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Assessment of Drug Use Pattern Using WHO Prescribing Indicators in the Medication Therapy of Indoor Diabetic Patients

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Abstract – Diabetes mellitus is one of the prevailing disease in society depending on the release of hormones i.e Insulin and glucagon in the body. The prescribing practices are assessed in this study using the six hundred and fifty prescriptions of indoor hospitalized patients from tertiary care hospital in Peshawar. The assessments are made using WHO core indicators as standards in medication prescribing. In diabetes, the efforts of the prescriber can be successful and patient satisfaction can be achieved only if the patient receives rational treatment for his disease or illness. Irrationality in drug utilization and prescribing exists in most of the tertiary care setups that need utmost rectification and modification for rational clinical practices. Thus in current studies we found irrational prescribing practices regarding drug utilization and disease management from our cross sectional prospective cohort studies that adversely affects the essential drug program and reflects the state of irrational drug prescribing pattern.

Keywords – WHO, Indicator, Prescription, Rational, Irrational, Anti-Diabetic.

1. Introduction

Diabetes mellitus DM is one of the common, non-communicable diseases in the world. Insulin and glucagon are two hormones that help in the regulation of body glucose level. Insulin that usually convert glucose into glycogen is secreted by beta cells of pancreas while glucagon are the enzyme that help to produce glucose from stored glycogen precursor is secreted by alpha cells of pancreas. It is estimated that about more than 180 million people are effected worldwide and it is expected that it may be increased to double in 2030. Basically there are four types of DM namely; Type 1 Diabetes, Type 2 Diabetes, Gestational Diabetes and other Forms of Diabetes. Type 1 DM which is also known as insulin dependent diabetes mellitus (IDDM) afflict the individual in puberty or in the early adulthood. The disease is characterized by an absolute deficiency of insulin caused by massive beta cell necrosis. Type 2 diabetes mellitus which is also known as insulin nondependent diabetes mellitus (INDDM), effected the individual in late age, obesity and insulin resistance rather than autoimmune process or viruses. Both these types of DM lead to nephropathy, neuropathy, retinopathy and cardio vascular complications. Gestational diabetes mellitus that is actually carbohydrate intolerance with onset or first recognized during pregnancy. Diabetes due to other causes e.g. genetic defect or medication induced [1].

Diabetes prevalence is continuously growing all over the world. Type 2 diabetes constitute about 85% to 95% of the diabetic population in the developed countries and even higher in the developing countries. In 2003, 194 million people having age between 20 to 79 years are diabetic and a quarter of them belong to developing countries. There is a rapid increase in the prevalence of diabetes in Asian countries.

The treatment strategy for DM is dependent on the degree of its severity and types. In type I only insulin is administered because it is essential for DM type I cases. On the other hand, for the management of DM type II both the pharmacological and non-pharmacological approaches are applied. Pharmacological approach involves medication therapy while in non-pharmacological weight reduction, exercise; reduce alcohol intake and reductions of smoking as beneficial [2]. One half of all the medicines that are prescribed, dispensed and sold improperly worldwide while half of the patients failed to take the drugs properly while 1/3rd of them failed to access to essential drug list that is why it is necessary to introduce drug use pattern and to focus the irrational prescribing pattern during drug prescribing [3]. The efficacy and well-being of treatment that results in persistence of disease impairment interpret the patient to increase cost of therapy is due to improper prescription. Deals between pharmaceutical firm and health care practitioner can affect

the drug use pattern that ultimately results in irrational prescription. Round the world improper use of drugs has grown to be a comprehensive dilemma. Improper use of drug will lead to failure of treatment, resistance and toxicity of drug as well as affect the quality of drug therapy [4].

Drug use pattern is the process of prescribing, distribution, dispensing and usage of drug by the patients. To asses drug use pattern is essential for clinical, informative and financial rationale. Proper use of drug has an enormous contribution in reduction of death and diseases all over the world due to its subsequent checkup, public and economical reimbursement [5]. Treatment with drug is a general practice to cure a disease though drug use pattern are mostly inappropriate and there is a need for registration of drug use pattern that is essential to improve prescribing pattern. In developing world drugs are not mostly prescribed to their recommended guidelines majority of the practitioner are suspected to optimistic and pessimistic pressure from patients and are also exposed to marketable connection. The pattern of drug use is different in different countries. Problems related to drug use may be due to practitioner, distributer, and consumer and may be due to health care facility that further worsens the medication management [6]. The WHO published its first report on essential drug in 1977. Essential drugs are those drugs that accomplish the health concerns need of majority of the population and these should be available all the times in proper amount and in proper amount and right dosage form. These medicines include tools required to battle against disease.

