Prescribing Patterns and Errors in Family Practice; a Retrospective Study of Prescribing Records

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Abstract: Background: Irrational prescribing of drugs is a major health problem in medical practice resulting in; ineffective treatment, development of antibiotic-resistant organisms, adverse effects and economic burden on patients and society. **Objectives**: The main objective of this study was rationalization of prescribing drugs and the specific objectives were to; assess the family physicians' prescribing patterns and errors, evaluate the compatibility of prescribed drugs with the diagnosis according to the clinical practice guidelines for family physicians and also to evaluate the adherence of prescribed drugs to WHO drug use indicators. **Materials and Methods:** A retrospective study of all prescribing records in the family health unit of Kafr-Tanbedy from July 2010 to July 2011 was conducted .All prescriptions were evaluated for the presence and/or fulfillment of; personal data, clear diagnosis and prescribing details as well as frequency and types of prescribing errors .Also compatibility of prescribed drugs with the diagnosis according to the national practice guidelines for family physicians and adherence to WHO drug use indicators were evaluated. **Results**: The average number of drugs prescribed per encounter was 2.4±0.7 (Mean ± SD). Out of all prescribed drugs, 94.7% were available by the national Essential Drug List (EDL) and 86.4% were prescribed by its generic names. The doses of medications were missed only in 1.01% of studied prescriptions while duration of treatment was missed in 14.9%. Regarding to the national practice guidelines for family physicians, 66.9% of prescribed drugs were compatible with the diagnosis. Prescribing errors were detected in 21.3% of prescriptions and its types A,B,C and D were detected in 0.5%,4.4%,7.1% and 9.3% of studied prescriptions respectively. **Conclusion and Recommendations:** Although adherence of family physicians to the national EDL was generally accepted, there is a need to improve their prescribing pattern and prevent their prescribing errors. The study emphasizes the need for incorporation of the rational drug prescribing as an integral part in the national practice guidelines for family physicians and in the curricula of medical education at both undergraduate and postgraduate levels.

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Key words: Rational drug use, essential drug list, prescribing errors, WHO drug use indicators, clinical guidelines.

1. Introduction

Irrational use of drugs is a major health problem of present day medical practice and its consequences include ineffective treatment, unnecessary prescribing of drugs particularly antimicrobials and injections, development of antibiotic-resistant strains, adverse effects and economic burden on both patients and society [1]. The continuously increasing number of drugs available in the market for the treatment of different ailments has increased the possibility of its irrational use [2].World Health Organization (WHO) has reported that, more than 50% of national and 60-80% of individual health care expenditure was spent on medicines [3]. Prescribing errors have been defined as “any preventable event that may cause or lead to inappropriate medications or patient's harm. There are different systems for classifying the prescribing errors. WHO has been doing a continuous effort for promoting the rational use of medicines with the ultimate goal to achieve the situation that; patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at a lowest possible cost [4].Creation of an essential drug list aims to promote the rational and efficient use of drugs. Rationalization of prescribing drugs was firstly developed by WHO in 1977 providing a rational basis not only for drug procurement at the national level, but also for establishing drug requirements at various levels within the health care systems. Essential drugs were selected to fulfil the real needs of the majority of population for prophylactic, diagnostic, therapeutic and rehabilitative services

using the parameters of risk–benefit ratio, cost-effectiveness, quality assurance, patient adherence as well as patient satisfaction [4&5]. WHO formulated a set of "Drug use indicators" to measure the performance of health services and to assess the rational drug use in outpatient practice [1].**Objectives:** At the time of the study, very little information was available about the nature and extent of prescribing patterns and errors in the family health units. The main objective of this study was rationalization of prescribing drugs and the specific objectives were; to assess the family physicians prescribing patterns and errors, to evaluate the compatibility of prescribed drugs with the diagnosis according to the national practice guidelines for family physicians and also to evaluate the adherence of prescribing drugs to WHO drug use indicators.

2. Materials and Methods

The study was conducted in the randomly selected family health unit of Kafr-Tanbedy village which has a near position to Shebin Elkom city - The Capital of Menofia governorate- having the criteria of both urban and rural areas making data more representative. Informed consent was obtained from the local health authorities after simple and clear explanation of the research objectives and methodology. All prescribing records in the pharmacy of the selected family health unit dated from July 2010 to July 2011after exclusion of the dentist ones were collected and evaluated retrospectively for the following variables:-

1-Presence and fulfillment of personal data of patient such as name, age, sex and residency.

2-Presence of clear diagnosis.

3-Presence of patient instructions such as; how to use the prescribed medications, doses, duration of treatment, relations of drug intake to meals and its side effects.

