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Analysis of Pediatric Outpatient Prescriptions in a Polyclinic of Oman

By Khaloud Saif Al-Maqbali, Sujith Haridass, Mohamed Azmi Hassali & Ahmed Ibrahim Nouri

University of Nizwa

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Methodology: A retrospective survey was conducted in the outpatient pharmacy of Ibri polyclinic, Oman A total of 300 pediatric prescriptions in a pattern of 25 prescriptions per month fromJanuary to December 2018 was randomly selected. The W.H.O. specified core prescribing indicators and Oman approved drug list were used to assess the rationality of prescribed medicines.

Results: The analysis of 300 prescriptionsshowed that 46.7% (n=140) of the prescriptions were for male patients and 53.3 % (n=160) for female.The total number of prescribed drugs was found to be 866 and an average number of drugs per prescription was 2.88 (± 1.33). About 67.1% (n=581) of drugs were prescribed from W.H.O model list of essential medicines for children, and 83.8% of drugs from the approved drug list, Oman. The commonly prescribed class of medicine was analgesics/NSAIDs (31.1%) and the commonly prescribed individual drug was paracetamol (26.6%).

Keywords: *pediatric; outpatient; prescribing; oman.*

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Analysis of Pediatric Outpatient Prescriptions in a Polyclinic of Oman

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Conclusion: The findings of the study reveal that the prescribing in the outpatient pediatric setting of Ibri polyclinic was rational. The study also evidenced marginal overuse of antibiotic and there are few areas that warrant further attention by the prescribers for a more significant rational prescribing.

Keywords: pediatric; outpatient; prescribing; oman.

I. Introduction

Drug prescribing is a vital component of healthcare and symbolizes comparatively safe, effective, and economical mode of treatment. The drug prescribing practice of physician is influenced by various factors like inputs from the patients, professional colleagues, academic literature, commercial promotion or marketing of drugs and regulations by the Government (1, 2).

Author α σ: School of Pharmacy, College of Pharmacy and Nursing, University of Nizwa, Oman. e-mails: Khaloud_pharm@yahoo.com, sujith@unizwa.edu.om

Author ρ: Discipline of Social and Administrative Pharmacy, University, Sains Malaysia. e-mail: azmihassali@gmail.com

Author ω: Pharm D, Master of Science (Clinical Pharmacy), Discipline of Clinical Pharmacy, University, Sains Malaysia. e-mail: ahmad090@hotmail.com

According to W.H.O., rational use of the drug is defined as "patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community." On the other hand, when medication is prescribed, sold or dispensed incorrectly or inappropriately is called irrational use (3). The outcome of irrational drug use will be very serious and results in an increase the mortality and morbidity, health risk, ineffective treatment, patient non-compliance, drug wastage, and a waste of resources and needless expenditure (4). Reports from a study depict that a patient suffering from common cold and flu typically requires a treatment with antipyretic and cold medications as in the majority of the cases the causative organism is virus. Prescribing an antibiotic, an expensive drug, in this case, is unnecessary and will not show any therapeutic benefit for the patient (5).

Numerous factors can lead to irrational prescribing such as patients, physicians, the workplace environment, the supply system, weak governmental regulations, the lack of drug information and the problem of misinformation (6).

Infants and children are more prone to contract illness and to the harmful effects of drugs due to variances in pharmacodynamic and pharmacokinetic parameters. Studies had shown that children were prescribed drugs frequently and the average number of drugs per prescription were as high as 5.5 (7). Studies were done in the USA and Canada observed that about 50% and 85% of the antibiotics were inappropriately prescribed to children and irrational prescribing of antibiotics was very common among the pediatric population (1). Irrational use of antimicrobials can lead to antimicrobial resistance, treatment failures, and increased healthcare costs.

Analyzing prescribing patterns is a part of the medical audit and seeks to monitor, evaluate and suggest modifications in the practitioner's prescribing habits so as to make medical care rational and cost-effective (7).