Essential drugs are those that accomplish the health concern needs of the majority of the population; they should therefore be available at all times, in adequate amounts and in the right dosage forms [7]. Essential drugs include one of the tools needed to battle against disease [8]. In developing world this idea was introduced to pace up the affirmative impacts of drugs on health condition. A study was conducted in a tertiary care hospital at Dehadun in India, on prescribing pattern in DM patients. A total of 312 prescriptions were examined from which the ratio of 1.04:1 was found between male female and 129 patients were having family history of DM and average duration was 7.92 ±0.37. About 17.35%, 12.8%, 7.25%, 3.38% and 5.5% were found of anti-diabetic, antihypertensive, multi- vitamin, Antplatelet, statins, and miscellaneous drugs were prescribed in a complete of 1242 drugs. Metformin, glimepiride followed by pioglitazone, acarbose, gliclazide, sitagliptin, glibenclamideand insulin from antidiabetic class with percentage of 40.99%, 34.23%, 6.76%, 4.95%, 4.5%, 4.5%, 2.25% and 1.8% of drugs were prescribed and about 99.03% of oral drugs were also prescribed from anti diabetic class of drugs. It was also found that in total of 1242 drugs, 288 drugs were prescribed from essential drugs list and no drugs were recommend with generic names all drugs were prescribed with brand titles and metformin and glimepiride was the most frequently recommended drugs. It was concluded from the study that there is need in writing of prescription to increase rational prescriptions [9]

2. Methodology

2.1. Study Deisgn

The evaluation and assessment of quality of health care is receiving worldwide attention and drugs play an important role in the health care delivery system. The most effective way for evaluating medication use within the health care system is the usage of core indicators proposed and validated by WHO. These core indicators includes, average number of drugs per patient prescription, percentage of drugs prescribed by their generic names, percentage of prescriptions with antibiotic prescribed, percentage of prescriptions with injections prescribed and percentage of drugs prescribed from essential drugs list, for these finding we followed the method followed by [10][11]. But our study collection was in admitted patients so we little bit modify these core indicators for our desired findings.

2.2. Data Collection

Data were collected in Medical Ward of Khyber Teaching Hospital Peshawar from January, 2015 to April, 2015 (approximately 110 days). Patient's medications history charts were studied with the permission of concerned physicians. Complete patient medical history was collected on prescribed questionnaire "Dr Z Clinical Pharmacotherapeutics Patient Case History Form" in Medical ward of Khyber Teaching Hospital Peshawar. The form was little bit modified, for the concerned findings i.e. WHO Core Indicators.

2.3. WHO Core Indicators

WHO core indicators were determined through the following ways;

i. Average number of drugs per patient medications chart = Total number of drugs prescribed / Number of medication charts.
ii. Percentage of drugs prescribed by generic name = Number of generic drugs prescribed /Total number of drugs ×100.
iii. Percentage of patient medications charts with antibiotics prescribed = Total number of charts with antibiotics prescribed / total number of charts.
iv. Percentage of patient medications charts with injections prescribed = Total number of charts with injections /total number of charts.
v. Percentage of drugs prescribed from EDL = Total number of drugs from EDL /Total number of all drugsprescribed ×100

These methods were used and followed by [10] [11].

