Rational Drug use in Pakistan: A systematic review

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Abstract

Background: This article provides a review of different studies about rational use of drugs in Pakistan and different interventions to improve drug use in the country. The analysis of these studies focused on the quality of services offered by these pharmacies, knowledge of drug sellers and dispensing practices. **Material and methods:** The summary of rational drug use and their possible health consequences is based on reviews of drug use in Pakistan. A systematic inventory of published research work since 1990 to 2015 was undertaken to identify studies which focused on different aspects of rational drug use. Annals and computerized databases of International Network for Rational Use of Drugs (INRUD), WHO, PubMed, Science Direct were screened for relevant journal articles, research reports and newsletters. To expand and fortify the search process, the general search engine Google was utilize. **Results:** Initially, a total of 60 articles were retrieved for electronic databases by the authors. These articles were then again matched with the objectives of this study and those articles which did not qualify, were excluded. After further screening, 20 articles were selected and 15 appropriate studies were finally included in the review. **Conclusion:** In this study, we find out that large number of drugs is being used in wrong way. The current paper highlighted that quality of services provided at community pharmacies in Pakistan is not satisfactory. The situation of rational drug use indicators in the hospitals where the study was conducted is alarming. There is an urgent need for intervention to improve the situation.

Key words: Rational drug use, Irrational drug use, Pakistan.

INTRODUCTION

A drug is any substance other than food that when inhaled, injected, smoked, consumed, absorbed via a patch on the skin or dissolved under the tongue causes a physiological change in the body. In olden days drugs were very simple, yet there were problems. Now the drugs are like atomic energy, being powerful for evil as well as for good. Iatrogenic disorders (due to drugs) including fatalities are very common, even in countries where knowledge and facilities are quite advanced. In our own environment this is very high due to lack of professional competence and accountability.[1]

Health Care System in Pakistan

In Pakistan basic pharmacology is still taught at undergraduate level in isolation of clinical setting and at postgraduate level there are no programmes of education/training in clinical Therapeutics, nor is there any continued Medical education for practising doctors. Furthermore, due to non-existence of these units there is no training for clinical pharmacy. As a result, there is a lack of clinical Pharmacists to properly maintain the pharmacies in hospitals.

In Pakistan, the situation regarding drugs is precarious. Many of "Essential Drugs" which form the back-bone of rational prescribing are not available, while the market is flooded with irrational drugs including harmful herbs and many chemicals which are not included in the pharmacopoeias of the modern system of medicine and not registered in most countries. There are more than sixty thousand formulations registered in Pakistan. This situation is compounded by the free availability of drugs without prescription and existence of spurious and date-expired drugs. Studies carried out by the author of this editorial; on the prescribing trends showed very high misuse/irrational use of drugs by the doctors, both in public and private sectors in Pakistan.[2,3]

On the 14th of August, 1997, Pakistan celebrated its 50th anniversary of gaining independence. The present population is 130 million people. The pharmaceutical industry began from a scratch and presently has a large drug market of 650 million dollars. The growth of the pharmaceutical manufacturers has gone up to 275 out of which 31 are multinational companies who earn up to 70% of the profit. There are at least 1,200 pharmaceutical products registered in Pakistan. The Pakistan Drug Act of 1976 is now 28 years old and it requires carrying out of clinical trials on new drugs prior to registration in Pakistan. It is a fact that based on reality that no expertise exists in clinical pharmacology in the entire country, that means academia, pharmaceutical industry and governmental institutions that provide and manage drug supplies.[2]

Objective of the review

Rational use of drug is gaining importance throughout the world. It became an important need of today in health system for improving health of a patient. It is important that patient and practitioner should have accessible knowledge about the safety and effectiveness of various drug used in the management of their health.

MATERIALS AND METHODS

Search engine used

This comprehensive review is based on the content derived through a thorough literature search using electronic databases such as Science direct, PubMed, and Google scholar. In this review, we attempted to identify all published studies related to rational use of drug in Pakistan. The objective was to gather literature from different part of the world to give readers the broader perspective of the topic. A systematic inventory of published research work since 1990 to 2015 was undertaken to identify studies which

focused on different aspects of rational drug use. A total of 60 articles were retrieved for electronic databases, which were then reduced to 15 to meet the objectives of the study.

