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Research Paper

Rational Use and Prescribing Pattern of Drugs in Primary Health Care Centers, Baghdad

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ABSTRACT:

BACKGROUND:

The World health organization approximates that >50% of all medications are incorrectly prescribed, distributed, or sold. In Iraq, several serious issues and challenges arise in this matter, including minimal professional categorization of drug prescription, inept patient counseling, and finally high proportion of remedies being misused.

OBJECTIVE:

This study aims to measure the performance of the primary health care centers regarding the use of medications and if they match what is proposed by the WHO drug use indicators and their prescribing patterns.

PATIENTS AND METHOD:

A cross sectional study was conducted on prescriptions from the 1st of January to the last of December 2019 in 20 Primary Health Care Centers in Baghdad, Iraq. A sample of 1200 prescriptions that met the inclusion criteria were included in this study. Data collection was done by prescriptions review and prescribing indicators were measured in a special form.

RESULTS:

Drug rate per prescription was 2.33 items, antibiotics were prescribed in 76.3% of the 1200 reviewed prescriptions, while the percentage of injections was 8.9%, prescribing was in generic names in 24.3% and 100% from essential drug list. The main antibiotic prescribed was amoxicillin. And injectable diclofenac for adult age group.

CONCLUSIONS:

Prescribing indicators were below optimal (polypharmacy, antibiotics percentage and generic name) except for encounters with injections prescribed and prescribing from essential drug list.

KEYWORDS: Prescription, Pattern of Drugs, Primary Health Care, Baghdad.

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INTRODUCTION:

The World Health Organization (WHO) estimates that over half of all medications are improperly prescribed, dispensed, or sold. Moreover, approximately 50% of patients fail to adhere to proper medication usage[(1)]. Medications are pivotal in healthcare delivery, with the potential to cure diseases, alleviate symptoms, and ease patient suffering when used correctly. However, the pervasive problem of irrational medication use persists as a major challenge confronting health systems worldwide[(2)]. The issue of irrational medication use is particularly pronounced in developing countries with fragile health systems, where mechanisms for routinely monitoring medication usage are frequently underdeveloped or even non-existent. In Iraq, numerous significant challenges have arisen regarding this issue, including inadequate professional categorization in drug prescribing, inefficient patient counseling, and a high prevalence of prescription misuse [(3)].

Advocating for the rational use of medications necessitates the implementation of effective policies and fostering efficient collaboration among health professionals, patients, and entire communities. Ensuring that all stakeholders possess a comprehensive understanding of the relevant aspects of medication use is crucial for driving collaborative efforts to address the issue of irrational medication

use[4,5]. Addressing the issue of irrational medication use is essential not only for enhancing healthcare delivery to ensure patient safety but also for optimizing resource utilization. This is underscored by the reality that in developing countries, as much as 25%–70% of overall health expenditure is allocated to medications, compared to around 10% in most high-income countries[6]. This study aims to estimate the rate and percentage of drug among the prescriptions of the PHCs, and compare the current drug prescription pattern in PHC with drug prescribing indicators of the WHO standards.

PATIENTS AND METHOD:

A Cross sectional analysis of sampled prescriptions for 2019 was conducted in Baghdad city at twenty PHCs and A convenient sample of the PHCs of 10 PHCCs from Al-Karkh Health Directorate and 10 PHCCs from Al-Rusafa Health Directorate. All prescriptions from the 1st of January to the last of December for 2019 were revised.

Exclusion criteria

1. Prescription for vaccination, antenatal care visits or for chronic diseases.
2. Prescription that missed one of the following was excluded:
   a. Name of the patient.
   b. The diagnosis.
   c. The Prescribers signature.

For the sampling purpose the prescriptions next to the excluded one was selected as a substitution instead of the incomplete one.

Sample size and sampling method

Twenty PHCCs were selected conveniently of 10 center from each health directorate in Baghdad city. From every PHCC 60 prescriptions per year were selected randomly with a ratio of 5 prescriptions per month to overcome the difference in monthly medication prescription. This yielded a total of 1200 prescriptions per year.