The W.H.O. had framed a set of "core drug use indicators" to assess the rational drug use in outpatient practice, The core prescribing indicators measure the performance of prescribers, the patient care indicators measure what patients experience at health facilities, and the facility indicators measure whether the health

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personnel can function effectively. The prescribing indicators include the average number of prescribed drugs, percentage of prescribed drugs by generic name and percentage of encounters with antibiotics. Other indicators in this group are a percentage of drugs prescribed from essential drug list and percentage of an encounter with injection. These prescribing indicators offer basic information concerning drug prescribing practices (8, 9).

The first model list of essential drugs for children (less than 12 years) was released in October 2007 which was intended to serve as a guideline for rational prescribing among this age group. The core list encompasses a list of minimum medicine needs for a basic health care system, listing the most efficacious, safe and cost-effective medicines for priority conditions. Priority conditions are selected on the basis of current and estimated future public health relevance, and potential for safe and cost-effective treatment (10).

Rational drug use by physicians can be promoted by conducting workshops which are intended to enhance knowledge, skills, and changes in attitude of prescribing (11).

Many prescription audit studies are available for the adult population attending the medical and general outpatient clinics of primary, secondary and tertiary healthcare centers with several conclusions. However, the available data for the pediatric prescribing pattern is old and limited. As a result, there is a need to investigate the new trends in prescribing practice (12) (5).

II. Materials & Methods

A retrospective survey was conducted in the outpatient pharmacy of Ibri polyclinic. A total of 300 pediatric prescriptions in a pattern of 25 prescriptions per month from January to December 2018 were randomly selected and analyzed in the study. A data collection form was designed to record the demographic characteristics and to record prescribed medicines. WHO specified core prescribing indicators were used to evaluate the rationality of prescribed medicines to children.

Inclusion was to all drug prescriptions for children aged 0-12 years given out of the pediatric clinic and other medical clinics and presenting at the outpatient pharmacy of Ibri Polyclinic during the period of study. Exclusion involved drug prescriptions for children aged 0-12 years given out of dermatology clinic of Ibri Polyclinic. Also, repeat prescription / follow up a prescription for the same patient given out of the pediatric clinic and other medical clinics during the period of study.

After obtaining the approval of the study by the graduation project committee, School of Pharmacy and concerned M.O.H office in Al Dhahria Governorate, the study was carried out at Ibri polyclinic.

The prescriptions fulfilling the inclusion criteria were retrieved from the outpatient pharmacy electronic database. A total of 300 pediatric prescriptions in a pattern of 25 prescriptions from each month of the year 2018 were randomly selected and included in the study. A copy of the original prescription was used and the collected data was transferred to the Data Collection Form. Information regarding demography, morbidity pattern, the name of the drug prescribed, and dosage form, route of administration and duration of the treatment were recorded in the data collection form.

To assess the rationality of prescribed medicines the W.H.O specified core prescribing indicators like average number of drugs per prescriptions, number of drugs prescribed in generic name, percentage of encounters with antibiotics, number of drugs selected from WHO model list of essential medicines for children, 2018 and Oman approved drug list were used (21).

Confidentiality of the collected data was maintained and the collected data was strictly used only for the purpose of the present study.

III. Results

A total of 300 pediatric prescriptions in a pattern of 25 prescriptions per month from January to October2018 were randomly selected from the outpatient pharmacy of Ibri polyclinic and analyzed in the study. The gender distribution reflected that 46.7% (n=140) were male patients and 53.3 % (n=160) were female.

The age of the pediatric patient was classified into four groups according to W.H.O model essential list for children 2018 (22). Out of 300 prescriptions analyzed, the age of patient ranged from 4 months to12 years and the mean age was found to be 44.5 months (± 39.2). The study revealed that 42.3% (n=127) the of the patients were in young child category followed by the infant (31.3% ; n=94) and child (26.3%, n=79).

