inappropriate to use other antibacterial agents that are commonly recommended for the treatment of theseinfections."

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• Uncomplicatedcystitis • Simple uncomplicated acutecystitis • Acute cystitis inwomen • Simple uncomplicated acute cystitis in the premenopausal adultwomen • Recurrent cystitis inwomen • Acute uncomplicated infection of lower urinary tract (simplecystitis)
• Acuteexacerbationofchronicbronchitisandofchronicobstructivepulmonarydisease • Acute exacerbation of chronic obstructive pulmonary including chronicbronchitis • Acute exacerbations of chronicbronchitis • Exacerbation of chronic obstructive pulmonarydisease
• Acute bacterial rhinosinusitis • Acutesinusitis • Acute bacterialsinusitis
• Otitis mediaacute

Table.1.3.Infections

Amendments of indications for specific Quinolones/Fluoroquinolones Additionally for the following active substances, the following indications should be amended as recommended below:
Ciprofloxacin

Current indications in product information of ciprofloxacin containing products	Recommended wording
Adults	
Urethritis and cervicitis due to bacteria susceptible to Fluoroquinolones	Gonoccocal urethritis and cervicitis due to susceptible Neisseria gonorrhoeae
Bone and joint infections	Infections of the bones and joints

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Treatment of infections in neutropenic patients Infection in immune compromised patients	Ciprofloxacin may be used in the management of neutropenic patients with fever that is suspected to be due to abacterial infection
Urinary tract infection	Uncomplicated acute cystitis Acute pyelonephritis Complicated urinary tract infections Bacterial prostatitis
Children and adolescents	
Broncho-pulmonary infections in cystic fibrosis caused by Pseudomonas aeruginosa	Bronchopulmonary infections due to Pseudomonas aeruginosa in patients with cystic fibrosis

Table.1.4.Ciprofloxacin

Levofloxacin

Current category 1 indications in product information of levofloxacin	Recommended wording categoryof 1indications
Pyelonephritis and complicated urinary tract infections (see section 4.4)	Acute pyelonephritis and tract complicated urinary infections (see section4.4)
	Acute exacerbation of chronic obstructive pulmonary disease including bronchitis

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Acute exacerbation of chronic bronchitis (lastline)	In [indication] [name of product] should be used only when it is considered inappropriate to use other antibacterial agents that are commonly recommended for the treatment of these infections.
skin and soft tissue infections skin and soft structure infections	Complicated skin and soft tissue infections / Complicated skin and skin structure infections In [indication] [name of product] should be used only when it is considered inappropriate to use other antibacterial agents that are commonly recommended for the treatment of these infections.

Table.1.5. Levofloxacin

Moxifloxacin

Current category 1 indications in product information of moxifloxacin	Recommended wording of category 1 indications
	Acute exacerbation of chronic obstructive pulmonary diseaseincluding bronchitis In [indication] [name of

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Acute exacerbation of chronic bronchitis (lastline)	product] should be used only when it is considered inappropriate to use other antibacterial agents that are commonly recommended for the treatment of these infections.

Table.1.6. Moxifloxacin

Ofloxacin

Current indications in product information of ofloxacin containing products	Recommended wording
Pyelonephritis and complicated urinary tract infections	Acute pyelonephritis and complicated urinarytract infections
Prostatitis, epididymo-orchitis Chronic bacterial prostatitis (complicated or uncomplicated) o Prostatitis by E. coli o Prostatitis, epididymo-orchitis o Prostatitis, infection of the epididymis and the testicle Severe prostatitis	Bacterial prostatitis, epididymoorchitis
• Pelvic inflammatory disease, in combination treatment o Acute pelvic inflammatory diseaseo Pelvic inflammatory disease,in combination treatment	

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• Pelvic region infection in women (in combination with other antibiotics) • Inflammatory pelvic disease, in combinationstreatment • Upper genital tract infection in women • (see 4.4) (complicated or uncomplicated) • Upper gynaecological tract infections, including infections due to susceptible strains of Neisseria gonorrhoeae	• Pelvic inflammatory disease, in combination with other antibacterial agents
• Sepsis due toabove-mentioned genito-urinary infections	• Urosepsis (only applicable for i.v. formulation)

• Uncomplicated cystitis(last line) o Uncomplicated cystitis o Uncomplicated cystitis (should be used only when it is considered inappropriate to use antibacterial agents that are commonly recommended for the initial treatment	• Uncomplicad cystitis In [indication] [name of product] should be used only when it is considered inappropriate to use other antibacterial agents that are commonly recommende d for the treatment of these infections.

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of these infections) o Uncomplicated cystitis (XX should only be used if antibacterial treatment considered as first choice of treatment is deemed unfit/inappropriate)	
• Urethritis (last line) o Urethritis (should be used only when it is considered inappropriate to use antibacterial agents that are commonly recommended for the initial treatment of these infections)	Urethritis [indication] [name of duct] should be used y when it is sidered inappropriate use other antibacterial nts that are commonly ommended forthe

Urethritis (XX should only be used if antibacterial treatment considered as first choice of treatment is deemedunfit/inappropriate	atment of these ections.

Table.1.7. Ofloxacin

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Amoxicillin:

Amoxicillin, an acid stable, semi- synthetic drug belongs to a class of antibiotics called the Penicillins (antibiotics). It is shown to be effective against a wide range of infections caused by wide range of Gram - positive and Gram- negative bacteria in both human and animals[1- 4]. It is a congener of ampicillin (a semi- synthetic amino penicillin) differing from the parent drug only by hydroxylation of the phenyl side chain.

Pharmacology

Amoxicillin is bactericidal against susceptible micro- organisms through the inhibition of biosynthesis of cell wall mucopeptide during bacterial multiplication. It acts by binding to penicillin binding protein 1A (PBP1A) located inside the bacterial cell well. The penicillins (amoxicillin), acylate the penicillin sensitive transpeptidase C terminal domain by opening the lactam ring causing inactivation of the enzyme, prevents the formation of a cross link of two linear peptidoglycan strands, inhibiting the third and last stage of bacterial cell wall synthesis, which is necessary for cell division and cell shape and other essential processes; and thus, the lethality of penicillin for bacteria involves both lytic and non lytic mechanisms. Cell lysis is than mediated by bacterial cell wall autolytic enzymes such as autolysins; it is possible that amoxicillin interferes with an autolysininhibitor.