Study selection criteria

During the literature review, abstract of the articles were read for relevance to the research objective. In case of any doubt, full text of the articles was examined before including the article in study. Articles were selected for review if they had identified the rational use of drug in Pakistan, factors associated with it, and if they had measured the outcome of rational use. Those articles which did not identify any of the mentioned points were not included in this study.

RESULTS

Initially, a total of 60 articles were retrieved for electronic databases by the authors. These articles were then again matched with the objectives of this study and those articles which did not qualify, were excluded. After further screening, 20 articles were selected and distributed among the authors for more appraisals. After a thorough brain storming session by authors, 15 appropriate studies were finally included in the review. As our topic was rational use of drug in Pakistan so the articles on research conducted in Pakistan related to rational use were reviewed.

DISCUSSION

Irrational prescribing is a habit that is difficult to cure. The Government should make people aware of the virtues of the use of essential drugs and hazards of misuse/abuse of irrational drugs. Rational use of drugs should be given due importance in the medical education curriculum. In the teaching hospitals there should be clinical units of clinical therapeutics and clinical pharmacology like units of cardiology, gastroenterology etc. as recommended by WHO. These units promote rational use of drugs-impart education and training to doctors, pharmacists, nurses and paramedics and carry out research. Institutions, health professionals and patients all have roles to play in promoting more rational use of drugs. Effective regulation, clear clinical guidance, supportive incentive structures, training, education and management, are key components of an effective policy in this area.

The drug utilization study was carried out in the Pakistan Institute of Medical Sciences, Islamabad, Rawalpindi General Hospital and the Military Hospital, Rawalpindi. During the autumn of 1995, 601 prescriptions from medical, paediatric and psychiatry units, from in-patients and

out-patient units were analysed. Treatment did not co-relate to the diagnosis in 24.63 per cent cases. Doses of drugs were inappropriate in 30.62 percent cases. The duration of treatment was not specified in 73.38 per cent cases.[2]

There are 8,102 pharmacists who are categorised as 'A' category; 31,000 pharmacy technicians categorised in 'B' and 'C' categories in the country. There are over 63,000 private pharmacies in the country. If, theoretically, all these pharmacists and pharmacy technicians are employed by private pharmacies, still a good number of pharmacies are left without a qualified person in the country.

According to the Pharmacy Council of Pakistan (PCP), 70 percent of pharmacists are employed in the pharmaceutical industry, while only 10 percent work at community pharmacies in the country. The role of pharmacist is not very well recognised as compared to other health professionals in the country. The profession lacks an interface in society and is still seen in its infancy. Evaluation of storage practices highlighted the lack of temperature monitoring devices and alternative power supplies for refrigerators with more than half of the pharmacies keeping vaccines irrespective of appropriate storage temperatures. A study in Karachi reported that tetanus toxoid was sold by 76% of pharmacies. However, only 8.9% had a refrigerator. In legality, these pharmacies generally are registered by hiring a pharmacist, but in reality, they only rent a pharmacist license. The regulations regarding prescription drugs are generally not respected and prescription-only drugs are commonly dispensed without prescription and one of the most worrisome issues concerning irrational drug use is the common availability of OTC drugs.

Although, dispensing is regarded as an important component of rational use of drugs, yet it has been ignored by researchers in Pakistan. There are very few studies available which focus at the practices of pharmacies in Pakistan in public and private sectors, and there is just one intervention study with a very small sample size.

According to an article Data was collected from public and private hospitals of Karachi, Pakistan. 200 patient's prescriptions were selected out of 280 prescriptions and then we find out the factors of irrational drug use in those hospitals setups. We found that about 67.5% prescriptions were devoid of clear diagnosis which may be hinder the rational drug use. Besides that, 57.5% prescriptions were without clarity of drug dose that may leads towards irrational use of drugs. 47.5% prescriptions contained drugs which have interactions with other drugs and 57% prescriptions had contra indicated drugs that may cause misuse of drugs.

On 64.3% prescription consisted of only generic drugs and 29% prescriptions contained polypharmacy that may cause irrational drug use. About 34 percent prescriptions were devoid of doctor's name, contact number and signature and 74% were without date of consultation which is most important factor for rational drug use. 82% prescriptions did not contain patient medical registration number, 91% were without clarity of other instructions and 62% prescriptions contained two or more than two antibiotics as shown in Table 1.