The results revealed that among a total of 300 surveyed prescriptions, the most common diagnosis was upper respiratory tract infection (37.7%; n=112) followed by fever (8.3%; n=25). The lowest (0.3% n=1) were 3 diagnoses, lesion of oral mucosa, a disease of spleen and URTI with diarrhea. The study observed that URTI was the most common diagnosis in all age categories infant (37.2%; n=35), young child (34.6%; n=44) and child (41.8%; n=33) followed by fever in infant (15%; n=14)) and young child (6.2%; n=8) while pain (10%; n=8) was the second common diagnosis among child age category.

a) Prescribing pattern

The study results showed that among the 300 prescriptions analyzed, the total number of the drugs were found to be 866, the range of the drugs prescribed

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was from 1 to 9, and the average number of drug per prescription was 2.88 (± 1.33).

b) Number of drugs prescribed per prescription

The results of the study observed that among the 300 prescriptions analyzed, 34% (n=102) of the prescriptions contained 3 drugs followed by two drug containing prescriptions (25%; n=75) and four drug containing prescriptions (16.33%; n=49). About 0.3 % (n=1) of prescription contained 9 drugs.

c) Number of drugs prescribed among age category

The study revealed that among the infant category, 25.5% (n=24) of the prescriptions contained one drug followed by two drugs containing prescriptions (24.5%; n=23) and 1.1% (n=1) of the prescription contained 9 drugs.

The study observed that among young child, 36.2% (n=46) of the prescriptions contained three drugs followed by two drugs (22.8%; n=29) containing prescriptions while 4% (n=5) of the prescriptions contained six drugs.

Among the child category, 44.3% (n=35) of the prescriptions had three drugs followed by two drugs containing prescriptions 29.1% (n=23). About 3.8% (n=3) of the prescriptions contained five drugs.

d) Prescribing pattern according to the category of Drug

The results of the study observed that among a total of 866 drugs prescribed, antipyretic, analgesic and NSAIDs were the most commonly prescribed drug class contributing to 31.1% (n=269) followed by normal saline (16.1 %, n=139) and antibiotics (15.2%, n=132) and antihistamine (14.1%: n=122). The least prescribed drug classes were H_2 blocker and anthelmintic (0.1%, n=1) as shown in Table- 1.

Among the individual drugs prescribed, the study depicted that paracetamol (26.6%, n=230) was the most commonly prescribed drug followed by normal saline nasal drops (14.8%, n=128) and chlorpheniramine maleate (13%, n=113).

Table 1: Distribution of prescribed drug category

Drug Category	Frequency (n=866)	Percentage (%)
Antipyretic , analgesic , NSAID	269	31.1 %
ORS	25	2.9 %
Antihistamine	122	14.1 %
Fixed dose combination	26	3.0 %
Antibiotic	132	15.2 %
Antifungal	8	0.9 %
Osmotic diuretic	6	0.7 %
Laxative	14	1.6 %
H2 blocker	1	0.1 %
Antiemetic	34	3.9 %
Normal saline	139	16.1 %
Corticosteroids	23	2.7 %
Antispasmodics	6	0.7 %
Antiseptic	3	0.3 %
B2 agonist bronchodilator	21	2.4 %
Iron supplement	9	1.0 %
Emollient	12	1.4 %
Decongestant	2	0.2 %
Multivitamins	9	1.0 %
Urinary alkalinizer	4	0.5 %
Anthelminthic	1	0.1 %
Total	866	100.0

The study observed that 67.1% (n=581) of drugs prescribed were from the W.H.O. model list of essential medicines for children, 2018. Figure 1 shows the percentage of drugs prescribed from WHO model list of essential medicines for children.