The imperfect cell wall synthesis make bacterial cells to absorb water by osmosis; as gram positive & gram negative bacteria have 10 30 & 35 times intracellular osmotic pressure than external environment. Amoxicillin is more effective against gram positive than gram negative micro organisms and it demonstrates greater efficacy to penicillin, penicillin V and comparable to other antibiotics, e.g. ampicillin, azithromycin, clarithromycin, cefuroxime and doxycycline in treatment of various infections/ diseases.

Pharmacokinetics

Amoxicillin is well absorbed (at different rate and extent from various regions of gut) from GIT. It enjoys widespread clinical use, not only because of its broad antibacterial spectrum but also because of its high oral bioavailability (70-90%) with peak plasma levels occurring within 1 to 2 hrs. and is dose dependent, generally be 1.5-3 times greater than those of ampicillin after equivalent oraldoses.

The Apparent volume of distribution of amoxicillin is approximately 0.26 – 0.31 L/kg and widely distributed to many tissues including liver, lungs, prostate (human), muscle, bile, ascitic, pleural and synovial fluids, and ocular fluids, accumulates in the amniotic fluid and crosses the placenta, but penetrates poorly into the central nervous system unless inflammation is present (1060% of those found in serum). Very low levels of the drug are found in the aqueous humor, and low levels found in tears, sweat and saliva.

It is approximately 17-20% bound to human plasma proteins, primarily albumin. Excretion of amoxicillin is predominantly renal, and >80% of which 50-70% unchanged (of administered doses) is recoverable in the urine, leading replacements and in dentistry. Amoxicillin is susceptible to degradation by β- lactamase producing bacteria, and so may be given with β-lactamase inhibitor such as clavulanicacid.

Adverse Effects

A pharmacovigilance study conducted for documenting side effects of drugs within the WHO Programme for International Drug Monitoring from January 1988 up to June 2005, the GIF database collected 37 , 906 reports, of which 1095 were related to amoxicillin alone and 1088 toamoxicillin in combination (amoxicillin/clavulanic acid). The percentage of skin reactions was higher for both amoxicillin alone (82%) and amoxicillin in combination (76%); on the contrary, the percentage of gastrointestinal, hepatic and haematological reactions.

CEFTAZIDIME (for pseudomonas aeruginosa further expansion of Gm negative spectrum to include hard treating organisms such as Enterobacter, Seratia, and Pseudomonas. In addition to better Gm negative spectrum, this group has improved pharmacokinetic properties (longer half-lives) that allow once daily dosing with some agents. In general, activity toward Gm+ bacteria is reduced. These are specialty antibiotics that should be reserved for specificuses.

- Enterobacteriaciae that are almost always sensitive (>95%sensitive)
- E.coli
- Proteus mirabilis (indole-)
- Proteus vulgaris (indole+)
- Klebsiellapneumoniae
- Gram negative bacilli that age generally sensitive (>75%sensitive)
- Morganellamorganii
- Providenciaretgerri
- Citrobacterfreundii

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Antibiotics are the pillars of modern medical care and play a major role both in the prophylaxis and treatment of infectious diseases Excess of drug utilization studies focused on assessing patterns of drug prescribing as a mean of pinpointing areas for improper prescribing cannot be overlooked. Improper prescribing can cause toxicity for patients and will be a waste of money and time. It can also cause therapeutic failure that results in progress of disease conditions and worsening o the patient health condition. The improper prescribing and excessive use of antibiotics can lead to loss of the effectiveness of currently used antibiotics

Antibiotics are among the class of drugs with the most potential impact on preventable mortality in developing countries. Antimicrobial resistance is emerging as a complex problem driven by many interconnected factors especially the use and misuse of antimicrobials. Many patients believe that newer and expensive antibiotics are more effective than older agents; this belief is shared by some prescribers and results in unnecessary use of neweragents.

This practice cause unnecessary health care expenditure and encourages the development of resistance. Cephalosporin s are a commonly used group of antibiotics in hospitals and health care facilities around the world. In the developed countries the use of older cephalosporin's is decreasing, that of the newer generations hasincreased.

Beta-Lactam antibiotics

Beta-lactam antibiotics are a broad class of agents consisting of all antibiotic agents that consisting of all antibiotic agents that contain a beta lactam ring in their molecular structures these antibiotic agents includes penicillins derivatives (penams), cephalosporins(cephems).

Mechanism of action:

Cephalosporins are bactericidal agents and have the similar mode of action a beta-lactam antibiotics (such as pencillins) but are less susceptible to pencillinases, cephalosporins inhibit the synthesis of the peptidoglycan layer of bacterial cell walls. The peptidoglycan layer isimportant for cell wall structural integrity. In the final step the trans peptidation is in which the synthesis of the peptidoglycan is facilitated by peptidases known as penicillin-binding proteins(PBPs). PBPs bind to the D-Alanine-D As at the end of muropeptides (peptidoglycan precursors) to crosslink the peptidoglycan - lactam antibiotics mimic the D-Alanine - D- Alanine site, thereby irreversibly inhibiting pencillin-binding proteins (PBP) cross linking ofpeptidoglycan.

In gonorrhoea the first choice of the treatment is a single dose of ceftriaxone 250mg en intramuscularly, Ceftriaxone is subsided if prescribed for the treatment of confirmed atlosacin-resistant gonorrhea, and the prescription is endorsed accordingly. Research shows that ceftriaxone attains the optimal concentrations to prevent the development of step wise mutations and resistance in Neisseria gonorrhoea ceftriaxone has been shown to be greater than 95% effective. Therfore a repeat test to ensure care is not usually required as long as the patient is asymptomatic aftertreatment.