3. Results and Discussion

Six Hundred and Fifty prescriptions were evaluated for WHO Core indicators among indoor hospitalized patients in government sector tertiary care hospital, Peshawar. After collection of data about DM, it was properly analyzed and rectified. Table 1; shows the demographic distribution of data among male and female and their age prevalence. Among these prescriptions 300 (46.15%) were male and 350 (53.84) were female. Among age, highest number of patients were in the range of 41-60 years while people having≥81(3.08%) year of age group were the lowest. Similarly in the drug utilization, 49.23% of the patients receiving medications within the range 6-8 drugs per prescription, while 9.23% received medications within≤ 5drugs per prescription. We also observed prescription that were receiving medication up to ≥12 drugs per prescription (9.23%).Similarly Table 2; shows results for WHO Core indicators, which revealed high percentages of injectable prescribed (45.25%) and encounters with antibiotics (17.13%). Similarly 93.10% of the drugs were prescribed from EDL, downloaded from health regulatory authority department of KPK, Pakistan, during this assessment. In the prescribing pattern most of the physicians prescribed medications on their brand name. In our current findings we found 5.40% of the drugs that were prescribed by their generic name. Table 3; shows anti-diabetic drugs utilization profile along with dosage form prescribed. The most utilized drugs were Insulin (57.69%) and Metformin (19.23%). While among dosage forms 45.2% of the medications were administered in Injectable dosage form while 39.4% were from Tablets.

Table 1: Patient Demographic Characteristics

Patients Demographic Data	*n*	*Percentage%*
Total	**650**	
Gender		
Male	300	46.15
Female	350	53.85
Age		
≤20	30	4.62
21-40	70	10.77
41-60	300	46.15
61-80	230	35.38
≥81	20	3.08

Total No. of Prescription Evaluated	650	
Total No. of drugs prescribed	5370	
No. of drugs per prescription	8.26	
≤ 5 drugs	60	9.23
6-8 drug	320	49.23
9-11 drugs	210	32.31
≥12 drugs	60	9.23

Table2: Assessment of WHO Core Indicators

WHO Core Indicators	***n***	**Percentage**
Availability of a copy of essential drug list at point of prescription	0	
Total number of drugs prescribed (No.of Prescription *n*= 650)	5370	
Encounter with antibiotics prescribed	920	17.13
Encounter with an injectable prescribed	2430	45.25
Drugs prescribed from Essential Drug List	5000	93.11
Drugs prescribed by Generic name	290	5.40
Average number of drugs per prescription	8.26	
Key Notes: *n*= Number of drugs, %= Percentage		

Diabetes Mellitus comprises a group of common metabolic abnormalities that share the phenotype of hyperglycemia [12]. In general, more risk of DM was found in the age group of 40-60. It has been reported and so many demographic studies that diabetes starts in old age in Pakistan although we evaluated a very few prescriptions, we just narrated and justify our findings on this base regarding age groups that a higher incidence of DM was found in 40-60years in accordance with previous studies [13] [14].

We are unable to state that DM more prevalence regarding gender. Previous studies respected high prevalence among male population. We evaluated 300 (46.15%) of males prescriptions and 350 (53.84%) that of females had diabetes mellitus, a little bit difference from the previous studies [13] [14]. The reason may be that our target population and population size and the other reason of diabetes more in females than in males may have be because of having no exercise facilities for females due to our norms and tradition.

Average number of drugs per prescription was 8.4 in our study which is deviating and much above the standard (1.6-1.8) derived to serve as ideal [15]. Probable reason for multiple drug therapy could be because of comorbid conditions in diabetic patients. Doctors should refrain from prescribing unnecessary medicines like multivitamins, minerals and enzymes unless absolutely required by the patient. The results obtained are higher than most of the studies conducted in Bareilly, Utharpardesh (UP), India, whose number of drugs per prescription was 5.97 [16][14]. The comorbid conditions as it was seen in our study where hypertension followed by coronary artery disease (CAD), chronic obstructive pulmonary disease (COPD), urinary tract infections (UTI) and congestive cardiac failure (CCF). The study of prescribing pattern and evaluation of the prescribing practice may recommend necessary modifications; similarly 5.40% drugs were prescribed by generic name in the present study, considering the standard derived to serve as ideal (100%) [15]. Our findings were 100% much lower than those reported by other researchers

[10]. The Reason for which could be many lucrative advertisements by the pharmaceutical companies, limited awareness about the prescribing guidelines of WHO by the prescribers, insufficient availability of generic drugs in pharmacy. Further, educational intervention methods and strict compliance to WHO drug policies could play a role in generic prescribing [1].