According to World Health Organization, achieving rational prescribing in the private sector is "notoriously difficult" due to influences from patient demand, drug advertising, and profit-seeking behaviour of the drug-sellers. The research has established that improvements in the practices are possible through appropriate interventions and interventions can be sustained and are cost-effective if scaled up.[4]

The key health care players are the physicians, nurses, dentists, pharmacists and pharmacy assistants. The health care providers are quite low in number vis-a-vis the country's population. Although medical doctors are quite dominant and hold major administrative and decision making positions in health sector. There are over 30 pharmacy institutions in the country, from where 2587 pharmacists are graduated annually. The current number of pharmacists does not meet the demand of growing needs for optimal health care de-livery of the population. Pakistan Pharmacists Association is responsible for growth of the pharmacy profession and National Association of Pharmacists promotes and expands the role of pharmacist in public health and patient care.

Distribution of medicines relies heavily on community pharmacies and according to an estimate, 80% of the medicines are being distributed through this channel. Thus, majority of the population relies on them for their health care needs. There are approximately 63,000 com- munity pharmacies in the country. These pharmacies are quite diverse in their geographical distribution and operations; they are located in the urban, as well as, rural areas, inside hospitals, in general stores and grocery stores, and at market stalls. They often lack adequate facilities, staffing and equipment. Besides this, the dispensers working at these pharmacies are not trained, and yet, are involved in making diagnoses and recommending therapy to the patients along with dispensing of medicines.

In- appropriate storage and dispensing of medicines, lack of proper documentation and prescription check along

Table 1: Irrational drug use and prescription layout	
Item	Percentage (n=200)
Unclear Diagnosis	67.5
Clarity of Dose	57.5
Drug Interactions	47.5
Drug Contra Indication	57
High Cost	64.3
Generic drugs	29
Polypharmacy	34
Doctor's name, contact Number and signature	74
Date of consultation	82
Patient medical registration number	91
Clarity in instructions	82
Antibiotics	62

with labelling are the foremost issues to be addressed at these outlets in Pakistan. The dispensers working at these community pharmacies have minimal formal education, with 10 to 12 years of schooling, and little or no professional training. They mostly rely on information gathered by the representatives of pharmaceutical companies. With this state of qualification and training, these dispensers are responsible for the functions of a dispenser, store keeper, inventory manager, accountant, pre-scriber, information provider and patient counsellor. All kind of medicines are freely available irrespective of their status as prescription or over the counter drugs. The process of prescription handling is poor and patients are often treated without a proper prescription. Prescription validation, drug labelling and patient counselling are the missing components in effective patient management at these community pharmacies.

Laws exist, but due to lack of accountability and weak regulatory framework their proper implementation is not witnessed. Moreover, due to lack of research and evidence related to problems in dispensing practices in healthcare system of Pakistan, the counteractive actions in resolving these problems are limited.[5]

Rational Drug Use

In simple words rational use means, "prescribing right drug, in adequate dose for sufficient duration and appropriate to the clinical needs of the patients at lowest cost"[6] Rational prescribing implies using the right drug for the right patient at the right time in the right dose and manner of administration, at affordable cost and with right information. A prescription has to be tailor-made for an individual patient. It should take into account the diagnosis, age, sex, weight, drug and food interactions, vital functions

as well as socio-economic, spiritual beliefs and background of the individual patient. Worldwide, it is estimated that over half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take their medicine correctly.

In spite of available tools and information on how to measure medicines use and the intervention strategies needed to achieve this, irrational use continues to occur. Inappropriate use of medicines, and the related illness and deaths, are not restricted to low-income countries. Studies in Canada, Australia, Kuwait and the USA, as well as in middle-income countries such as South Africa and Thailand, have revealed that inappropriate use of medicines is widespread in teaching hospitals. In many countries, the problem extends well beyond hospitals. Two-thirds of all antibiotics are sold without prescription, through under-regulated private sectors.