Anthromycin is also routinely given when treating gonorrhea, because co- infection with chlamydia is common. Ciprofloxacin (500g stat) is an alternative to ceftriaxone if cephalosporins are contraindicated (most often due to documented allergy to beta-lactam antibiotics) or if the isolate is known to be sensitive to ciproflxacin. Increasing of oprofloxacin resistance is becoming common the prevalence of resistance is varying by location. Broad-spectrum treatment is used in pelvic inflammatory disease (PID) because the consequences of untreated infection can be serious, Infertility and ectopicpregnancy.

The recommended treatment which covers N. Gonorrhea, Chlamydia trachomatis and anaerobe is ceftriaxone 250mg IM, stat and doxycycline 100mg, two time daily and Metronidazole 400mg, two times daily, for two weeks.

In the regimen primarily Ceftriaxone is included to cover N. gonorrhea. Patients should be advised to inform sexual partners that they need to be screened and treated if positive for gonorrhoea and Chlamydia. Ceftriaxone 250mg IM stat in combination with doxycycline 100mg, two times daily, for two weeks is recommended for epididymo orchitis fix sexually transmitted infections (mostly Chlamydia or gonorrhoea) are the suspectedcause.

Most guidelines recommend this regimen in less than 35 years old men. Urethral discharge and more than one sexual partner in the last 12 month are the other risk factors for sexually transmitted infections. Any patients with suspected meningitis should be immediately transferred to hospital Ceftriaxone is an alternative to benzyl penicillin for suspected meningitis. IM or IV benzylpencillin should be given while transfer to hospital is being arranged. People with suspected

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meningitis who have a history of immediate allergic reaction to penicillin in this condition ceftriaxone are an alternative to benzyl penicillin. Although there is some cross reactivity between penicillin and cephalosporinallergy.

Ceftriaxone is given of this appropriate for seriousness of the infection Second-line dations for cephalosporins, some respiratory tract infections cefaclor is used as a second acrative. Cefaclor is a second-line alternative to amoxicillin for suspected a sinusitis. Other second line alternatives are co-trimoxazoleer doxycycline However, in most cases antibiotics are not necessary at all. Without antibiotics 80% of cases resolve in 14 days. In addition, antibiotics only offer marginal befit after 7 dos a sinusitis analgesics (e.g. paracetamol or NASAIDs) are the primarytreatment.

Other treatments that may enhance drainage of exudates and improve symptoms include rational corticosteroids, sodium chloride 0.9% sprays and drops, steam inhalations and congestants. Purulent nasal discharge persisting for more than seven days, facial pain or villary tooth ache, unilateral sinus tenderness or fever safest that bacterial infection is more key and antibiotics may be appropriate in people with these symptoms and signs.Cefaclor a second line alternative (as are erythromycin or co-trimoxazole) to amoxicillin in acute a media, however, again antibiotic treatment isunnecessary.

Most cases of scute otitis can be treated with paracetmol and arrangements for a follow-up appointment and antibiotic prescription can be prepare in the next 24 hours if no improvement occurs. Antibiotics can be considered earlier for those with systemic symptoms, children aged less than six months or children aged less than two years with severe or bilateraldisease.

GENERATION	DRUGS	DESCRIPTION
FIRST	CEFACETRILE, CEFADROXIL CEFALOGLYCIN, CEFALORIDINE, CEFAPIRIN, CEFAZAFLUR, CEFRADINE, CEFTEZOLE CEFPROZIL, CEFUZONAM, CEFMETAZOLE, CEFOXITIN, CEPHALEXIN CEFALONIUM, CEFALOTIN, CEFATRIZINE, CEFAZEDONE, CEFAZOLIN,	Gram-positive: Activity against penicillinase-producing. Methicillin susceptible staphylococci and streptococci (though they are not the drugs of choice for such infections). No activity against methicillin resistant staphylococci orenterococci. Gram-negative: Activity against Proteus mirabilis, some Escherichia coli, and Klebiellapnemoniae, but have no activity against Bacteroidsfragilis, Pseudomonas, Enterobacter, indole-positive Proteus, or Serratia.

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.	CEFROXADINE	

SECOND	CEFACLOR, CEFONICEID, CEFUROXIME, CEFOTETAN, CARBACEPHEMS: LORACARBEF	Gram-Positive: Less than first- generation. Gram-negative: Greater than first generations: HEN (Haemophilus influenzae, Enterobacteraerogenes and some Neisseria + the PECK described above.

THIRD	CEFCAPENE, CEFDALOXIME, CEFDINIR, CEFDITOREN, CEFETAMET, CEFIXIME, CEFMENOXIME, CEFODIZIME, CEFOTAXIME, CEFOVECIN, CEFPIMIZOLE, CEFPODOXIME,	Gram-positive: some members of this group (in particular, those available in an oral formulation, and those with anti pseudomonal activity)have decreased activity against gram positive organisms Gram-negative: Thrid-generation cephalosporins have a broad spectrum of activity and further increased activity against gram-negative organisms. They are also able to penetrate the CNS, making them

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Third generation Cephalosporins- with anti pseudo monal activity	CEFTERAM, CEFTAMERE, CEFTIBUTEN, CEFTIOFUR, CEFTIOLENE, CEFTIZOXIME, CEFTRIAXONE CEFOPERAZONE CEFTAZIDIME	useful against meningitis caused by pneumococci, meningococci, H.influezae, and susceptibleE.coli, Klebsiella, and penicillin-resistant N.gonorrhoeae.
FOURTH	CEFCLIDINE, CEFEPIME, CEFOSELIS, Note: Cefquinome human use. It is medicine. CEFLUPRENAM, CEFOZOPRAN, CEFPIROME, CERQUINOME, is not approved for veterinary Medicine.	Gram-Positive: They are extended spectrum agents with similar activity against gram-positive organisms generation cephalosporins. Gram-negative: Fourth generation cephalosporins are zwitterions that can penetrate the outer membrane of gram negative bacteria. They also have a greater resistance to bet-lactamases than the third generation cephalosporins. Many can cross the blood-brainbarrier and are effective inmeningitis...
FIFTH	CEFTOBIPROLE, CEFTAROLINE,	Ceftobiprole has powerful anti pseudomonal characteristics and appears to be less susceptible to development of resistance. Cetaroline has also been described as " fifth-generation" cephalosporin, but does not have the anti- pseudomonas or VRE coverage of ceftobiprole

