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Irrational use of antibiotics in paediatric prescriptions: A pilot study at community pharmacy in Erode City

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ABSTRACT

Children and infants are the most susceptible group toward various diseases than adults due to under development of immune system. Paediatric healthcare providers face huge challenges in day to day practice due to lack of knowledge about the appropriate drugs. Most paediatric prescriptions carries antibiotics which has become a routine practice in the treatment of common paediatric illnesses which were not caused by bacteria and leads to irrational use of antibiotics which significantly contributes to antibiotic resistance, side effects and cost of the therapy. In general, drug utilization studies are carried out to identify appropriate usage of drugs in terms of medical, social and economic aspects. Similarly, the present study was conducted in seven randomly selected potential community pharmacies with an aim to determine the proportion common paediatric illnesses in and around Erode city and rational use of antibiotics for the same. Study results have shown that the cold and its related ailments were predominant paediatric illnesses followed by diarrhea and its related ailments. All paediatric prescriptions carried antibiotics and found to be irrational except few prescriptions. Paediatric healthcare providers should implement the standard treatment guidelines developed by appropriate authorities to provide quality service by preventing irrational use of antibiotic/ drugs.

Key words: Antibiotic, Paediatric, Community Pharmacy, Irrational.

INTRODUCTION

Worldwide population constitute of about 28% of children and infants who are the most susceptible to diseases than adults which is mainly due to under development of immune system, hormonal imbalance, genetic factors, environmental change, water borne and food borne etc. Some of the common ailments which are generally developed during childhood are shown in table 1. Paediatricians and other medical personnel who provide health care to infants and

children in developing countries face huge challenges in day to day practice due to lack of knowledge about the appropriate drugs.

Table 1: Common Paediatric Diseases and Ailments

Diseases	Ailments
Diphtheria	Cough and cold
Polio	Skin infection
Tuberculosis	Eye infection
Chickenpox	Fever
Measles	Ear infection
Whooping cough	Worm infection

Many studies across the globe have shown the inappropriate utilization of antibiotics which are being prescribed for common childhood illnesses which were not caused by bacteria and leads to irrational use of antibiotics which significantly contributes to antibiotic resistance, side effects and cost of the therapy. In general, drug utilization studies are carried out to identify appropriate usage of drugs in terms of medical, social and economic aspects [1-11]. Similarly, the present study was executed with an aim to determine the proportion common childhood illnesses in and around Erode city and rational use of antibiotics for the same.

MATERIALS AND METHODS

The study was executed between June 2010 to January 2011 in seven randomly selected potential community pharmacies in and around Erode city. A total of 708 paediatric prescriptions which met all inclusion criteria and none of the exclusion criteria were included in the study.

Inclusion criteria and exclusion criteria

Prescriptions of paediatric patient below 12 years of age who were prescribed antibiotics for common illness were included in the study. However, paediatric patients with congenital anomalies, major illnesses and patients who have age above 12 years were excluded from the study.

Data collection

Prior to data collection, community pharmacists in the randomly selected community pharmacies were briefed about the nature of the study by the study personnel. Patient related parameters such as age, sex, and diagnosis were recorded in the data collection sheet. The treatment related data such as name of the drug, dosage form, dosing frequency, duration and route of administration were also recorded in the data collection sheet. Patient's names and other data which can identify the patient were not recorded to prevent the violation of patient's confidentiality.

RESULTS AND DISCUSSION

Data collected from 708 paediatric prescriptions were compiled, analyzed and discussed below.

Paediatric characteristics

Study included 708 paediatric prescriptions out of which 396 (56%) were male and 312 (44%) were female children which shows that male children are porn to diseases than female children. About 38% of collected prescriptions belong to the age group of 1-3 years. Children at this age group (1-3 years) try to move around the room using their hand and bring the hands to the mouth which increases the chance of infection. Hygienic environment around the children and proper

caring may bring down the infection rate. Study also shown, as the child grows disease rate decreases from 25% to 2.5%. The summary of paediatric characteristics is given in table 2.

Table 2: Summary of Paediatric Characteristics

Pediatric characteristics	No. of Patients
Gender	
Male	396 (56.00 %)
Female	312 (44.00 %)
Age (in years)	
0-1	180 (25.42 %)
1-3	267 (37.71 %)
3-5	168 (23.72 %)
5-7	054 (07.62 %)
7-10	021 (02.96 %)
10-12	018 (02.54 %)

Childhood diseases and its treatment

The study included paediatric prescriptions of 9 most common paediatric illnesses which were summarized in table 3.