Medicines prescribed[6]:

1. Average number of medications (items) per prescription (C)

The number of prescriptions from which data were collected was counted firstly, even if these prescriptions contained no item at all (A). Then the total number of drugs (items) prescribed in these prescriptions was added up (B) and total drugs are divided by the prescriptions number (A).

Formula Average number of drugs (items)/prescription C=B/A

2. Drugs by generic name (E)

The total number of generic drugs (D) divided by the number of items (B), and multiplied by 100 to make a percentage (E).

Formula % of drugs Prescribed by generic E= (D/B) x 100%

3. Antibiotics prescribed % (G)

The number of patients who were prescribed ABs (F) divided by prescriptions number (A) and multiplied by 100 to make a percentage.

Formula % Antibiotics G= (F/A) x 100%

4. Injection prescribed % (I)

Number of those who were prescribed injections (H) divided by the total encounters (A) and multiplied by 100 to make a percentage**.**

Formula: % Injections I = (H/A) x 100%

5. Drugs prescribed from essential drug list (EDL) (K)

Divide the drugs (from EDL) prescribed (J) by the drugs total number (A) and multiplied by 100 to make a percentage (K).

Formula % drugs from EDL K= (J/A) x 100%

Ethical consideration and permission:

From Al-karkh and Al-Russafa health directorates

Pilot study

A pilot study was conducted on 60 prescriptions obtained from a PHCC that was not included in this study, with the purpose of estimating the total time needed to collect the data and to assess any difficulty, availability and completeness of the prescriptions.

RESULTS:

1. Attendants' characteristic.

For this study of WHO prescribing indicators a total of 1200 prescriptions encounters from PHC centers were included. The age of the prescriptions' attendees ranged from 2 days to 77 years with mean of 18.7 + 17.4 years. About half of them, (50.8%) were children, and one third (33.4%) were adults, as showing in table (1). Nearly half of children (47.2%) were school age children, as in table (2). Among the total prescriptions that were reviewed, 53.3% were for females and 46.7% were for males.

Table 1: Frequency distribution of different age groups among the total prescriptions.

Age groups	Total prescriptions	
	N	%
Children ≤ 12 years	610	50.8
Adolescent 13-19 years	146	12.1
Adult 20-59 years	401	33.4
Old ≥ 60 years	43	3.6
Total	1200	100

Table 2: Frequency distribution of the children subgroups among the total prescriptions.

Children ≤12 years	Total prescriptions	
	N	%
Infant ≤1 years	95	15.6
Pre-school >1 – 5 years	227	37.2
School age 6-12 years	288	47.2
Total	610	100

2. Prescribed items

Among the total prescriptions, there were 2743 items prescribed, with an average number equal to 2.33 items per prescription. The frequency distribution of items showed that the frequency of two items prescribed was the highest (46.2%) from the total prescriptions and there were 20 prescriptions with no item at all but they contained gauze and syringes, as shown in figure (1).

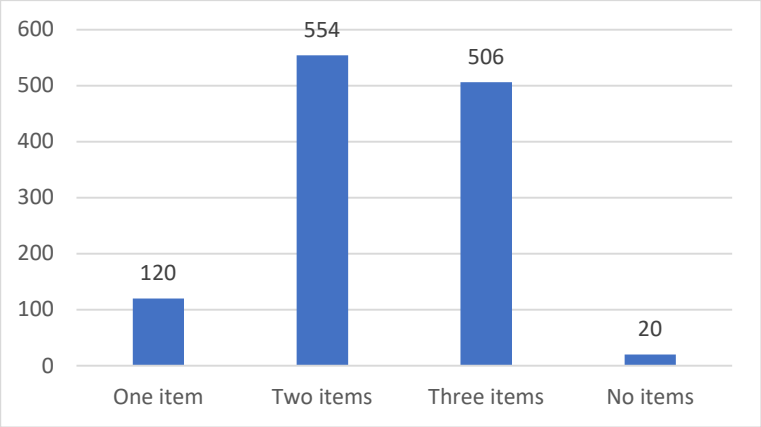

Figure 1: Frequency of items among the total prescriptions.