Table.l.8. Classification of Cephalosporins

SPECTRUM & USES

First Generation Cephalosporins - Spectrum

- Prototype Drugs are CEFAZOLIN (IV use) and CEPHALEXIN (oraluse).
- Staph aureus - excellent activity against b-lactamase-producingstrains

Not effective against the methicillin-resistant staph auresus and epidermidis

- Streptococci - excellent activity versus Streptococcussp.
- Not effective against the penicillin-resistant strep. Pneumonia CEFTAZIDIME (for pseudomonasaeruginosa.)

Further expansion of Gram negative spectrum to include hard treating organisms such as Enterobacter, Seratia, and Pseudomonas. In addition to better Gm negative spectrum, this group has improved pharmacokinetic properties (longer half-lives) that allow once daily dosing with some agents. In general, activity toward Gm+ bacteria is reduced. These are specialty antibiotics that should be reserved for specificuses.

- Enterobacteriaciae that are almost always sensitive (>95%sensitive)
- E.coli
- Proteus mirabilis (indole-)
- Proteus vulgaris (indole+)

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- Klebsiellapneumoniae
- Gram negative bacilli that age generally sensitive (>75%sensitive)
- Morganellamorganii
- Providenciaretgerri
- Citrobacterfreundii

II. AIM AND OBJECTIVES

AIM:

- To evaluate the use of antibiotics in pregnant women and pediatric patients in various hospitals ofNarasaraopet.

OBJECTIVES:

- To evaluate the utilization of antibiotics in pregnant women and pediatric patients we are collecting the prescriptions at various hospitals of Narasaraopet for the duration of 3 months (April 2021- June2021).

III. LITERATUREREVIEW

Remesh, Samna Salim et al. (2014) done a cross-sectional prospective study on subotics prescribing pattern in the inpatient departments of tertiary care hospital was carried out in 100 inpatients in six departments. The shows mean duration of hospitalization among the study population was 5.48 (64.28) Among these 410Smedicines prescribed, antibiotics contributed 151 (36.8%). They were any indicated for respiratory infections, and the most common antibiotic was Beta- lactums 250 Interestingly, 89 antibiotics (60%) were administered as injections. About 70 of the antibiotics were prescribed without any combinations. The adherences to World ith Organization's essential medicines list were 122 (81%). A total of seven adverse drug ons were reported in the current study. Their conclusion was physicians prescribed tics more rationally with no banned drugs and less newer drugs. Rational prescribing of tics would help avoid poly pharmacy and prevent drug resistances.

Pandlamuninj et al(2014) done a study on prescribing pattern of anti microbial agents in the medical intensive care unit of a tertiary care territory south india.100 consecutive inpatient records of patients admitted to the teaching hospital in puducherry union micu during September to decmber,2013 were studied. The results was average number of MAs per patient was found to be 1.13. cephalosporins and ceftriaxone. Organisms isolated in the culture and sensitivity tests were sensitive to imipenem and picillinTazobactam in common. No adverse drug reaction was observed for any AMA. and name of the drugs and parenteral of administration were prefered by the physicians for ping the AMAs. Most AMA prescriptions were made without bacteriological culture and tivity testing evidences. They concluded that need for motivating the physicians to prescribe antimicrobial agents by generic names with bacteriologicalevidences.

Shwanthm et al (2014) was conducted a prospective, observational study on assessment of drug utilization in hospitalized children at a tertia3.ry care teaching hospital in department of pediatrics total of 150 patients aged 1-5 years were analyzed, which included 80 males and 70 females. The duration of hospitalization was 4-5 days. Respiratory diseases were accounted for 33.33%, followedby intestinal diseases (19.33%). Among majority of cases were pneumonia(56%) and acute stroenteritis(82.75%).In all patients total 854 drugs were prescribed. most commonly prescribed drug classes were antimicrobial agents (28.10%)drugs acting on respiratory system (12.18%) and NSAIDs (7.50%). penicillins(28.75%)agents followed by aminoglycosides 21.33 %) &cephalosporins (17.5%) salbutamol aerosol (48.08 %) inhaled salbutamo+ipratropium al.15%). paracetamol (90.63%) was most extensively.Prescribed NSAID ibuprofen+PCT 837%) 49.06% of drugs were injectables (IV/IM),44.73% oral and 6.21% average number of drugs prescribed per encounter was 5.69 (62.30 %)of drugs were prescribed by their generic me. 86.42% were from EML. This study concluded that better prescribing practices as suggested above would lead to improvement in quality of health care provided to children. Educational interventions towards improving prescribing practices arerequired.

Vinod S. Deshmukh et al. (2013) conducted a retrospective cross sectional study carried on study of prescribing pattern of antimicrobial agents in indoor patients of a tertiary care hospital in 130 patients which results most commonly prescribed antimicrobial agent was cefotaxime (21.7%) in medicine and metronidazole in surgery (30.6%) department. The average number of antimicrobials per patient was found to be 1.7 and 3.02 in medicine and surgery department respectively. The witch on therapy from parenteral to oral rote was employed in 16.15% patients in medicine department and 11.82% oatuebtsubsyrgertdeoartnebt. As per Kunin's modified criteria, 862% and 58.06% patients received antimicrobial therapy appropriately in Medicine and Surgery department

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respectively. In conclusion this study highlights the problem of overne in bronchopneumonia. ion Ceftriaxone was the commonly prescribed as empirical antibiotic. who received therapy with cephalosporin derivatives (Ceftriaxone and cefoximadwer mean duration of hospital stay, less than days.