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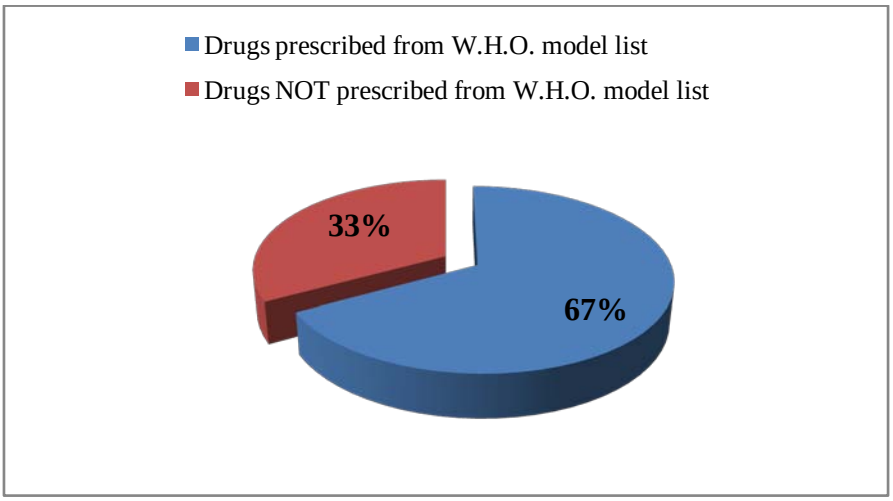


Figure 1: The percentage of drugs prescribed from W.H.O. model list of essential medicines for children, 2018

The study observed that 83.8% of drugs were prescribed from Oman approved drug list as shown in Figure-2.

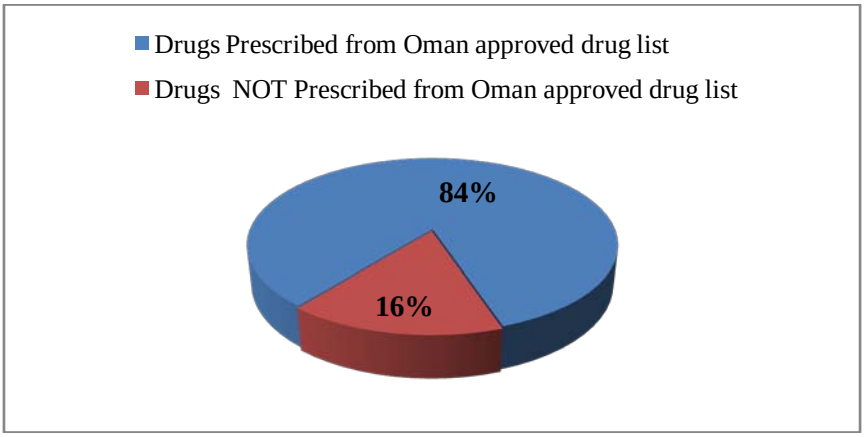


Figure 2: The percentage of drugs prescribed from Oman approved drug list

The observed result shows that among the entire age category, the majority (infant 90.6%, young child 81.3%, and child 90.6%) of the antibiotic prescriptions contain one antibiotic. Three antibiotic containing prescriptions were observed in a young child (2.1%; n=1) and child (6.2%; n=2) groups. The study observed that among the age groups, amoxicillin was the most frequently prescribed antibiotic in infants (37.5%; n=15), young child (32.1%; n=17) and child (34.2%; n=13) followed by co-amoxiclav in infants (15%; n=6), young child (22.6%; n=12) and child (21.1%; n= 8).

The study results showed that among a total of 866 drugs, the most commonly prescribed dosage form was syrups (36.7%; n=318), followed by suspensions (15.6%, n= 135) and suppository (14.2%, n=123). The least commonly prescribed dosage form was nasal spray (0.1%, n=1). The study observed that 68.4 % (n=592) of the drugs were administered by oral route followed by nasal 14% (n=121) and external applications 10.3 % (n=89).

IV. Discussion

The present study analyzed 300 pediatric prescriptions (randomly selected) in a pattern of 25 prescriptions per month at Ibri polyclinic during the period from January 1st to December 31st, 2018. The results of the study revealed that 53.3% of the patients were female and 46.7% were male.42.3% of the prescriptions were for a young child (2-6 years) followed by 31.3% infant (1 month to 2 years) group .The present study depicted that the most common diagnosis was upper respiratory tract infection (37.3%).Compared to a study done by Shinde R, et al (2) in two hospitals in India showed that the number of prescriptions from teaching hospital were 204 and only 170 from a private hospital. In teaching hospital 64.22% were male and 35.78% were female whereas in private hospital 62.35 % were male and 37.65% were female. 20.1% of prescriptions were for children between 0-1 years in the teaching hospital whereas 12.94% in private hospital. While 51.96 % of the prescriptions were for the age of