3. Percentage of drugs prescribed by generic name:

The percentage of items prescribed in generic name was 24.3%.

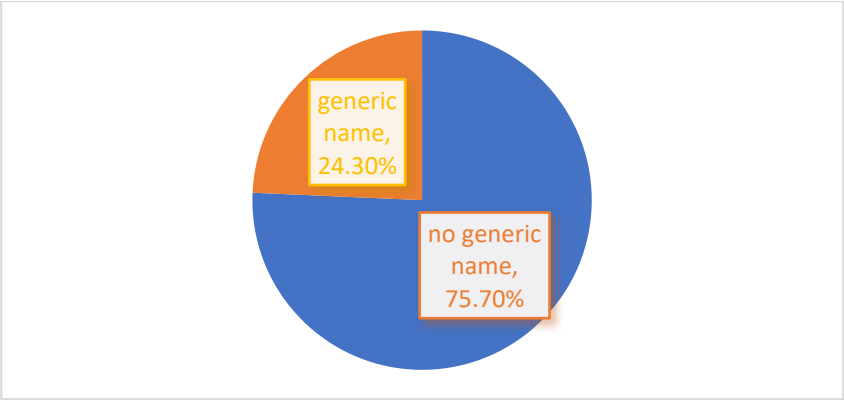

Figure 2: Percentage of drugs prescribed by generic name.

4. Antibiotics prescription

Out of the 1200 prescriptions, 76.3% (916) of them contained antibiotics, alone or with other, as shown in figure (3).

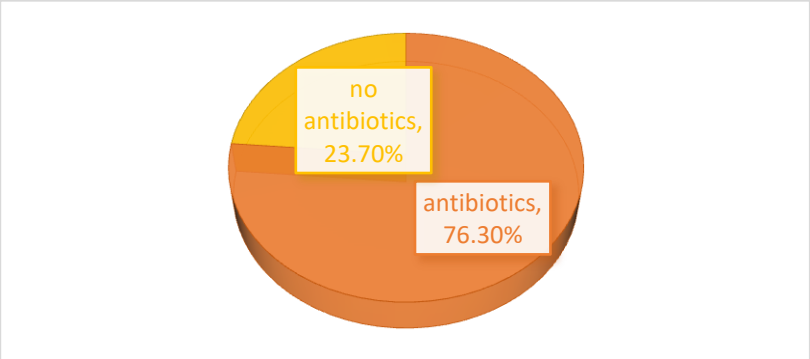

Figure 3: Antibiotics prescription percentage.

The majority of antibiotics were prescribed via oral (96.1%), followed by injection (2.7%), then, topical antibiotics (1%).

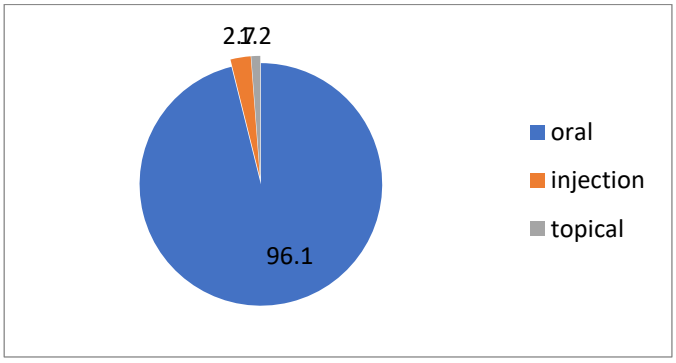

Figure 4: Routes of antibiotics percentage.

4.1. Antibiotics prescription by age and gender
There was no statistical significant difference in antibiotics prescription between females (75%) and males (77.9%), (P=0.2).