Percentage of encounters in which antibiotics were prescribed in our tertiary care center was 17.13%. This result is near to the (20.0%-26.8%) which were repeated by [15]. The optimum percentage of prescriptions with antibiotics shows that the doctors in our hospital are almost judiciously using antibiotics.

The percentage of encounters in which injections were prescribed was 45.25%. The results are somewhat comparable with previously reported (13.4%-24.1%) [10]. The possible reason for using high prescription of injections could be the psycho of the patients to get quick results and the trend of our clinical setup. In our community most of people when come to the clinics, they often told the doctors for injectable prescribing and administering. They have in their minds of relieve the signs quickly, but they are most unaware about their toxicities and complications. The use of injections is always expensive compared to other dosage forms moreover it requires trained personal for administration, unhygienic use of injections can increase the risk of transmission of potentially serious pathogens such as hepatitis, HIV/AIDS, and blood-borne diseases. So the percentage of injectable drugs should be ceased according to the standards.

The percentage of drugs prescribed from EDL was 93.10 % which is slightly less than standard (100%) to serve as ideal [15]. Low percentage of result could be because of decrease awareness among the doctors about EDL.

A number of studies carried out on prescribing pattern of ant diabetic drugs at global level concluded metformin to be the most common ant diabetic drug utilized for Type 2 DM. In uncontrolled cases, sulfonylureas or insulin was added as the combination therapy as per FDA Guidelines and WHO and metformin seems to be the first line drug followed [13][17] [18]. Our study shows insulin to be the most prescribed drug (57.69%) followed by metformin (19.23%), glaburide (7.69%) and sulphonylurea (3.85). The possible reason for result variation could be because of in our study most of the patients were DM1 which is insulin dependent while in previous study there were more number of DM2 patients which is non-insulin dependent.

The dosage form evaluation in this study shows injections are being prescribed mostly having percentage of 45.25%. Tablets with 39.48% are second most prescribed dosage form, Syrups with 7.08%, capsules 6.15% and nebulizer in low quantity about 2.05%.

Table 3: Anti-diabetic Drug Utilization and Types of dosage forms prescribed

Medications used for DM Management	***n***	Percentage%
Anti-diabetic Drugs	***520***	
Insulin	300	57.69
Metformin	100	19.23
Metformin +Glyburide	60	11.54
Glyburide	40	7.69
Sulphonyl Urea	20	3.85
Dosage Form Administered	***n***	Percentage %
Total Drugs	***5370***	
Injectable	2430	45.25
Tablets	2120	39.48
Syrups	380	7.08
Capsules	330	6.15
Nebulizers	110	2.05

4. Conclusion

The efforts of the prescriber can be successful and patient satisfaction can be achieved only if the patient receives rational treatment for his disease or illness. Irrationality in drug utilization and prescribing exists in most of the tertiary care setups that need utmost rectification and modification for rational clinical practices. We found irrational prescribing practices regarding drug utilization and disease management from our cross sectional prospective cohort studies that adversely affects the essential drug program and reflects the state of irrational drug prescribing pattern. This study will act as a feedback to the prescribers, so as to create awareness about the rational use of drugs. Thus poly-pharmacy prescribing by trade name, non-availability of drugs, encounters with antibiotic and injectable prescribing remains a problem in health facilities. It's a big dilemma especially in under developed countries. WHO recommend generic drug prescribing and from EDL avoiding the standard guidelines. The percentage of drugs prescribed from the EDL or formulary was less than optimal. Based on the finding of this study, Poly-pharmacy is obvious and lack of awareness of essential drugs list is seen in this study. The percentage of drugs prescribed by generic name was far away from the optimal value may be due to lucrative advertisements by the pharmaceutical companies, limited awareness about the prescribing guidelines of WHO by the prescribers, insufficient availability of generic drugs in pharmacy. Although the percentage of encounters with antibiotics prescribed found slightly lower

than the optimal but the use of injection is much higher from the standard recommended by WHO.

References

[1] A. Abidi, S. Gupta, S. Kansal and Ramgopal "Prescription auditing and drug utilization pattern in a tertiary care teaching hospital of western UP", IJBCP International Journal of Basic & Clinical Pharmacology., 1: 184-190, 2012.