4-Frequency of prescribing errors which were classified according to Neville et al. system [6] as follow:

- Errors [A] -Potentially life-threatening errors that were mainly related to over dosage.
- Errors [B]-The nature of the prescription was completely unclear, e.g. forgetting the dose.
- Errors [C]-A minor nuisance e.g. prescriptions for an inappropriate duration exceeding therapeutic requirements.
- Errors [D]-A trivial issue, i.e.; the prescription does not conform to the guidelines of the Ministry of Health formulary. Spelling errors were the most commonly observed type D prescription errors.

5-Compatibility of treatment with the mentioned diagnosis was evaluated according to the national practice guidelines for family practice.

6-Adherence to WHO drug use indicators [4] as; number of drugs prescribed per encounter, percent of drugs prescribed by generic names, percent of drugs prescribed from the EDL and percent of prescribed injections and antibiotics.

As a quality assurance measure, all classifications were triple-checked by the researchers.

Statistical Analysis:

The data were collected, tabulated and statistically analyzed using SPSS software program (Statistical Program for Social Science), version14 under Windows XP. The data were expressed in descriptive tables as numbers, percent as well as mean and standard deviation (Mean ± SD).

3. Results

Results showed that, all prescription records contain the names and ages of the patients. Diagnosis was missed in 1.56% of prescriptions, whereas it was vague in 1.48% of prescriptions. Parasitic infestations were the most common prevalent diagnosis (23.17%) followed by Genito-urinary disorders (22.63%) and acute respiratory infections (20.53%). The doses of medications were missed only in 1.01% of prescriptions while duration of treatment was missed in 14.9%. Also 16.6% of prescriptions haven't any information about the relation of drug intake to meals and only 5.2% of prescriptions had instructions regarding drug-use. However alarming information regarding the adverse reactions of prescribed drugs was missed in 22.5% of studied prescriptions. According to WHO drug use indicators; the average number of drugs prescribed per encounter was 2.4±0.7 (Mean ± SD). The percent of drugs prescribed by generic names was 86.4%.The percent of drugs prescribed from the national EDL was 95.9%. Percent of prescribed injections was 19.8% and that of prescribed antibiotics was 35.3%. Regarding to the national practice guidelines for family physician, the prescribed medications were compatible with mentioned diagnosis in only 66.9% of prescriptions , partially compatible in 18.3% and incompatible in 9.8% however it cannot be judged in 5 % due to vague or absent diagnosis or to some extent unclear hand writing .The prescribing errors were detected in 21.3% of studied prescriptions. Only 0.5% of prescriptions had serious errors (type - A), 4.4% had type B errors, 7.1% had type C and 9.3% had type D errors.

4. Discussion

Rational drug prescribing is defined as the use of the least number of drugs to obtain the best possible effects in a shortest period at a reasonable cost [7]. Increasing the number of drugs per prescription increases the risk of drug-interactions, lake of patients' adherence to the dosage schedules and the dispensing errors. Such errors may be hidden so that, their incidence, etiologies and consequences haven't not been fully explored. The extent of this hidden health problem is greater in rapidly developing countries than in developed ones, in which systems for their detection are better established. [4].

Table 1:-Frequency of missed items in the studied prescriptions.

Missed items	Frequency	%
Name	-	-
Age	-	-
Sex	142	11.2
Clear Diagnosis	20	1.56
Dosage of medications	13	1.01
Duration of treatment	189	14.9
Alarming from side effects	286	22.5
Relation of drug- intake to meals	211	16.6
Instructions of drug usage	67	5.2

Table 2:- Frequency of different medical diagnosis.

Diagnosis	Frequency	%
Parasitic infestations	298	23.17
Genito-urinary disorders	29	22.63
Acute respiratory tract infections	264	20.53
Gastro-intestinal disorders	113	8.79
Skin infections	83	6.45
Diabetes mellitus	46	3.58
Allergic disorders	43	3.34
Hypertension	42	3.26
Musculo-skeletal disorders	27	2.10
Anemia	21	1.63
Eye infections	19	1.48
Vague diagnosis	19	1.48

Table 3:- Distribution of studied prescriptions according to WHO drug use indicators.

WHO drug use indicators	Frequency	%
Percent of drugs prescribed by its generic names	1111	86.4
Percent of drugs prescribed from the national EDL	1233	95.9
Percent of prescribed injections	255	19.8
Percent of prescribed antibiotics	454	35.3
Number of drugs prescribed per encounter	(Mean ±SD)	2.4± 0.7

Table 4:- Distribution of studied prescriptions according to the number of drugs prescribed per encounter.

Studied prescriptions	Frequency	%
Prescriptions having only one drug	138	10.73
Prescriptions having only two drugs	460	35.77
Prescriptions having three or more drugs	688	53.50
Total	1286	100.0

Table 5:- Compatibility of prescribed drugs with the diagnosis regarding to the national practice guidelines for family physicians.