Table 3: Antibiotics prescriptions gender.

gender	antibiotics prescription %	P value
Male	77.9%	
Female	75%	0.2

Around three quarters of each age group were given antibiotics although significant difference was not encountered among them (P=0.7), also further categorization of children showed a non-significant increase in antibiotics prescription with age with a highest percentage among preschool children (P=0.4), as shown in table (4).

Table 4: Antibiotics prescriptions by age among all age groups and among children subgroups.

Age groups		Total	ABs prescription				P value
			Yes		No		
			N	%	N	%	
Children	**≤12 years**	610	468	76.7	142	23.3	0.7
Adolescent	**13-19 years**	146	115	78.8	31	21.2	
Adult	**20-59 years**	401	299	74.6	102	25.4	
Old	**≥60 years**	43	34	79.1	9	20.9	
Total		**1200**	**916**	**76.3**	**284**	**23.7**	

Table 5: Antibiotics prescriptions by age among children subgroups.

Age groups		total	ABs prescription				P value
			yes		no		
			N	%	N	%	
Infant	**≤1 year**	95	71	74.7	24	25.2	0.4
Preschool	**>1-5 years**	227	177	77.9	50	22	
School age	**6-12 years**	288	220	76.3	68	23.6	
Total		**610**	**468**	**76.7**	**142**	**23.2**	

4.2. Types of antibiotics
There were 1057 antibiotics prescribed in the 916 antibiotics contained prescriptions. They belonged to 11 different classes. The majority (91.5%) belonged to five classes. Among those, the most frequently prescribed antibiotic was amoxicillin (43.2%) followed by cephalosporin's (25.4%) and thirdly metronidazole (12.2%) and sulfonamide (4.9%) as in figure (5). Other antibiotic classes constituted (5.8%), these contained six groups, namely: tetracycline, fucidic acid, chloramphenicol, aminoglycosides, nitrofurantoine and macrolides.

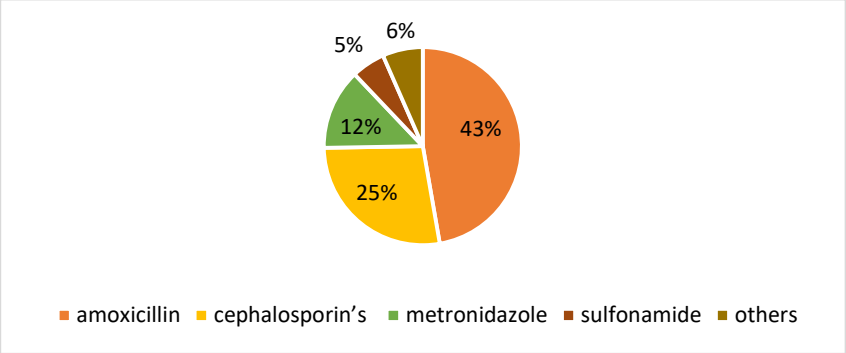

Figure 5: The types of antibiotics prescribed.

5. Prescription of injections:

Out of the 1200 prescriptions, 8.9% (107) of them contained injections, alone or with other items, Of those contained injections, the most frequently prescribed type was diclofenac in 36 (33.6%) followed by amoxicillin 27 (25.2%) and hydrocortisone 19 (17.7%) and the others were buscopan, vitamin B6, plasil as shown in figure (6).

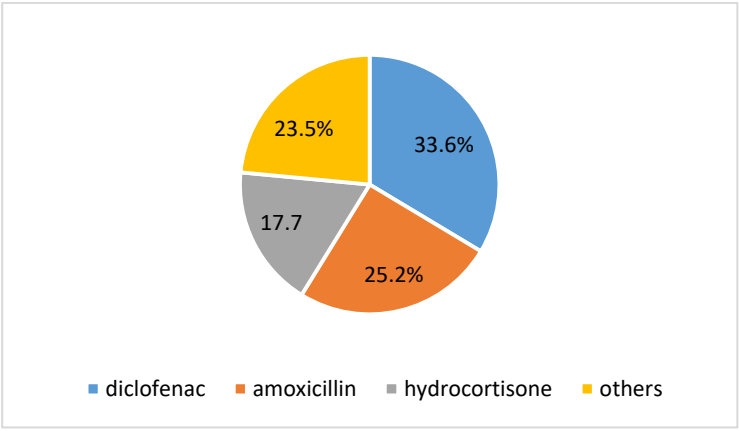

Figure 6: Types of injections prescribed.