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2-5 years old in teaching hospital while 68.82 % in private hospital. The study conducted by Sharif SI, et al (20) in a Government hospital of U.A.E. showed that among a total of 707 prescriptions 56.34% of the prescriptions were for male and 43.65% for females. Another pediatric out-patient prescription study done by Ahlawat R, et al (17) in India observed that the most common diagnosis was respiratory tract infections (47%). The study done by Shankar PR, et al (7) teaching hospital in western Nepal showed that the common diagnosis among 356 admitted pediatric patients was acute gastroenteritis (16.6%).

The observed results of the study showed that among a total of 866 prescribed drugs, 99.9% (n=865) of drugs were prescribed in generic name and the average number of drugs per prescription was 2.88 (±1.33) which is higher than the W.H.O. recommendation {optimal value of ≤ 2 (14)}. About 34% of prescriptions contained 3 drugs and 37.3% (n=112) of prescriptions contained antibiotic drugs which are slightly higher than the W.H.O. recommendation {optimal value of ≤30 (14)}.The study also observed that 67% of the drugs were prescribed from the WHO model list of essential medicines for children, 2018 which is lower than W.H.O. recommendation {optimal value of ≤100% (14)} and 83.8% of drugs were prescribed from Oman approved drug list which is lower than W.H.O. recommendation {optimal value of 100% (14)}. When compared to Oman study (5) done in teaching hospital observed that among a total of 1186 pediatric prescriptions, the average number of drugs per encounter was 2.3±1.5 and 15.9% of drugs prescribed were antibiotics and 45.1% of drugs were prescribed from WHO essential drug list. The study conducted by Mahmood A, et al. (14) in four hospitals of UAE showed that among a total of 2741 drugs prescribed in 1100 prescriptions, average number of drugs per prescription was 2.49 (±0.9), all the drugs were prescribed in generic name and the mean percentage of antibiotic prescribing was low 9.8 (± 4.8). Another UAE study (20) demonstrated that the average number of drugs per prescription was 2.6 (28% had two drugs and 24% had one drug), 44.60% of the prescriptions contained antibiotics and all the drugs were prescribed in generic name. The study conducted by Al Mahalli AA et.al (16) on analysis of pediatric prescriptions (n=300) in two clinics of Egypt showed that the average number of drugs per prescription was 1.37±0.6 in clinic A, while 0.93± 0.2 in clinic B. 1.6% of drugs were prescribed by generic name in clinic A and 96.7% in clinic B. The study also observed that 45.3% prescriptions from clinic A contained antibiotics and 30% from clinic B. The study revealed that the drugs prescribed from essential drug list were 76.8% in clinic A and 97% in clinic B. A Yemeni study (13) observed that among a total of 550 prescriptions from 20 health facilities, the average number of drugs was 2.8 and the range from 1 to 5. Antibiotics accounted for 28.8% of the total drugs prescribed, 39.2% of drugs were prescribed by generic name in all health facilities and 81.2% of drugs were prescribed from the national EDL.