VipalD.prajapati et al. (2012) carried out Retrospective study on prescribing patterns of antimicrobial agents in the pediatric wards at ertiary teaching care hospital, Gujarat. They collected 350 prescriptions ainin antimicrobial agents in pediatricdepartmentatSriSayajiroGeneral (SSG)Hospital,Vadodaratoassessthe prescribing patterns of antimicrobial agents.Total 350 prescriptions maining 690 antimicrobial drugs were prescribed in patients drugs were prescribed in patients and study of them Cephalosprins (176;25.5%). Average numbers of antimicrobials per cription was 1.97.Out of 690 antimicrobial 576 (83.81%), while only 91 (13.18%) mimicrobial agents were prescribed by oral route. They concluded that antimicrobials were frequently prescribed for treating respiratory tractinfections.

FrehiwotAmareAbebe et al. (2012) drug use evaluation ofceftriaxone: the case of ayder referral hospital, mekelle, ethiopia. The study a conducted by reviewing medication records of 296 patients who received ceftriaxone bring hospitalization at Ayder referral Hospital from September 11, 2009 to September 2010. The duration of therapy was found to be high in the range 2-7 days (51.9%). Ceftriaxone was mainly used as preoperative prophylaxis (38.8%) for the justification of use. Most of inappropriate uses were seen in terms of duration. Consistency of prescribing to the treatment regimens implemented in most of the cases were without doing any culture sensitivity test which leads irritational prescribing. reactions caused by b-lactam antibiotics in e reports of adverse reactions caused by B-lactam antibiotics collected in the hospital 2007 and 2009. The result was, in 113 cases of ADR involved 17 kinds of -lactam ots and headed by ceftriaxone sodium, The most common manifestation was skin and ry damage, nervous system and gastrointestinal system damage were also easier to find, de administration route was mainly intravenous infusion. The clinical application of B antibiotics should pay attention to adverse reaction monitoring and rational drug use to e the incidence of adverse reactions. The final conclusion was clinical application of antibiotics should pay attention to adverse reaction monitoring and rational drug use to ce the incidence of adverse reactions.

Dongsik Jung et al. (2009) carried evaluation of ceftriaxone tilization at multicenter study, prospectively evaluated the appropriateness dantibiotic usage in 400 adult patients who received ceftriaxone between February 1, 2006 and June 30, 2006. The results shows utilization of ceftriaxone was appropriate in 262 cases 5%) for the justification of use, while inappropriate use was observed in 138 cases (34.3%). Common reason for inappropriate use of ceftriaxone included continued empiric use for presumed infections, prophylactic preoperative injection, and empiric therapy for fever, Most of the critical indications showed a high rate of suitability (66.5-98.5%). Complications occurred in 37 cases (9.3 %). With respect outco measures, clinical responses were observed in 60.7% of cases, while only 15.7% of cases showed evidence of infection eradication via negative cultures. In Conclusions, appropriate use (65,5 %) of ceftriaxone was higher than inappropriate use (34.5%) at university hospital in Korea. Inappropriate Utilization, however, including continued empiric use for presumed infections and prophylactic preoperative injection remained high. Intensification of educational programs and antibiotic control systems for ceftriaxone is needed to improve the suitability of antimicrobialuse.

Palikhe N etal. (2005) was done a prospective follow up study on prescribing pattern of antibiotics in paediatric hospital of kathmandu valley. 121 patients were included in the study. The average number of drugs per patient was 5.0111.36 and antibiotics per each patient were 2.41±1.02. More than 98% of the patients were exposed to at least two drugs. In total 121 patients clinically diagnosed with infectious diseases and treated with antibiotics, specimens were taken for culture in only 24 cases i.e. (19.8 %) to identify pathogenic organisms. Only 13 specimens showed positive culture cases of adverse reactions caused by b-lactam antibiotics in reports of adverse reactions caused by B-lactam antibiotics collected in the hospital 2007 and 2009. The result was, in 113 cases of ADR involved 17 kinds of B-lactam e Notics, and headed by ceftriaxone sodium. The most common manifestation was skin and the damage; nervous system and gastrointestinal system damage were also easier to find, administration route was mainly intravenous infusion. The clinical application of B should m antibiotics s pay attention to adverse reaction

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monitoring and rational drug use to the incidence of adverse reactions. The final conclusion was clinical application of tam antibiotics should pay attention to adverse reaction monitoring and rational drug use to aterce the incidence of adversereactions.

Ryuck lee, Dongsik Jung et al. (2009) carried evaluation of ceftriaxone utilization at multicenter study, prospectively evaluated the appropriateness biotic usage in 400 adult patients who received ceftriaxone between February 1, 2006 and Jane 30, 2006. The results shows utilization of ceftriaxone was appropriate in 262 cases (85.59%) for the justification of use, while inappropriate use was observed in 138cases (34.3%). Common reason for inappropriate use of ceftriaxone included continued empiric use for presumed infections, prophylactic preoperative injection, and empiric therapy for fever. Most of the critical indications showed a high rate of suitability (66.5-98.5%). Complications occurred in 37 cases (9.3 %). With respect to outcome measures, clinical responses were observed in 60.7% of cases, while only 15.7% of cases showed evidence of infection eradication via negative cultures. In Conclusions, appropriate use (65.5%) of ceftriaxone was higher than inappropriate use (34.5%) at university hospital in Korea. Inappropriate Utilization, however, including continued empiric use for presumed infections and prophylactic preoperative injection remained high. Intensification of educational programs and antibioti control systems for ceftriaxone is needed to improve the suitability of antimicrobial use percentages of the total antibiotics were administered parentally. Cephalosporins were the top est frequently prescribed antibiotics followed by penicillin group. His final conclusion was ren below 1 year or infants are at special risk of receiving multiple courses of antibiotics, ther with the knowledge that antibiotic resistance develops in this setting, suggest that ategies to control antibiotic use should focus on these patients' populations.