Table 3: Most common paediatric illnesses with respect to age

Diseases/ Ailments	Age in years												Total
	0-1		>1-3		>3-5		>5-7		>7-10		>10-12		
	M	F	M	F	M	F	M	F	M	F	M	F	
Cold and related ailments	72	63	99	60	75	42	30	6	3	12	0	3	465 (65.67%)
Constipation	0	0	3	3	0	0	0	0	0	0	0	0	006 (00.84%)
Diarrhea and related ailments	18	27	27	33	21	15	3	6	0	0	9	6	165 (23.30%)
Throat infection	0	0	15	9	9	3	3	6	0	0	0	0	045 (06.35%)
UTI	0	0	3	3	0	0	0	0	6	0	0	0	012 (01.69%)
Allergic rhinitis	0	0	0	3	0	0	0	0	0	0	0	0	003 (00.42%)
Inflammatory Gingival Enlargements	0	0	0	6	0	0	0	0	0	0	0	0	006 (00.84%)
Burns	0	0	0	0	0	3	0	0	0	0	0	0	003 (00.42%)
Ear infection	0	0	0	3	0	0	0	0	0	0	0	0	003 (00.42%)

M = Male; F = Female

Cold and its related ailments

In the study, cold and its related ailments was the predominant illness seen among children which accounts for 465 (65.67%) cases and the prevalence was significantly high in the age between 0-5 years and as the child grows the prevalence rate decreases. The most common cause of cold is viruses such as *rhinovirus, picornavirus, coronavirus, influenza, human parainfluenza virus, human respiratory syncytial virus, adenovirus, enterovirus, metapneumovirus, echovirus and coxsackievirus*. Usually bacteria do not cause the cold [12-13]. Hence antibiotics have no role in the treatment and it requires symptomatic treatment rather than antibiotics. However, all most all prescription contains antibiotics which have confirmed the irrational use of antibiotics. The list of prescribed medications for cold and its related ailments is tabulated in table 4.

Diarrhea and its related ailments

With the incidence rate of 165 (23.30%) cases of diarrhea and its related ailments was the second largest illness seen among children in the study and it was more common in the age group of 1-3 years and as the child grows the incident rate decreases. Some of the common causes of diarrhea are bacteria such as *Campylobacter, Salmonella, Shigella,* and *Escherichia coli*; virus such as *rotavirus, norovirus, cytomegalovirus and herpes simplex virus*; and parasite such as *Giardia lamblia, Entamoeba histolytica,* and *Cryptosporidium* [14]. Antibiotics have limited role in the

management of diarrhea as most of the common diarrhea is due to virus and requires symptomatic treatment rather than antibiotics. However, most prescriptions contain antibiotics which show its irrational use. The list of prescribed medications for diarrhea and its related ailments is tabulated in table 5.

Table 4: Prescribed medications for cold and its related ailments

Prescribed medications	Cold	Cold with cough	Cold with wheezing	Cold with diarrhea
Azithromycin (Drops)	6	21	12	3
Azithromycin 100 mg (Suspension)	21	33	3	3
Azithromycin 200 mg (Suspension)	12	12	6	9
Azithromycin 250 mg (Tablet)	3	9	-	-
Amoxicillin 125 mg (Suspension)	9	15	-	-
Cefpodoxime (Drops)	10	15	-	6
Amoxicillin 400 mg + Potassium Clavulanic acid 57 mg (Suspension)	43	75	-	9
Ofloxacin 50 mg (suspension)	4	-	-	-
Ofloxacin 100 mg (Suspension)	3	-	-	3
Cephalexin (Suspension)	3	-	-	-
Cefixime 50 mg (Suspension)	-	-	-	18
Cefixime 100 mg (Suspension)	3	3	-	12
Cefdroxil (Suspension)	3	6	-	-
Clarithromycin 125 mg (Suspension)	9	3	-	-
Cefdnir 125 mg (Suspension)	3	6	-	6
Clarithromycin 125 mg and Amoxicillin 400 mg + Potassium Clavulanic acid 57 mg (Suspension)	3	-	-	-
Cefpodoxime 50 mg DT (Tablet)	-	3	-	-
Cefpodoxime 100 mg (Tablet)	-	3	-	-
Cefixime 50 mg + Potassium Clavulanic Acid 31.25 mg (Suspension & Tablet)	-	6	-	-
Cefaclor (Suspension)	-	9	-	-
Azithromycin 100 mg, Cephalexcin (Suspension)	-	3	-	-
Clarithromycin (Tablet)	-	9	-	-
Amoxicillin DT 125 mg (Tablet)	-	9	-	-

Constipation

In the study, constipation was mainly seen between the age group of 1-3 years which accounts for 6 (00.84%) cases. Constipation is particularly common at three times in an infant and child's life (a) Transitioning from breast milk or formula to solid foods, (b) Toilet training and (c) Hard or painful bowel movement [15, 16]. Antibiotics have no role in constipation however, the prescriptions contain antibiotics which show its irrational usage and the list of prescribed medications for constipation are tabulated in table 5.

Throat Infection

In the study, prevalence of throat infection was 45 (06.35%) cases which was only seen in the age between 1-7 years which are mainly due to viruses such as *influenza, adenovirus, and Epstein-Barr virus*; bacteria such as *Streptococcus*, mouth breathing, allergies and foreign body such as toy, coin, food stuck in the throat, esophagus, or respiratory tract [17, 18]. Antibiotics play a significant role in throat infection and it is limited to specific antibiotics such as Penicillin benzathine, Penicillin G procaine, Amoxicillin, Erythromycin Estolate. Only very few prescriptions were found to be rational and rest of the prescriptions contains non recommended antibiotics which leads to irrational use and the list of prescribed medications is tabulated in table 6.