Compatibility of prescribed drugs with the diagnosis	Frequency	%
Compatible with the diagnosis	861	66.9
Partially compatible with the diagnosis	235	18.3
Not compatible with the diagnosis	126	9.8
Cannot be judged	64	5.0
Total	1286	100.0

Table 6:- Frequency and distribution of different types of prescribing errors in family practice

Frequency and Types of prescribing errors	Frequency	%
Errors	**274**	**21.3**
Type A (Serious)	6	0.5
Type B (Major nuisance)	56	4.4
Type C (Minor nuisance)	92	7.1
Type D (Trivial)	120	9.3
No errors	**1012**	**78.7**
Total	1286	100.0

The present study showed that, the average number of drugs prescribed per encounter was 2.4 ± 0.7 (Mean ± SD) which is higher than the international standard recommended by WHO (< 2). However, it was lower than that reported by **Bashrahil** [5] which was 2.8, and **Sunil et al.,** [8] which was 2.9. In this study, 53.5% of prescriptions contain three or more prescribed drugs which are lower than that of **Sunil *et al.,*** [8] who found that, 62.4% of prescriptions contain three or more drugs.

Essential drugs offer a cost-effective solution to many health problems in developing countries. The national EDL were selected regarding to disease frequency, be affordable, with assured quality and be available in appropriate dosage forms. In this study, the percent of drugs prescribed from the national EDL was 95.9% which is higher than that reported by **Sunil *et al.* and Sapkota *et al.,*** [8, 9] which were 90.3% and 75% respectively. Increasing generic prescribing would rationalize the use and reduce the cost of drug therapy [10].The percent of drugs prescribed by generic names was 86.4% which approach the standard WHO value (100%) and is higher than that of **Sunil *et al.,*** (73.4%) [8] and **Sapkota *et al.,***(84%) [9]. However it is much higher than that reported by **Dipak *et al.,*** (3.36%) [10]. Appropriate use of antibiotics is necessary to prevent emergence of drug-resistant bacteria. In this study the frequency of prescribed antibiotics was 35.3% which is higher than the WHO recommended values (20-26.8%) but is lower than that reported from Cambodia, Ethiopia, Ghana, Morocco, and Nigeria (47.5% to 100%)[4] and also lower than that reported by **Sunil *et al.*** (39.6%)[8], and **Dipak *et al.***(42% to 38%)[10], and much lower than that of **Bashrahil** (66.2%)[5].However lesser figures of antibiotic prescriptions (17.5% to 35.4%) have been reported from several countries [4]. In the present study, the percent of injections was 19.8% which is slightly higher than that reported by **Dipak *et al.* , (**11.4%) and slightly lower than the values recommended by WHO (13.4% to 24.1%) [10]. Also, it was lower than that of **Bodenschatz *et al,.***[11] who conducted a study in Egypt and found that, 18.1% of patients received injections which were more often prescribed in hospitals than in primary health care clinics and in rural than urban settings and most of these injections (94.7%) could have been replaced by a suitable oral preparations. An urgent need arises to reduce the use of injections in developing countries to prevent health care problems associated with hepatitis, HIV and other blood borne pathogens. Duration of treatment was missed only in 14.9 % of prescriptions. **Mahfouz *et al.* ,** [12] found that, the leading missing item in the studied prescriptions was, for how long medications should be taken (32.9%). **Sapkota *et al.* ,** [9] found that, the route of drug administration and ending date of therapy were the most missed items in prescriptions (10.25 and 7% respectively). Only 66.9% of prescriptions were compatible with the diagnosis emphasizing that, rational drug prescribing is needed as a part of medical education. In this study, the frequency of prescriptions with different types of errors was 21.3% .Fortunately, only 0.5% of prescriptions had serious errors (type A), 4.4% had type B, 7.1% had type C and 9.3% had type D errors. In Bahrain, **Al Khaja *et al.,***[13]explored prescription errors and found less patterns of prescribing errors to those identified in our study. According to their study, 5959 out of 77511 prescriptions (7.7%) were found

to contain errors compared with 274 out of 1286 (21.3%) in the current study. In a study of hospitalized patients, **Blix *et al.,*** [14] reported that, 81% of patients had problems with their drug prescriptions, most commonly for drugs such as warfarin, digoxin and prednisolone .In a study in four United Kingdom primary care pharmacies, **Chua *et al.,*** [15] reported that, "near misses" occurred 6 times more often than dispensing errors, indicating the importance of final checking in pharmacies. The most common types of dispensing errors or near misses appeared to be incorrect strength of medications, incorrect drugs, incorrect quantities, incorrect dosage and incorrect labels [16].

Conclusion and Recommendation

The study mandate a training initiative to improve the family physicians' prescribing skills and their adherence to; essential drugs list, national practice guidelines for family physicians, WHO drug use indicators and in order to improve the patterns and reduce the errors of prescribing drugs in family practice. Also, rationalization of drug-prescribing in family practice should be incorporated as an integral part in the national practice guidelines for family physicians as well as the curricula of medical education at both under and postgraduate levels.

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