P.R. Shankar, P. Subish et al. (2004) was done a study on Cephalosporin utilization in the patient wards of a teaching hospital in western Nepal. In this study Nine thousand eight hundred and forty-five patients were admitted to the inpatient wards during the study period. Eight hundred and forty-one patients (8.54%) were prescribed antibiotics. A total of 252 patients (2.56%) were prescribed cephalosporins. Cephalosporins were prescribed in 73 of the 2097(3.48%) surgical inpatients, 50 of the 1726 (2.9%) patients admitted in the obstetrics and gynecology wards and 25 of the 927 patients (2.7%) admitted in orthopedics. Among pediatric and internal medicine inpatients the percentage was 2.85 % (57 of 2000 inpatients) and 1.51% (27 of the 1824 patients) respectively. They concluded the use of cephalosporins in our hospital was lower than that reported in the literature which is a welcome trend and has to be encouraged. Antibiotic use policies for postoperative prophylaxis and infection control policies for the wards arerequired.

METHODOLOGY

Methods

Study Design and Site

This is an observational and prospective study which was carried out in 300 bedded hospital It was performed at pregnant women and paediatrics of various hospitals at Narasaraopet for the duration of 3-months(Apr 2021 - June 2021).

Study Population and sample

Patients both genders are included in paediatrics and pregnant women 300 patients were selected based on age ,inclusion and exclusion criteria.We visited the hospitals and collected the requireddata.

Study Criteria:

Age Criteria in Paediatrics

Categories	Age Groups
Neonatal	0 days -1 month
Infants	From birth to 1 year old
Early Childhood	2Years-5Years
Middle Childhood	6Years-12Years

Table.4.1. Age Criteria in Paediatrics Age criteria inpregnantwomen 19-40 years

InclusionCriteria:

The criteria were included in the study of Paediatric Patients of either sex age 0- 12 years and patients of pregnant women aged19-40years.

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Exclusion Criteria

The criteria were excluded from the study patients of either sex aged >12 years of age in paediatrics, patients of pregnant women aged>40years.

IV. DISCUSSION

Among total patients Cefotaxime (72.30%) was most commonly used ophalosporin than other cephalosporin's followed by ceftriaxone (13845) This way shows the wider usage of third generation cephalosporin in hospitalized pediatric patients testings are similar to the study conducted by Mahendrakianer et al. UNICER and WHO ha pren guidelines for treating pnements. According to the guideliems, Come and amoxicillin are effective drugs against bacterial pathogens and are often used to treat child with pneumonia. In this study most of the drugs prescribed were cephalosporia's to treatpneumonia.

It was found out that 97% of cephalosporins were prescribed for parental administration, while only 3% were for oral route in paediatric patients. A study carried out in Kathmadu valley (2004) showed that, 75% antibiotics were give by injections. Among 80 patients 63(78.75%) patients were immunized and 17 (21.29%) patients were not immunized. These findings are related to the study conducted by Lexley M Pinto Pereira. Immunization will reduce the severity of occurrence of infection In this study on ADRs were observed among the patients on using thetherapy.

All patients were adhere for the drugs and shows compliance. This may because all patients are in patients and they are regularly monitored by the nurses, physicians and pharmacists. In total 80 prescriptions74 drug- drug interactions were found. Among them major found to be 1, moderate was found to be 64 and minor was 11. The all interactions were potential drug interactions and no one interaction is observed among 28interactions.

Cefotaxime with Amikacin was 19 (68%). Ceftriaxone with Amikacin was 7 (25%), Cefotaxime with Gentamycin Was 1 (3.5%) and Ceftriaxone with Gentamycin was 1(3.5%).

Our study had a number of limitations. The study was prospective observational and seasonal variations were not considered. The patient care indicators were not studied. The study was limited to only a paediatric department. Also, further studies for a longer period of time in all the clinical departments are required. The data presented here will be useful infuture, long term and more extensive drug utilization studies in the hospital and in promotion of rational prescribing and drug use inhospitals.

Drug utilisation evaluation (DUE) is systematized approach designed to control rational use of drugs. The study on drug utilization will identify problems like irrational drug adverse drug reactions, patient non adherence, drug interactions and drug cost. Cephalosporins are currently the most commonly prescribed drugs in hospitals, worldwide. But, excessive and inappropriate use of Cephalosporins, may leads to drug related problems like increased drug resistance. Total 80 patients were included in the study. Among them 49 (61.25%) patients were the male and 31(38.7596) patients were female. These results are similar to by VishwanthaM et. Al (2016) study Assessment of drug utilization in hospitalized children at a private hospital which reveals predominance of males (53.33%) thanfemales.

Considering the age group the majority number of patients was in 1 day - 1 year age group38(47.5%) followed by 27 (33.75%) patients are in 1-5 years. These findings were in related P KhajaMoinuddinlet. Al study of prescribing pattern of antibiotic in pediatric pneumonia. In our study most of the patients were diagnosed for respiratory tract infections ie 2 s followed by 17 patients were diagnose for fever. This result shows that pneumonia is e common in pediatric departments and it is more prevalence amongchildren.

Epidemiology states that over 1090 India children under five years of age die every day prompt treatment of pneumonia is usually with a full course of appropriate antibiotics like Cephalosporins. For various indications, 511 different drugs were prescribed for treating. Among them majority of drugs were NSAIDS (16.04) followed by cephalosporin's (12.72%) and (11.15%) of the drugs were antibiotics other thancephalosporin's.

These findings are in contrast to the NemaPallavi et.at study where in their study the beta- lactam antibiotics are majorly prescribed drugs than cephalosporins. The cephalosporins were the most common drugs prescribed for treating pneumonia infections. The prescribing of cephalosporin's for treating normal fever is unnecessary (10) Among 65 cephalosporin prescribed patients majority of the patients 22 (33.84%) were prescribed cephalosporin'swith the duration of 5-6 days, followed by 7-8 days and 19

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patients (29.23%) these results were similar to the pandiamunian j et.al.study.

Gender:
Among 200 paediatric prescriptions we observed 96 are of male patients and 104 are of female patients.