The present study demonstrated that the most common category of the drugs prescribed was Antipyretic, analgesic, and NSAIDs (31.1%) followed by normal saline (16.1%) and antibiotics (15.2%). The most commonly prescribed individual drug was paracetamol (26.6%) followed by Sodium chloride (14.8%) and amoxicillin (5.2%). The study observed that the most commonly prescribed dosage form for pediatrics was syrup (36.7%) followed by suspension (15.6%) and then nasal drops (14.2%). The oral route (68.4%) was the most common route of administration of prescribed drugs among pediatrics followed by nasal route (14%). For the majority (63.6%) of the prescribed drugs, the duration of treatment was for 4-5 days. On the other hand, Oman study (5) revealed that was respiratory system drugs (22%) was the most commonly prescribed drugs followed by antibiotics (21%) and musculoskeletal drugs (20%). The study revealed that salbutamol was the commonly prescribed individual drug. Whereas study was done by Ahlawat R, et al (17) showed that most commonly prescribed dosage form was syrup (60%) and 90% of the prescribed drugs were administered by oral route. Paracetamol (44%) and paracetamol+ibuprofen (36%) were the individual drugs prescribed which were similar to the results observed with the present study. The UAE study (20) showed that most commonly prescribed therapeutic classes of drugs were antibiotics (44.60%), antihistamines (43.65%), and analgesics/antipyretics (32.30%). Nepal study (7) observed that antibiotics (23%) were the most commonly prescribed class of drug followed by antipyretics and anti-inflammatory drugs (11%) and ampicillin (9.6%) and paracetamol (8.7%) were the most commonly used individual drugs among pediatrics. A study done by Ghosh R, et al (18) showed that analgesics (11.85%) and drugs for peptic ulcer disease (10.72%) were the most prescribed after antibiotics (32.27%). An Indian study (2) observed that antimicrobial drugs were the most commonly prescribed class of drug and about 37.81% and 37.99% of them were prescribed in both teaching hospital and private hospital respectively.

The present study observed that among a total of 130 antibiotic drugs prescribed, the most commonly prescribed antibiotics were amoxicillin (33.8%), amoxicalv (20%) and tetracycline (12.3%). The number of prescriptions which contained one antibiotic drug was 97 prescriptions (86.6%), 12 prescriptions contain 2 antibiotic drugs (10.7%) and 3 prescriptions with 3 antibiotic drugs (2.7%). The study revealed that 15.2% of antibiotic prescriptions were to treat upper

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respiratory tract infection. Similar results were observed with the study conducted by Al-Niemat S,et.al (19) showed that 88% of the prescriptions contain one antibiotic, 11% of prescriptions contain two antibiotics, (1%) contain three antibiotics and the most common diagnosis was upper respiratory tract infection. While azithromycin had the highest percentage share of prescribed antibiotics (53%) for treating URTI. An Indian study (17) Cefexime and azithromycin was the most common antibiotics prescribed.

However the present study also observed some errors in prescribing such as 12 prescriptions for infant patient were prescribed with antihistaminic drugs (when the current M.O.H Oman guidelines recommends not to prescribe antihistamines to children below 2 years), a prescription contain 9 drugs (for diarrhea and URTI disease), a prescription containing tablet prednisolone for 1-year-old female infant and a prescription containing paracetamol oral drops for a 12-year-old child.

The present study did not consider seasonal variations that might influence the morbidity pattern and prescribing practices. The study was done only in a single institution, so broad conclusions cannot be drawn and findings cannot be generalizable for the whole population of Oman. The dose, frequency and the strength of the drugs were not considered in the study.

V. Conclusions

The findings of the study highlight that the prescribing in the outpatient pediatric setting of Ibri polyclinic was rational as observed with the highest percentage of drugs were prescribed from Oman approval drug list and W.H.O. essential drugs list for children, 2018 and the highest percentage of the drugs were prescribed in generic name. However, the study showed marginal overuse of antibiotics as evidenced by a value higher than the optimal value of antibiotic prescriptions. The study also evidenced that amoxicillin was the most commonly prescribed antibiotic and the broad spectrum were rarely prescribed thus reducing the incidence of antibiotic resistance. Prophylactic use of antibiotics for indications such as upper respiratory tract infection, sinusitis, cough, and fever should be discouraged through proper and effective interventions. This could be achieved by creating awareness on rational drug use, evidence-based medicine and the hazards of irrational antibiotic use and continuing medical education and healthcare professional development program. There are some areas that warrant further attention by the prescribers for a more significantly rational prescribing like prescribing of antihistamines to children below 2 years and the selection of appropriate dosage form for the pediatric population. This study will provide limelight to the prescribing practices at the primary health care facility and may benefit institutional authorities to review their practices in prescribing medicines for pediatrics and modify if necessary to facilitate rational use of medicines among pediatrics. This accounts for the rationale of this study.

Conflict of interest

Authors have no conflicts of interest to be declared.

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