IRRATIONAL DRUG USE;
EVALUATION OF PRESCRIBING TRENDS IN A HOSPITAL

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ABSTRACT… Objectives: To evaluate drug prescribing practices at Medical Unit, ICU and Nephrology Unit, using WHO prescribing indicators, in order to promote rational drug use. **Study Design:** A retrospective cross sectional study. **Place and Duration of Study:** Bolan Medical Complex Hospital Quetta, Pakistan, from July to December 2015. **Methodology:** Drug prescribing trends in 218 prescriptions were scrutinized thoroughly. Data was collected by well-trained pharmacy personals by using prescriptions and prescription registration books of patients. Descriptive statistics were calculated on SPSS version 16.0. **Results:** The average number of drugs prescribed per prescription were 4.11 whereas, WHO recommends that it should be 2.00 or less. Alternatively, percentage of drugs prescribed by generic name and from an essential drug list were 14.73% and 78.35% while, in accordance with WHO it must be 100% and 70% correspondingly. On the other hand, percentage of encounters having antibiotics or injections prescribed were 18.33% and 32.79% but according to WHO it should be 20% or less and 10% respectively. Nevertheless, proper diagnosis was stated in 89.44% of prescriptions and 72.11% prescriptions had complete relevance between treatment and diagnosis. Along with, appropriate drug dosage and their administration was instituted in 65.16% of prescriptions and 73.21% of prescriptions had accurate duration of therapy. **Conclusion:** The prescribing patterns in Bolan Medical Complex Hospital Quetta reflect the practice of polypharmacy, which is more of an irrational type in contrast to WHO recommendations. Thus, there is an urge to bring about some interventions to improve the pharmacotherapy.

Key words: Prescribing indicators, Prescriptions, Essential drug list, Generic name.

INTRODUCTION

Drugs are necessary for prevention, cure and rehabilitation. Although investments and funds for health system are finite, still number and type of drugs are continually expanding. More than 28000 drugs are registered in Pakistan and a huge sum of money is spent on buying medicines.[1] Regardless of these heavy expenditures, essential medicines are not in the reach of 1/3rd of world population[2], because of failure of available resources and due to poor drug management systems, 70% of resources decay in any country.[3]

Irrational prescribing is a universal dilemma, mainly influencing developing countries and use of drugs further provoke this condition in less developed countries.[4] World Health Organization (WHO) has interpreted drug utilization as marketing, distribution, prescription and drug use in a society with marked importance to reflex medical, social and economic outcomes.[5] So, rational use of medications is need of hour to optimize drug budget and health standards. Joint efforts to regulate pharmaceutical execution and focusing at rational use of medication are requisite in present scenario, as drugs are major reservoir. WHO has developed medication use indicators to access the state of facilities provided to community regarding medication.[6] To ascertain therapeutic actions taken in any area, to access population's medication demand and to check most persistently used medications in an area, prescription indicators are used. Moreover, these indicators permit the recognition of prescription profile and standard of services presented to public.[7]

The prescribing indicators of WHO include, average number of drugs per prescription, which investigate poly drug use responsible for many drug interactions and adverse reactions; percentage of drugs prescribed by generic name, which estimates marketing pressure on prescriber; percentage of drugs prescribed from Essential drug list (EDL), which examines the degree to which practices comply with standards of national drug policy as pointed out in national drug list of any country; percentage of antibiotics prescribed, which explains overused prescribed antibiotics and cost of therapy; and percentage of injectables prescribed, which evaluate excess use of injectables because their administration may be associated with life threatening outcomes when prescribed wrongly e.g., anaphylactic reactions, adverse reactions, fiber necrosis etc.[8,9] Employing these indicators, it is feasible to promptly and carefully figure out the attention given to health, but these indicators do not estimate all the important conditions of drug use.[9]

To fight ill health, essential drugs are wanted. By mounting approach towards rational use of essential drugs, level of health can be upgraded and secured. Assessment of drug use patterns with the WHO drug use indicators is pretty mandatory to encourage rational drug use in developing countries.[10]

The objective of this study was to evaluate prescription indicators in Medical, ICU and Nephrology wards at Bolan Medical Complex Hospital Quetta, Baluchistan, Pakistan and to compare them with WHO approved prescribing indicators, in order to promote rational drug use.