In many countries, the problem is entrenched. Few countries currently monitor inappropriate use of medicines - partly due to a lack of awareness of the scale of the problem and it's economic and health costs - and decision-makers often lack knowledge of the most cost-effective ways to tackle this problem. Meanwhile, some countries lack the financial and human resources needed to promote more accurate diagnostic procedures, to implement effective regulation of prescribing and dispensing behavior and to promote adherence to treatment by patients, in both the public and private sectors. In addition, the high cost of medicines contributes to low adherence levels by patients: in some studies, an estimated 90% of consumers buy three days' supply, or less, of antibiotics, making compliance with the recommended dosage impossible.[7]

According to another article Minimum drugs per prescription recorded were 5 which exceed the WHO limits of 2 drugs per prescription. This simply show physicians' trend towards the polypharmacy which is an important factor for irrational use. Drug dose and adverse effects are strongly interconnected with each other. Drug dosing errors were the most common type of prescription errors observed up to 22% of dosage errors accounting for 50% of preventable reported adverse effects. Moreover this study shows high occurrence rates of drug duplication, and drug interactions. 70% of drugs were costly for patients. High cost may lead to non-adherence to the therapy. It has been observed that more than one antibiotic prescription was a common practice using mostly third generation antibiotics. Overuse of antibiotics is the principal factor in the emergence of resistant strains of bacterial pathogens.[8]

According to a research journal about 31% of drugs were found with improper dose or the frequency of the dose was not mentioned. Both of which are very important for the best therapeutic treatment. About 12.56% drugs were prescribed without mentioning the duration of therapy which is very important for the management of certain diseases like malaria, antibiotic therapy etc. The prescription containing unnecessary drugs without any indication was found. It was seen that the patients were suffer from various diseases and in the prescription the treatment of some problems were totally ignored.[9]

WHO recommends that each medicine should be properly labeled i.e., it should at least contain the dose regimen, patient name and drug dose. According to a study only 3.96% drugs were found to be properly labelled whereas it is highly desirable that all drugs are labelled properly. During patient interviews, it was found that most of them did not know exactly when they should take medicines. Not even a single drug had been labelled properly in three out of four facilities. Unfortunately, patient's knowledge of the correct dosage of drugs was low (54.98%) compared with the desirable value of 100%.[10]

According to a journal average Percentage of generic drug prescribed was 29.7% that is not according to the WHO standard values which was 100% it shows the greater interest of doctors to brand name prescribing. The average percentage of antibiotics prescribed was 64% while WHO international networking for rational use of drugs (INRUD) devised limit up to 30% that showed all health facilities contributing to bacterial resistance to antibiotics. The average dispensing time was 88.5 seconds in province Punjab and no patient counselling was done before dispensing in that limited time in hospitals. The percentage of drugs actually dispensed was 82.9% in Punjab hospitals so rest of patients referred to take drugs from community pharmacy. There was minimum number of patients who correctly know dosage of medicines that was because of low literacy and no attention paid during prescribing and dispensing of medicines.[11]

A descriptive cross-sectional and self-administered study was conducted according to which the use of medicine without medical consultation is most common in Headache (96.52%), Minor cuts, wounds (85%) and Fever (80%). Self-medication is comparatively less with antibiotics and more with the medicines used for minor injuries. The participants in the study found the advertisements on print and electronic media to be a source of encouragement for self-medication with OTC preparations for headache besides cough, cold and fever. This study however reveals a dire situation that a misuse of cough and cold medication is seen in few participants of this study, for the induction of sleep in an addictive manner, even though insomnia had not been clinically diagnosed in them. The toxicity due to self-medication with cough syrups is an increasing area of concern. Previous studies show that the irrational prescribing and irrational use of antibiotics in Pakistan has led to the emergence of resistant strains.[12]

Irrational drug use has been highlighted as a serious concern across LMICs. Although an Essential Medicines Program was established in Pakistan in the 1970s, our review indicates that irrational use continues to be widely prevalent. Prescription of medicines and injections is higher in Pakistan, mainly driven up high level of antibiotic usage. As shown in Table 2, average number of medicines prescribed per prescription is 3 or more in Pakistan and some studies indicate it to be 4.5 in private sector. Prescription Medicines are inappropriately prescribed even for endemic diseases despite existence of national disease control program and standard management protocols. Prescribing predominantly follows brand names, and low cost options are frequently overlooked in favour of costlier medicines even in public sector facilities.