Prescription of injections by age and gender

Most injections were prescribed for the adults followed by old age groups, which was statistically significant difference (p=0.03). Also, further categorization of children showed no significant statistical difference in injection prescription (P=0.2), as shown in table 6.

Also, there was no statistical significant difference in the prescription of injections (p=0.13) between males 55 (51.4%) and females 52 (48.5%).

Table 6: Injection prescriptions by age among all age groups.

Age groups		Total	injections prescription				P value
			Yes		No		
			N	%	N	%	
Children	**≤12 years**	610	49	8	561	91.9	0.03
Adolescent	**13-19 years**	146	12	8.2	134	91.7	
Adult	**20-59 years**	401	56	13.9	345	86	
Old	**≥60 years**	43	5	11,6	38	88.4	
Total		1200	107	8.9	1093	91	

Table 7: Injections prescriptions by age among children subgroups.

Age groups		total	ABs prescription				P value
			yes		no		
			N	%	N	%	
Infant	**≤1 year**	95	9	9.4	86	90.5	0.2
Preschool	**>1-5 years**	227	21	9.2	206	90.7	
School age	**6-12 years**	288	19	6.5	269	93.4	
Total		**610**	49	8	142	23.2	

6.Percentage of drugs from essential drug list(EDL):

All the prescribed items were from EDL which was available in all of the 20 studied PHCCs.

DISCUSSION:

Efforts to promote rational drug use have been mainly evolved over the last years, especially when the WHO introduced the concept of essential drugs, and it is mainly targeted the formal health care services all over the world, as harm to people happened due to the irrational drug use. WHO indicators of drug usage were essentially for: describing the ongoing treatment practices which are useful in the identification of drug problems, identify if a set of norm of practices has been exceeded in a given facility or not and for it to be an information`s baseline for monitoring[7].

According to the drug prescriptions guidelines, the WHO proposed that the best value for non-polypharmacy was less than 2 drugs. Unfortunately, this study showed that the average number of drugs per encounter exceeded this threshold 2.33. This polypharmacy could be due to misperception (by both care givers and receivers) of Iraqi ministry of health instructions that allows prescribing of three medicines per prescription as a maximum. Also it could be due to symptomatic management of health problems or it could indicate the coexistence of multiple morbidities at the same occasion. The average number of drugs in many developing countries was lower than that in this study and up to 2.2. In China, this value was 2.4[8]. In PHCC in Saudi Arabia Kingdom (KSA) [9], and in a study conducted at more than ten PHC facilities in Serbia (Kragujevac), this value was 2.8[10].

For easy exchange of information, better communication between physicians and care receivers, and to grant intelligible identification of drugs, WHO recommends 100% prescribing drugs by their generic name. Once again this study showed a result far away from this indictor and it was 24.3%. this might be explained to the attractiveness and easy use of generic name in prescription which could be one of the explanations beyond physicians' selection of writing in generic in order to overcome the crowding of PHCCs. Also In Iraq, medications are distributed to patients at Primary Healthcare Centers (PHCCs) free of charge, therefore, there may be no significant distinction between prescribing medications in generic or brand names taking in consideration that physicians are not allowed to prescribe medicines from private pharmacies during the official hours of working at the PHCCs and if the needed drugs were unavailable, the patient would be referred to hospital. Comparing this to other countries like Serbia (Kragujevac), it was lower than 59%[10], in KSA it was (61.2%)[9].