METHODOLOGY
This retrospective cross sectional survey was carried out to study different prescribing indicators in Bolan Medical Complex Hospital Quetta, Baluchistan, Pakistan. Data was collected by well-trained pharmacy personals by using prescriptions and prescription registration books from patients of Medical Unit, ICU and Nephrology Unit of Bolan Medical Complex Hospital Quetta during July to December 2015. Prescriptions were collected randomly from both

inpatients and outpatients of these 3 wards, by keeping sample size variable depending upon availability of patients. A total of 218 prescriptions were analyzed. The whole procedure was carried out with permission of concerned authorities of hospital and confidentiality of prescriptions was assured to hospital management. Data was collected from prescriptions on predesigned Performa, which were designed to compare drug prescribing indicators in Bolan Medical Complex Hospital Quetta with relevance of standard drug prescribing indicators of WHO for following parameters.
1. Average number of drugs per prescription
2. Percentage of drugs prescribed by generic name
3. Percentage of drugs prescribed from EDL
4. Percentage of prescribed antibiotics
5. Average number of drugs per prescription
6. Percentage of prescribed injectables drugs

Beside these parameters; diagnosis, treatment plan, dosage, administration and duration of therapy were also evaluated.

All the data were analyzed using SPSS version 16.0. Descriptive statistics has been used for computing frequency and percentage and results were summarized using tables and bar chart.

RESULTS
A sample of total 218 patients encountered in distinct wards of Bolan Medical Complex Hospital Quetta was accessed in present study. A total of 829 drugs were prescribed on 218 prescriptions analyzed. Out of 829 drugs, total number of antibiotics prescribed, total number of injectables prescribed, total drugs prescribed by generic name and total drugs prescribed from EDL were 174, 309, 141 and 674 respectively. The cost of medicines prescribed and data of individual department is displayed in Table I.

Assessment of prescribing indicators with respect to WHO prescribing trends is summarized in Table II. The average number of drugs per prescription in different wards as Medical unit, ICU and Nephrology unit were 3.01, 4.97 and

4.37, respectively but WHO recommended value is 2.00 or less. Likewise the drugs prescribed by generic name in Medical unit, ICU and Nephrology unit were 19.56%, 18.7% and 5.93% while, WHO recommends that it must be 100%. In the same manner, the habit of prescribing medicines from EDL in Medical unit, ICU and Nephrology unit was accessed as 80.70%, 86.58% and 67.79% whereas, percentage recommended by WHO is 70%. Moreover, the trend of prescribing antibiotics in Medical unit, ICU and Nephrology unit was computed as 26%, 18% and 11%, although standard value of WHO is 20% or less. Likewise, frequency of prescribing injectables in Medical unit, ICU and Nephrology unit was 38.58%, 42.85% and 16.94% whilst, WHO recommended value is 10% as well.

Drug prescribing practices were also evaluated by comprehensive investigation of 218 prescriptions included in study, as shown in Figure-1. Diagnosis was specified in 89.44% prescriptions. Similarly, 72.11% prescriptions had treatment completely pertinent to diagnosis but 28.94% prescriptions exhibited partial relevance of treatment to diagnosis. Drug administration and dosage was found appropriate in 65.16% of prescriptions studied whereas, inappropriate dosage was indicated in 35.09% prescriptions. Also, appropriate duration of treatment was

clearly mentioned on 73.21% of prescriptions but 17.89% had an inappropriate duration of therapy and 9.00% prescriptions lacked diagnosis.
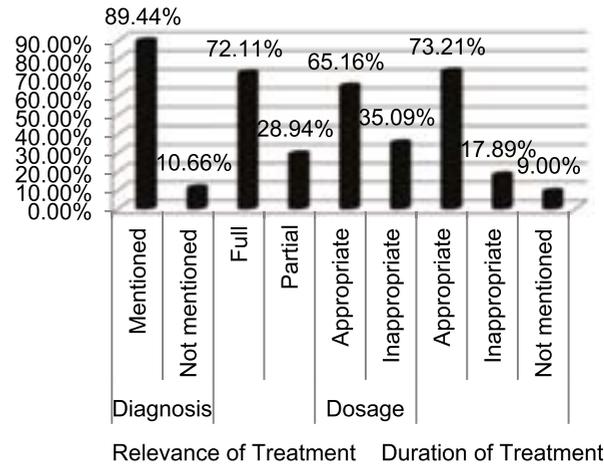

Figure-1. Appraisal of drug prescribing practices

DISCUSSION

A prescription provides clear view about prescriber's attitude towards disease being treated and nature of health care facilities provided to public.[11] The present study evaluated prescribing practices in Bolan Medical Complex Hospital Quetta. The prescribing indicators were examined to check out their reliability with WHO prescribing indicators.