Mean consultation time and medicine dispensation time is insufficient for patient advice on usage medicines, and safety and storage parameters for dispensing are inadequate. Irrational use is more marked in the private sector and in rural areas. Evidence suggests that self-medication with antibiotics is commonly practices by 6-11% of the population.[13]

Rational drug use is well recognized as an important part of health policy. The underlying principles or criteria include safety, accessibility and efficacy/effectiveness. Irrational drug use might be in different forms such as unavailability of prescribed drugs, failure of proper drug prescription. For the maintenance of health or to improve it, access to medicine is also a problem. It also increased rate of morbidity and mortality and the use of unsterile injections that leads to broaden a variety of blood borne infections like hepatitis. To minimize these problems, we have to improve the proper use of drugs within limited resources available. In 1970, WHO introduced the "Essential drug" concept, that a limited number of drugs would lead to better supply of drugs, better prescribing & lower costs for health care.[14]

In Pakistan the situation with regards to drugs is precarious. Many of the "Essential Drugs" which form the back-bone of rational prescribing are not available, while the market is flooded with irrational drugs. There are about fifty thousand

Table 2: Rational Drug Use Indicators: Comparison of Pakistan and LMICs

Title	Pakistan	LMICs
Drugs per prescription	3 or >†	2.39†
Drugs per prescription public sector	2.77≠	Nil
Drugs per prescription private sector	4.51*	Nil
Antibiotics per patient encounter	70%†/ 52%≠	45%†
Injections per patient encounter	60%†/14.7%≠	23%†
Medicines prescribed from formulary	50%π	71.7 %
Facilities having national formulary	20%≠	78%†
Prescribed by brand names	88%*	78†40†
Mean dispensing time	38 sec#	105 sec†
Mean consultation time	2-9 min#	4 min †
Self-medication of antibiotics	6-11%‡	Nil

Source: † WHO: The World Medicines Situation; 2004.

≠Networks: EDSP Baseline Survey Report; 2002.

*Das N, Prescribing practices of consultants at Karachi, Pakistan.2001

†WHO: The World Medicines Situation; 2004. / ≠Networks: EDSP Baseline Survey Report; 2002

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‡Haider & Thaver: implication for primary health care strategies. 1995, Sturm: Over-the-counter availability of antimicrobial agents, self-medication and patterns of resistance in Karachi, Pakistan. 1997

#Hafeez A: Prescription and dispensing practices in public sector health facilities in Pakistan: 2004, Nizami SQ,: Drug prescribing practices of general practitioners and paediatricians for childhood diarrhoea in Karachi, Pakistan. 1996, / Networks: EDSP Baseline Survey Report; 2002 [12].

formulations registered in Pakistan, a record numbers indeed. The situation is compounded by the free availability of spurious and date-expired drugs in the market. Studies carried out by the author of this editorial on the prescribing trends showed very high misuse/irrational use of drugs/medicines by the doctors both in the public and the private sector in Pakistan.[15]

Common examples of irrational use of drugs includes; large number of medicines or polypharmacy, use of injections instead of oral medication where orally given medicine is sufficient, prescription of antibiotics including inappropriate dosages &duration of treatment , noncompliance of proper clinical guidelines during prescription writing and patient's ignorance to take full prescribed treatment or self-medication. In the poor and developing country like Pakistan, socioeconomic condition is not satisfactory and also there is need to educate paramedical staff and people about the proper use of drugs. The effect of irrational drug use is, inappropriate drug prescription that either causes drug resistance or can increase morbidity or mortality rate, improper attention leading to wastage of resources as well

as of essential drugs, there may be increased availability or prescription of drugs that have comparatively increased number of side effects and there may be an impact of patient's behaviour that there must be a medicine for every problem that may lead to irrational use of drugs.[16,17]

CONCLUSION

In this study, we find out that large number of drugs is being used in wrong way. Drug practice in the tertiary care hospital was mainly irrational and was potentially exposing the life of patients to a continuous threat during treatment period. The current paper highlighted that quality of services provided at community pharmacies in Pakistan is not satisfactory. Absence of qualified people, lack of provision of advice and lack of professionalism by the dispensers, ambiguity of laws and their implementation are the main reasons for the poor quality of services offered at com- munity pharmacies. This all lead to irrational use.

There is a strong need to utilize the important segment i.e. community pharmacies which acts as a first-line treatment source for most of the population. Strategies shall be formed to utilize their potential in promoting rational drug use in line with the experience of other developing countries. Policy investment is needed in regulation of drugs to reduce unnecessary proliferation and prescribing, and strengthening quality parameters at provider and community pharmacy. WHO's recommended Essential Drugs should be made available everywhere and at all times. The government should make every endeavour to promote the use of Essential Drugs in both the public and the private sectors. It is recommended that government health facilities and government must do best to eliminate that severe condition and follow WHO protocols to ensure rational use of drugs in Pakistan.

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