[2] S. M. Grundy, I. J. Benjamin, G. L. Burke, A. Chait, R. H. Eckel, B. V. Howard, W. Mitch, S. C. Smith, J. R. Sowers, "Diabetes and Cardiovascular Disease, A Statement for Healthcare Professionals From the American Heart Association" AHA Scientific Statement , 2016.

[3] J. P. Marshner, P. Thurmann, S. Harder, " Drug utilisation review on a surgical intensive care unit", Int J Clin Pharmacol Ther., 32:447-451, 1994.

[4] S. C. Shivhare, H. K. Kunjwani, A. M. Manikrao, A. V. Bondre "Drugs Hazards and Rational Use of Drugs: A Review." J. Chem. Pharm. Res., 2: 106-112, 2010.

[5] T. Abula, M. Kedir, "The pattern of antibiotic usage in surgical in-patients of a teaching hospital, northwest Ethiopia," Ethiopian Journal of Health Development. 18:35-38, 2004.

[6] M. Najmi, R. Hafiz, I. Khan, F. Fazli, "Prescribing practices: An overview of 3 teaching hospitals in Pakistan", JPMA., 48:73–77, 1998.

[7] WHO Technical Report Series "The use of essential drugs" Sixth report of the WHO Expert Committee; Geneva 1995.

[8] WHO Technical Report Series "The use of essential drugs" Eighth report of the WHO Expert Committee; Geneva 2000.

[9] S. Dutta, M. A. Beg, M. Anjoom, A.Varma, S. Bawa, "Study on drug prescribing pattern in diabetes mellitus patients in a tertiary care teaching hospital at Dehradun, Uttarakhand", Int J Med Sci Public Health., 3: 1351-1354, 2014

[10] S. Sapkota, N. Pudasaini, C. Singh, S. Gc, "Drug prescribing pattern and prescription error in elderly: a retrospective Study of inpatient record", Asian Journal of Pharmaceutical and Clinical Research., 4:2011

[11] I. Tamuno and J. O Fadare, "Drug Prescription Pattern in a Nigerian Tertiary Hospital", Tropical Journal of Pharmaceutical Research February., 11: 146-152, 2012.

[12] S. Rajan, R. Sivakumar, J. Arunaprakash, "The study of plasma glycosylated hemoglobin and fibrinogen levels in patients with type 2 diabetes mellitus and its complication", Asian Journal of Diabetology., 7:9-12, 2005.

[13] D. K.Upadhyay, S. Palaian, Ravi, P. Shanker, P. Mishra, A.K. Sah, "Prescribing Pattern In Diabetic Outpatients In A Tertiary Care Hospital In Nepal" *J. Clin.Diag,Res*., 3:248-255, 2007.

[14] T. J. Wang, M. G. Larson, R. S. Vasan, S. Cheng, E.P. Rhee, E. McCabe, G. D. Lewis, C. S.Fox, P. F. Jacques, C. Fernandez, C. J. O'Donnell, S. A. Carr, V.K. Mootha, J.C. Florez, A. Souza, O. Melander, C. B. Clish and R. E. Gerszten, "Metabolite profiles and the risk of developing diabetes", Nature Medicine., 17: 448–453, 2011.

[15] A. O. Isah, D. Ross, J. Quick, R. Laing, A.F.B. Mabadeje, "Assessment of drug use pattern using WHO prescribing indicators at Hawassa University teaching and referral hospital, south Ethiopia: a cross-sectional study; ICUM/EDM/WHO", BMC Health Services Research.,13:170, 2013.

[16] Q. Ahmed, K. Sayedda, D. Gupta, N.Ansari, Ahmad, "WHO/INRUD drug use indicators at primary healthcare centers in Alexandria, Egypt", *J.Pharma. and Scient, Innov*.**,** 2: 41-46, 2013

[17] P. Bela, B. Oza, P. Kamlesh, Patel, D. Supriya, Malhotra, J.Varsha, Patel, " Pattern of antidiabetic drugs use in type-2 diabetic patients in a medicine outpatient clinic of a tertiary care teaching hospital" , *Int. J. Drug Dev. and Res.,* 2: 485-491, 2013

[18] K. S. Boyc, N. Yurgin, M. J. Lage, "Trends in the prescription of antidiabetic medications in France: evidence from primary care physicians", Adv Ther., 24:803–13, 2007.