V. RESULTS

Classification of paediatric patients based on

Gender	Number Of Patients
Male	96(53%)
Female	104(57%)
Total	200(100%)

Table.6.1: Paediatrics (Gender of patients observed in the study)

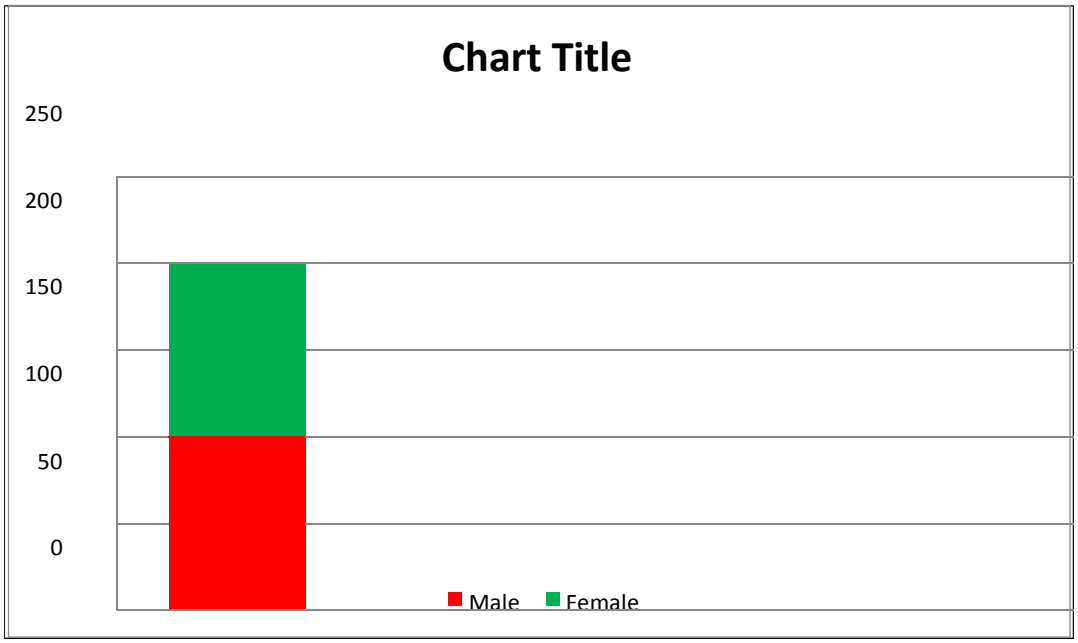

Figure.6.1 Classification of paediatric patients based on Gender

Classification of paediatric patients based on Age group:
All the Paediatric patients were divided into 4 groups based on the age of the patients.

Age Group	Number of Patients
Birth-12 months	27(15%)
13months-2years	33(18%)
2years-5years	67(30%)
6years-12years	73(50%)

Table.6.2. Age groups of patients observed our study (n=200)

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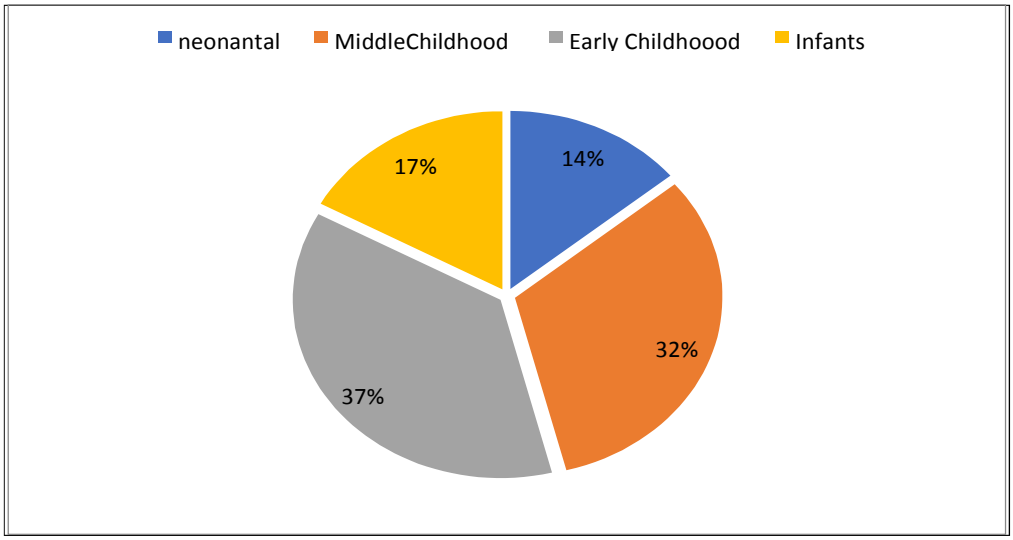

Figure.6.2 Classification of paediatric patients based on Age group

Classification of paediatric patients based on Infections:
We have observed various kinds of infections in paediatric patients during our study

Types of infections	Number of Patients
Respiratory Tract Infections	90(30%)
Dermatology	30(10%)
Gastrointestinal Infections	20(6.6%)
Urinary tract infections	98(40%)
Ear ,Nose, and Throat	50(16.6%)
Others	12(4%)