Variables	Medical Unit	ICU	Nephrology Unit	Total
No. of patients	122	69	27	218
No. of drugs prescribed	368	343	118	829
No. of antibiotics prescribed	98	63	13	174
No. of drugs prescribed by generic	72	62	7	141
No. of drugs prescribed from EDL	297	297	80	674
No. of injectables prescribed	142	20	147	309
Cost of medications prescribed (Rs)	111198	241602	69340	422140

Table-I. Evaluation of prescribing indicators in Bolan Medical Complex Hospital Quetta.

WHO Prescribing Indicators	Medical Unit	ICU	Nephrology Unit	Total	WHO Recommended
Average number of medications per prescription	3.01	4.97	4.37	4.11	2.00 or less
% Generic name	19.56%	18.7%	5.93%	14.73%	100%
% Essential medication	80.70%	86.58%	67.79%	78.35%	70%
%Antibiotics	26%	18%	11%	18.33%	20% or less
% Injectables	38.58%	42.85%	16.94%	32.79%	10%

Table-II. Comparison of prescribing indicators in Bolan Medical Complex Hospital Quetta with relevance to WHO recommended indicators.

A total of 218 prescriptions were sorted out from Medical, ICU and Nephrology wards of Bolan Medical Complex Hospital Quetta and overall average number of drugs per prescription was 4.11. This figure is comparable to that reported in studies carried out in same manner in Rawalpindi, where average numbers of drugs per prescription were 4.01.[12] However, this value is significantly high as compared to WHO prescribing indicator, which is 2.00 or less. The results revealed the tendency towards polypharmacy practice and continual irrational prescribing practices in Bolan Medical Complex Hospital Quetta that can raise the probability for non-compliance and side effects or drug interactions.[13]

The percentage of generic prescribing in current research was found to be 14.73% which significantly deviates from WHO recommended value that vows 100% generic prescribing. These findings are analogous to the study carried out in Rawalpindi that presented 23.61% generic prescribing.[12] The reason behind this extremely low frequency of generic prescribing is unavailability of generic formulations in market and the practice of generic prescribing can be expedited by limiting drug samples provided to physicians by medical representatives. Generic prescribing can progressively decrease the expense of drugs for both patients andinstitute.[14] The overall percentage (78.35%) of drugs prescribed from the essential drug list in present study was in line with WHO recommendation (70%). Former researches conducted in Hawasa University Hospital, Jimma Hospital, South West Ethiopia and Tanzania reflected that 96.6%[15], 99%[16] and 88%[17] drugs were prescribed respectively from EDL. So, it can be concluded that prescribing trends of physicians from EDL are highly plausible. The major factor behind prescription of drugs from EDL is the availability of copy of National Essential Drug List of Pakistan in Bolan Medical Complex Hospital Quetta.[13,18]

The percentage of prescribed antibiotics in current investigation (18.33%) corroborates prescribing practices in Rawalpindi (20.4%)[12], Bangladesh(25%)[18] and Burkina Faso(25%).[19] Hence, antibiotic usage in Bolan Medical Complex

Hospital Quetta is comparatively less and is most promising with respect to WHO recommendation which is 20% or less.

The percentage of prescriptions with injectables (32.79%) in Bolan Medical Complex Hospital Quetta was alarmingly high with respect to standard set by WHO, which states that it should be 10%. The overuse of injectables was noticed in patients of ICU (42.85%) according to existing study. The use of injectables in hospital under study was even more than injectables being used in a teaching hospital of Rawalpindi (17.1%).[12] The inadequate usage of injectables reported in other underdeveloped countries was 16% in Sharjah[20], 19% in Tanzania[21] and Ethiopia[22] and 24.6% in Burkina Faso.[19] The plausible reliance and perspectives of both patients and primary care providers towards effectiveness of injectables preparations may be the factor influencing irrational prescribing of injections. Besides, patients in ICU suffer from serious conditions and injectables provide quick onset of action so, bypassing oral route might be another possible reason for increased use of injectables.[10]

The requisite of rational pharmacotherapy is complete and accurate diagnosis and relatable treatment of patient. During scrutinization of prescribing trends in Bolan Medical Complex Hospital Quetta, it was found that diagnosis was mentioned in 89.44% of total encountered prescriptions. The oversight of diagnosis was reported in OPD prescriptions, which may be owing to heavy task of health care professionals, especially in government hospitals. In the overall situation, relevant treatment was fully intimated in 72.11% of confronted prescriptions while partial relevance of therapy was ascertained in 28.94% of cases. In various prescriptions therapeutic modalities unrelated to diagnosis were analyzed. Albeit these results are distressing but proportionate to those reported from USA where 20 to 40% prescriptions were revealed to be trivial to the diagnosis.[23,24]

The imperative elements of a rational and successful therapy are appropriate and relevant dosage and duration of therapy, which should be

properly disseminated to patients and paramedical staff responsible for drug administration. In the present investigation, these factors were found satisfactory.