The best value for antibiotics prescription suggested by WHO was less than 30%. Nevertheless ours surpassed that value which was 76.3%. It might be due to the attitude of prescribing even for viral illness among our prescribing physicians. This was much higher than that in Western China, this value was (48.4%)[8], in KSA, it was (32.2%)[9] and in University Teaching hospital (the Hawassa) in Ethiopia, Precautionary measures should be observed when prescribing antibiotics. Excessive use of antibiotics contributes to the rise of antibiotic resistance, which is a key issue associated with the irrational utilization of antibiotics[12].

The percentage of injections optimally to be prescribed suggested by WHO was less than 10%. Our study expectedly met that of the WHO proposed which was 8.9%. This low percent of injectable antibiotics might be due to the low supply of injections to the studied PHCCs. And in this study it was lower than that of the study conducted in Western China (22.9%)([8], in Kragujevac, Serbia, it was less than (25%)[10], in KSA, it was (2%)[9], and in south Ethiopia, it was 38.1[11].

Optimally the proposed percentage of drugs prescribed from Essential Drug list/formulary was 100% as suggested by WHO. And the prescriptions of this study were 100% matched this indicator precisely. It is not surprising the prescribed drugs in

the PHCCs are 100% from the EML because supplying the PHCCs with the medicines they need is the responsibility of Iraqi ministry of health, who usually restrict the choice and purchase of these medicines to those items included in the EDL and a copy of National Master List of Drugs (equivalent to EDL) was present in the all studied PHCCs. This is higher than results of a study in Western China (67.7%)[8], and in Kragujevac, Serbia (<70%) [10]. Prescribing medications from the Essential drug List (EDL) serves as a foundation for rational prescribing. Drugs listed here are widely recognized, extensively used in practice, clinically proven, and typically more cost-effective compared to newer alternatives.

Generally, PHCCs' drugs selections are confined to those included in the Essential Model List and aimed to treat uncomplicated and simple health problems and this may be the cause that makes amoxicillin to be the main prescribed antibiotic (43.2%) in the current study followed by cephalexin (25.4%) and metronidazole (12.2%). Therefore, MoH was diligent to provide these three antibiotics most of the time and in sizeable amounts more than that of the other types of antibiotics to achieve the goal and meet the role of PHCCs aforementioned. Several studies had also found that amoxicillin is the most frequently prescribed antibiotics in PHCCs. A study in a city in Cameroon found amoxicillin was the most frequently prescribed one, followed by cotrimoxazole and metronidazole[(13)].

The characteristics of the attendants and their health problems have also an effect on antibiotics prescription. Age and gender of attendants are two of these characteristics. in a study performed in England and Wales they found that more than 50% of children under five years of age were exposed to antibiotics(14). And in a study in England they found that more than 67% of antibiotics were prescribed for females[15]. In this study, neither the age of the attendants nor the gender were significantly affecting the studied Antibiotics prescriptions' indicators.

As for injections prescribing pattern, our study found that the most frequently prescribed injections was diclofenac followed by amoxicillin and hydrocortisone. This might be because diclofenac is a potent anti-inflammatory used as a pain killer and as an analgesic and the fact that it is the only NSAID available in this studied PHCC. This was compatible with a study in Croatia and Sweden[16]. This study found that there is a statistical significant difference in age group favoring the adults and followed by old age groups however no such significance in gender.

CONCLUSION:

Polypharmacy is prevalent among PHC prescriptions with average number which is more than the indicated average by WHO of <2. Antibiotics are overprescribed in more than double of the recommended percentage of WHO < 30%. Prescribing medications in generic names was much lower than the WHO reference value of 100%. Prescribed medications were 100% from the EDL. The percentage of injections among the prescriptions was the proposed value by WHO < 20%. The main pattern of antibiotics was single oral amoxicillin. The second pattern was injectable diclofenac for adult age group (between 20-59 years old).

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Authors' declaration: Nothing to be declared, and The manuscript is original and has not been previously published or submitted to other journals. We affirm that all Figures and Tables included in the manuscript are our own. Additionally, the project obtained approval from the local ethical committee of the Iraqi Board for Medical Specialization.

Conflicts of Interest: None

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