Table6.3. List of Infections and system affected to patients

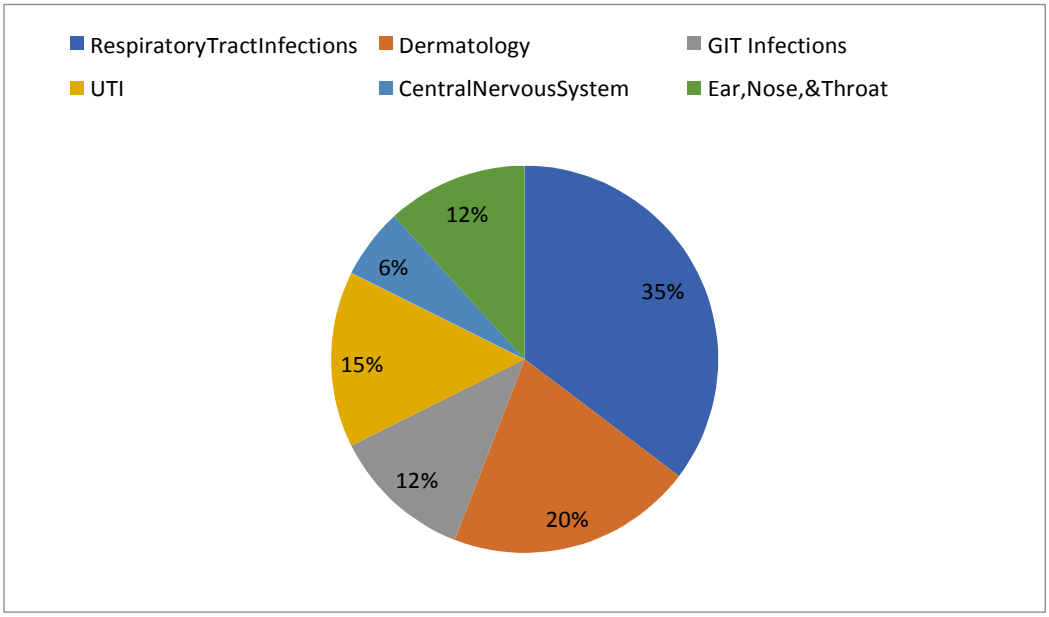

Figure.6.3. Classification of paediatric patients based on Types of Infections

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The Antibiotics that have been used to various paediatric patients for treating the infections are divided into macrolide, flouroquinolones, nitroimidazoles, penicillin, cephalosporin andlincomycin.

List of class of Antibiotics	Number of Patients(%)
Macrolides	27(13%)
Flouroquinolones	14(7%)
Nitroimidazoles	13(6%)
Penicillin	56(50%)
Cephalosporin	75(60%)
Lincomycin	15(6%)

Table.6.4. Pharmacological classification of antibiotics prescribed to paediatrics (n=200)

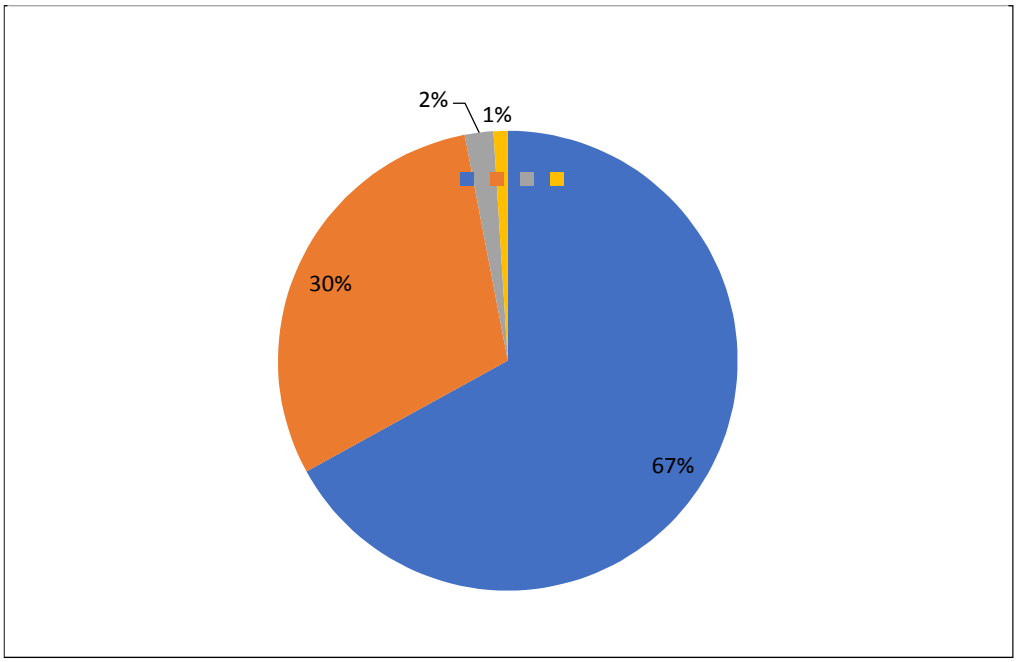

Figure.6.4 Pharmacological Classification of Antibiotics Prescribed to Paediatrics

We have observed in our study that some combination of 2 or more antibiotics have been given at a time to the same patient to increase the efficacy of the drug the following are most commonly used combination of antibiotics that have identified from ourstudy.

Combination of Antibiotics	Class of Antibiotic	Number Of Patients
Cefixime + Azythromycin	Cephalosporin +Macrolides	4

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Ofloxacin + Metranidazole	Flouroquinolones + Antiprotozoaldrug	5
Amoxicllin+Calvulanic Acid	Penicillin +beta lactase inhibitor	10

Table.6.5 Antibiotics Combination Prescribed in Paediatrics

The most commonly used antibiotics in pregnant women are

List of class of Antibiotic	Number of Patients (%)
Ofloxocin	10
Amoxacillin+PotassiumCaluvlanate	30
Ceftriaxone and Sulbactam for Injection	20
Ceftriaxone Injection IP	50

Table.6.6 Pharmacological Classification of Antibiotics Prescribed in PregnantWomen

We have observed from our study some antibiotics are prescribed to pregnant women to treat various infections.

VI. CONCLUSION

Paediatrics

Among the Total Paediatric Patients Penicillins are mostly used Antibiotics In that group of antibiotics amoxicillin with clavulanic Acid is most widely used antibiotic to treat Various Kinds of infections in paediatricpopulation.

We have observed That cephalosporine (cefexime, and cefpodoxime proxetil) are most Commonly used oral Antibiotics AfterAmoxicillin.

pregnant woman

Amoxicillin + Potassium clavuelanate is most widely used in pregnant women so, Amoxicillin is most Safely used Antibiotic in all Categories ofpatients.

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