In the end, the present study reinforces the notion of regulating prescribing practices according to WHO recommendations. Rational prescribing throughout Pakistan can be promoted by properly following appropriate educational, managerial and regulatory interventions to improve patient health and quality of life and to avoid expenses on unnecessary and costly medications for patients. Educational outreach through illustrated materials and face to face deliberation with prescribers might be helpful to boost up drug use patterns.[25] Among other activities that might be useful include standard treatment guidelines; essential drug lists; establishing drug and therapeutic committee; problem-based basic training in pharmacotherapy; targeted continuing education; availability, accessibility, and affordability of good standard drugs; drug information centers; drug use evaluation and drug bulletins.[10]

CONCLUSION
In general, drug prescribing trends of Bolan Medical Complex Hospital Quetta needs improvement in the light of WHO prescribing indicators. Predominantly, significant deviancy from acceptable WHO standard in prescribing injectables medications and generic prescription entails special consideration. Keeping in view aforementioned findings, it can be supposed that irrational drug use and polypharmacy is being observed in Bolan Medical Complex Hospital Quetta. Thus, orchestrated training on pharmacotherapy can be alluring for enlightening rational prescribing.

REFERENCES
1. Perez-Casas C, Herranz E, Ford N. **Pricing of drugs and donations: options for sustainable equity pricing.** Trop Med Int Health 2001; 6:960-4.

2. **Who pays for health systems? In world health report 2000 WHO Geneva.** Available at www.who.int/whr.

3. MSH 1981. **Managing drug supply: the selection, procurement, distribution, and use of pharmaceuticals in primary health care**. Boston: Kumosian Press, 1997.

4. Baksaas I, Lunde PKM. **National drug policies: the need for drug utilization studies.** Trends Pharmacol Sci 1986; 7:231-234.

5. WHO Expert Committee, **The selection of essential drugs. (Technical Report Series 615).** Geneva, WHO, 1977.

6. Bernardi CLB, Bieberbach EW, Thome HI. **Evaluation of Basic Pharmaceutical Assistance in the municipalities of Coverage of the 17th Regional Coordination of the Rio Grande do Sul Health**. Saude Soc. Sao Paulo 2006; 15:73-83.

7. Vooss AT, Diefenthaeler HA. **Evaluation of prescription indicators established by the WHO in Getulio Vargas – RS.** Braz J Pharm Sci 2011; 47(2): 385-390.

8. Farias AD, Cardoso MAA, Medeiros ACD, Belem LF, Simoes MOS. **Prescription indicators in Family Health basic units of the municipal district of Campina Grande, PB.** Rev Bras Epidemiol 2007; 10:149-156.

9. Carmo TA, Farhat FCLG, Alves JM. **Indicators of Drug Prescriptions: tools for intervention.** Saude Rev 2003; 5:49-55.

10. **Desalegn AA**. **Assessment of drug use pattern using WHO prescribing indicators at Hawassa University teaching and referral hospital, South Ethiopia: a cross-sectional study.** BMC Health Serv Res 2013; 13:170.

11. Laporte JR. **Towards a health use of pharmaceuticals.** Dev Dialogue 1985; 2:48-55.

12. Najmi MH, Hafiz RA, Khan I, Fazli FR. **Prescribing Practices: An overview of three teaching hospitals in Pakistan.** J Pak Med Assoc1998; 48:73-77.

13. Pavin M, Nurgozhin T, Hafner G, Yusufy F, Laing R. **Prescribing practices of rural primary health care clinicians in Uzbekistan.** Trop Med Inter Health 2003; 8:182-90.

14. Brewer D. **The effect of drug sampling policies on residents' prescribing.** Fam Med 1998; 30:482-6.

15. Isah AO, Ross-Degnan D, Quick J, Laing R, Mabadeje AFB: **The development of standard values for the WHO drug use prescribing indicators.** ICUM/EDM/WHO. http://archives.who.int/prduc2004/rducd/ICIUM_Posters/1a2_txt.htm.