Allergic rhinitis

Allergic rhinitis is commonly called hay fever which is one of the most commonly diagnosed health disorders among children. In the study, allergic rhinitis was seen only in the age group of 1-3 which accounts for 3 (00.42%) cases which is mainly due to allergens in the house such as dust, mite feces, and molds growing on wallpaper, house plants, carpeting, and upholstery [19-21]. Antibiotics have no role in the management of allergic rhinitis. However, the prescriptions contain antibiotics which show the irrational use and the list of prescribed medications is tabulated in table 6.

Table 5: Prescribed medications for diarrhea and constipation

Prescribed medications	Diarrhea	Diarrhea with Vomiting	Constipation
Cefpodoxime (Drops)	9	-	-
Amoxicillin 400 mg + Potassium Clavulanic acid 57 mg (Suspension)	3	-	-
Ofloxacin100 mg (Suspension)	3	3	-
Cephalexin (Suspension)	-	-	-
Cefixime 50 mg (Suspension)	24	9	-
Cefixime 100 mg (suspension)	39	21	-
Cefixime 200 mg (Tablet)	-	9	-
Clarithromycin125 mg (Suspension)	3	-	-
Benzometranidazole (Suspension)	3	-	-
Nitazsoxanide (Suspension)	6	-	-
Norflaxacin (Suspension)	3	-	-
Albendazole, Cefixime 100 mg (Suspension)	9	-	3
Cefixime 100 mg, Nitazsoxanide (Suspension)	12	3	-
Metranidazole, Cefixime 100 mg (Suspension)	3	-	-
Ofloxacin 100 mg, Nitazsoxanide (Suspension)	3	-	-
Ceftriaoxone, Lactulose (Suspension)	-	-	3

Inflammatory Gingival Enlargements

In the study, inflammatory gingival enlargements was seen only in the age group of 1-3 which accounts for 6 (00.84%) cases and the main causes gingival enlargement are mouth breathing, accumulation & retention of plaque and poor oral hygiene [22, 23]. Antibiotics such as ciprofloxacin play a significant role in inflammatory gingival enlargements. However, prescriptions contain non recommended antibiotics which show its irrational use and the list of prescribed medications is tabulated in table 6.

Ear infection

In the study, ear infection was seen only in the age group of 1-3 which accounts for 3 (00.42%) cases which is mainly due to viruses such as *respiratory syncytial virus*, *Haemophilus influenza*; bacteria such as *Streptococcus pneumonia, Pseudomonas aeruginosa*, *Haemophilus influenzae*, and *Moraxella catarrhalis*; and fungal pathogens [24]. Antibiotics such as Amoxycillin and Cephalexin play a significant role in the treatment of ear infection. However, the collected prescriptions also contain non recommended antibiotics which show its irrational use and the list of prescribed medications is tabulated in table 6.

Urinary tract infection

In the study, incident of urinary tract infection was 12 (01.36%) cases which was mainly seen between the age group of 1-7 years and it is mainly caused by entry of bacteria through urinary opening, unhygienic conditions around the genital region, diapers and pin worms [25]. Antibiotics play important role in the management of UTI. However most prescriptions contain

non recommended drugs which show its irrational use and the list of prescribed medications is tabulated in table 7.

Table 6: Prescribed medications for ENT related illness

Prescribed medications	Throat Infection	Allergic Rhinitis	Inflammatory Gingival Enlargements	Ear Infection
Azithromycin 100 mg (Suspension)	12	-	-	-
Azithromycin 200 mg (Suspension)	3	-	-	-
Amoxicillin 125 mg (Suspension)	3	-	-	-
Amoxicillin 400 mg + Potassium Clavulanic acid 57 mg (Suspension)	9	3	-	-
Cephalexin (Suspension)	-	-	6	-
Clarithromycin 125 mg (Suspension)	12	-	-	-
Amoxillin250 mg (Tablet)	3	-	-	-
Cefixme 50 mg + Potassium Clavulanic acid 31.25 mg (Tablet)	3	-	-	-
Cefdnir (Suspension), Ciproflaxacin (Ear Drops)	-	-	-	3

Table 7: Prescribed medications for UTI

Prescribed medications	UTI
Cefixime 200 mg (Tablet)	6
Cefaclor (Suspension)	3
Clarithromycin 125 mg, Amoxicillin 125 mg (Suspension)	3

Burns

In the study, burns were seen only in the age group of 3-5 years which accounts for 3 (00.42%) cases. Antibiotics play a most significant role in preventing secondary infections. Antibiotics such as injection Ampicillin and Ciproflaxacillin are the most recommended for the management of burns. However, all most all prescription contain Amoxillin 250 tablet which shows its irrational use.

CONCLUSION

The study results have proved the irrational use of antibiotics in common paediatric illnesses. Paediatric healthcare providers should implement the standard treatment guidelines developed by appropriate authorities to provide quality service by preventing the irrational use of drugs which accounts for drug resistance, side effect and increase the therapy duration and cost.

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