16. **Assessment of the Pharmaceutical Sector in Ethiopia. Addis Ababa; 2003.** Accessed at http://

www.who.int/medicines/areas/coordination/ethiopia_pharmaceutical.pdf.

17. Ofori-Adjei D: **Report on Tanzanian field test. INRUD News; 3(1): 9. In How to investigate drug use in health facilities.** WHO: Geneva; 1993. 74 (WHO/DAP/93.1).

18. Guyon AB, Barman A, Ahmed JU, Ahmed AU, Alam MS. **A baseline survey on use of drugs at the primary health care level in Bangladesh.** WHO Bull 1994; 72:265–71.

19. Krause G, Borchert M, Benzler J, Heinmuller R, Kaba I, Savadogo M, Siho N, Diesfeld HJ. **Rationality of drug prescriptions in rural health centers in Burkina Faso.** Health Policy Plan1999; 14:291-8.

20. Hasan MY, Das Mandira, Mourad F. **Drug utilization and antibiotic use in the primary health care centres in Sharjah.** East Mediterr Health J 1997; 3:444-51.

21. Massele AY, Nsimba SE, Rimoy G. **Prescribing habits in church-owned primary health care facilities in Dar Es Salaam and other Tanzanian coast regions.** East Afr Med J 2001; 78:510-4.

22. Desta Z, Abula T, Beyene L, Fantahun M, Yohannes AG, Ayalew S. **Assessment of rational drug use and prescribing in primary health care facilities in North West Ethiopia.** East Afr Med J 1997; 74:758-63.

23. Palumbo FB, Knapp DA, Brandon BM, Knapp DE, Solomon DK, Klein LS, Shah RK. **Detecting prescribing problems through drug usage review: A case study.** Am J Hosp Pharm 1977; 34:152-54.

24. Maki DG, Schuna AA. **A study of antimicrobial misuses in a university hospital.** Am J Med Sci1978; 275:271-282.

25. Avorn J, Soumerai SB. Improving drug-therapy decisions through educational outreach. A randomized controlled trial of academically based "detailing". N Eng J Med 1983; 308:1457-1463.

"Everyone has two eyes but no one has the same view."

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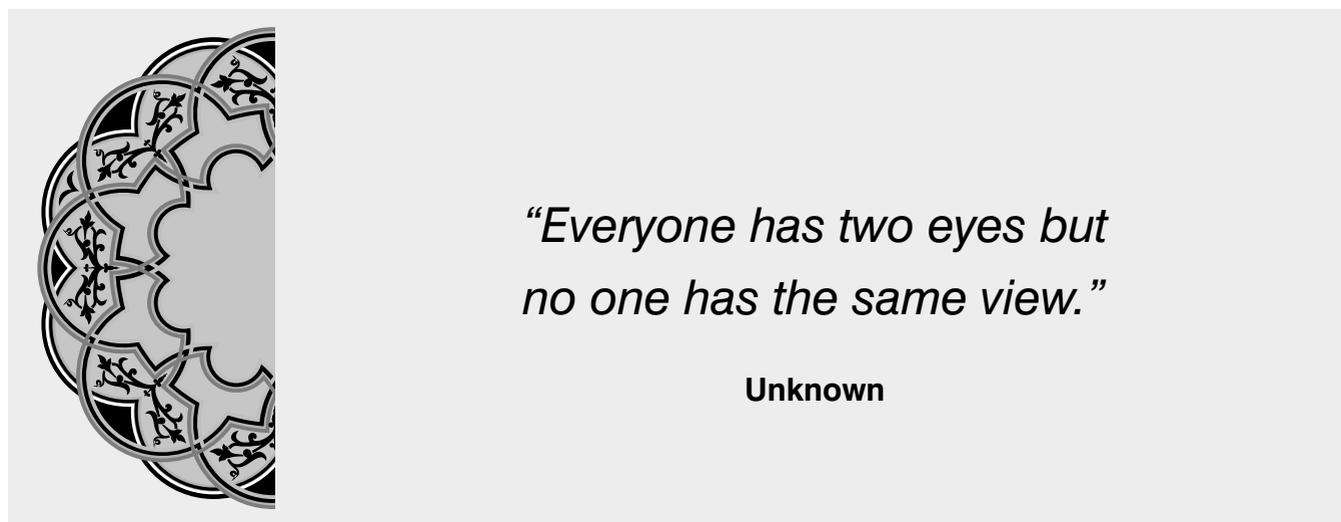
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3	Sheraz Saleem	Idea conception and questionnaire designing	
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